Pre-Hospital Standard Patient Care Treatment Protocols

2022 Edition
Effective October 1, 2022

Lord Fairfax EMS Council, Inc.
180-1 Prosperity Drive
Winchester, Virginia 22602
Phone 540-665-0014 Fax 540-722-0094
www.lfems.vaems.org

TABLE OF CONTENTS

INTRODUCTION

The purpose of protocols in the Lord Fairfax EMS Council is to establish guidelines between EMS administration, the EMS provider, and medical direction for the management, treatment, and transport of specific medical and traumatic emergencies.

The protocols set forth are not designed nor intended to limit the EMS provider in the exercise of good judgment or initiative in taking reasonable action in extraordinary circumstances. These protocols are intended to assist in achieving excellent, consistent pre-hospital care for patients. The following protocols are not intended to provide a solution to every problem which may arise.

Pre-hospital care is a shared responsibility between the EMS provider and the physician. The services which EMS providers are authorized to perform pursuant to the Virginia Emergency Medical Services Regulations shall be performed by the EMS provider only pursuant to the written or verbal authorization of the EMS Physician or medical control. The National EMS Scope of Practice Model, the National EMS Education Standards (NEMSES) and the American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care shall be the reference for standard of care. In the Lord Fairfax EMS Council region, in all cases where written protocols, directives, and policies do not address patient care or disposition, these guidelines shall be the basis for patient care.

Our objective is not only to serve the people of our area, but also to give them our best possible service. We will measure up to the high standard required of emergency medical services only by coordinating our operations, working together, and maintaining a high degree of professionalism.

The following levels of EMS certification are recognized in the Lord Fairfax EMS Council region. EMS provider levels are referenced in the protocols based on the associated letter assigned by the Virginia Office of Emergency Medical Services. In Sections 1 and 4, a "•" indicates a procedure permitted at the designated level. A "**o**" indicates a procedure permitted at the level but typically reserved for another level (i.e., BLS procedure).

Level	Designation
Emergency Medical Responder	**EMR**
Emergency Medical Technician	**EMT**
Advanced EMT	**AEMT**
Intermediate	**INT**
Paramedic	**PM**

Protocol 1.1 – GENERAL – UNIVERSAL PATIENT CARE / INITIAL PATIENT CONTACT

- Protocols in Section 1 are designed to guide the EMS provider in the initial and ongoing approach to assessment and management of medical and trauma patients.
- The patient examination should focus on rapid assessment and interventions. On-scene management of high priority patients should be limited to stabilization of life-threatening problems. Other procedures should always be performed while en route to the hospital or a landing zone.
- The goal for on-scene time should not exceed ten (10) minutes for high priority trauma and medical patients. Shorter scene times are desirable for high priority patients. Rescue efforts for patients that are entrapped or have access / egress problems should be coordinated to minimize scene time.
- The receiving hospital should be notified as soon as possible to prepare for the patient.
- At any time, a provider is uncertain of how to best manage a patient, on-line **[Medical Control]** must be contacted for instruction.
- Rarely are emergent transports (red lights and sirens) required once the patient has been evaluated and treated. It is important that the AIC carefully evaluate the risks and benefits of an emergency transport to the hospital. The time saved transporting in an emergent mode is frequently very short. Furthermore, the time saved is unlikely to affect patient outcome. Ultimately, the mode of transportation decision is the responsibility of the AIC.

Protocol 1.2 – GENERAL – UNIVERSAL PATIENT CARE / SCENE SIZE-UP

	EMR	EMT	AEMT	INT	PM
1. Take appropriate standard precautions. Put on personal protective equipment as appropriate, including gloves, eye protection mask and gown.	●	●	●	●	●
2. Assess scene safety	●	●	●	●	●
a. Ensure personal protection on all scenes, especially those that involve motor vehicle collisions, toxic substances, potential for violence and unstable surfaces (e.g., slope, ice, water).	●	●	●	●	●
b. Protect the patient (e.g., environmental considerations)	●	●	●	●	●
c. Protect bystanders	●	●	●	●	●
3. Assess mechanism of injury and/or nature of illness.	●	●	●	●	●
a. Medical – determine nature of the illness from the patient, family, or bystanders. Why was EMS activated?	●	●	●	●	●
b. Trauma – determine the mechanism of injury from the patient, family, or bystanders, and inspection of the scene.	●	●	●	●	●
4. Determine total number of patients. Initiate a mass casualty plan if necessary and initiate triage.	●	●	●	●	●
5. Summon additional resources as necessary to manage the incident. Additional resources include, but are not limited to: – fire, rescue, advanced life support, law enforcement, utilities	●	●	●	●	●

Protocol 1.3 – GENERAL – UNIVERSAL PATIENT CARE / PRIMARY SURVEY

	EMR	EMT	AEMT	INT	PM
1. Form general impression of the patient. Consider appearance, work of breathing, and circulation to skin. If a life-threatening condition is found, treat immediately.	•	•	•	•	•
2. Assess patient's **mental status** (maintain spinal immobilization if needed)	•	•	•	•	•
a. **A**lert | Responds to **V**erbal stimuli | Responds to **P**ainful stimuli | **U**nresponsive to verbal / painful stimuli (no gag or cough)	•	•	•	•	•
b. If the victim is unresponsive with no breathing or no normal breathing (i.e., only gasping), see **CARDIAC ARREST – UNKNOWN RHYTHM (ADULT) or CARDIAC ARREST – UNKNOWN RHYTHM (PEDIATRIC)**.	•	•	•	•	•
3. Assess the patient's **airway** status. Provide manual in-line stabilization of the head and neck for suspected spinal injury.	•	•	•	•	•
a. Use head-tilt, chin lift or jaw thrust (suspected trauma) to open airway. Note: Do not hyperextend the neck in infants and small children.	•	•	•	•	•
b. Suction the airway as necessary.	•	•	•	•	•
c. Consider maintenance of the airway with an oropharyngeal or nasopharyngeal airway as necessary.	•	•	•	•	•
d. For a complete airway obstruction, see **RESPIRATORY DISTRESS – AIRWAY OBSTRUCTION**.	•	•	•	•	•
4. Assess the patient's **breathing**.	•	•	•	•	•
a. If respirations are inadequate, assist breathing by giving 1 breath every 5 to 6 seconds.	•	•	•	•	•
b. If respirations are adequate:	•	•	•	•	•
i. Consider oxygen with a nonrebreather mask at 15 L/minute.	•	•	•	•	•
ii. Consider oxygen with a nasal cannula at 2 to 6 L/minute.	•	•	•	•	•
5. Assess the patient's **circulation**.	•	•	•	•	•
a. Assess pulses at appropriate pulse points.	•	•	•	•	•
b. Check for and control major bleeding.	•	•	•	•	•
c. Check perfusion by evaluating skin color, temperature, and moisture.	•	•	•	•	•
6. Assess **disability** using the **GLASGOW COMA SCALE**.	•	•	•	•	•
7. **Expose** patient. Expose pertinent areas of the patient's body for examination.	•	•	•	•	•
8. Identify the priority of the patient based on assessment findings.	•	•	•	•	•
9. Determine patient disposition. Expedite transport for high priority patients.	•	•	•	•	•

Protocol 1.3 – GENERAL – UNIVERSAL PATIENT CARE / PRIMARY SURVEY

Key Points: PATIENT MANAGEMENT – PRIMARY SURVEY

- Consider neck injury while evaluating the airway in the following patients:
  - All deceleration injuries (vehicle accidents, falls).
  - All trauma victims who complain of neck pain.
  - All trauma victims with neck tenderness or deformity.
  - All non-alert patients with possible trauma.
  - In drowning, if there is no spontaneous breathing remove patient from the water immediately and begin resuscitation. Minimize in-water resuscitation.
- While evaluating breathing and circulation, expose the thorax, assess for, and manage life-threatening signs and symptoms:
  - Assure bilateral breath sounds.
  - Assess for jugular vein distention.
  - Assess for tracheal deviation.
  - Seal sucking wounds with gloved hand, then an occlusive dressing.
  - Splint flail segments with gloved hand, then a bulky dressing.
  - For tension pneumothorax, follow **THORACENTESIS, NEEDLE** protocol.

Protocol 1.4 – GENERAL – UNIVERSAL PATIENT CARE / SECONDARY SURVEY

	EMR	EMT	AEMT	INT	PM
1. Obtain vital signs, including, at minimum:	●	●	●	●	●
a. Respirations	●	●	●	●	●
b. Pulse	●	●	●	●	●
c. Blood pressure	●	●	●	●	●
d. Skin color, temperature, and moisture	●	●	●	●	●
2. Obtain chief complaint.	●	●	●	●	●
3. Obtain history of present illness and past medical history including:	●	●	●	●	●
a. S = signs and symptoms	●	●	●	●	●
b. A = allergies (medications, food and environmental)	●	●	●	●	●
c. M = medications (prescription, over-the-counter, vitamins, herbal, birth control, erectile dysfunction)	●	●	●	●	●
d. P = past medical history (medical, surgical, and trauma)	●	●	●	●	●
e. L = last oral intake (solid or liquid)	●	●	●	●	●
f. E = events leading to the injury or illness	●	●	●	●	●

Protocol 1.4 (Continued)

GENERAL – UNIVERSAL PATIENT CARE / SECONDARY SURVEY

	EMR	EMT	AEMT	INT	PM
4. OPQRST-ASPN history.					
a. O = Onset – time the signs or symptoms started	●	●	●	●	●
b. P = Provocative, palliative, and positioning	●	●	●	●	●
c. Q = Quality of the discomfort	●	●	●	●	●
d. R = Radiation	●	●	●	●	●
e. S = Severity – rate pain on 0 to 10 scale.	●	●	●	●	●
f. T = Timing – relating to onset, however, more definitive in regards to initial onset in the history.	●	●	●	●	●
g. AS = Associated symptoms.	●	●	●	●	●
h. PN = Pertinent negatives.	●	●	●	●	●
5. Conduct a physical examination (head-to-toe assessment)	●	●	●	●	●
a. Medical (unresponsive patient): perform a **rapid medical assessment** to determine life-threatening problems.	●	●	●	●	●
b. Trauma (significant MOI): perform **rapid trauma assessment** to determine life-threatening injuries. Perform a detailed physical examination en route to the hospital or at landing zone only after life-saving assessments and interventions are completed.	●	●	●	●	●
c. Other (medical and trauma): perform **focused physical examination** to assess specific body areas that relate to the patient's illness or injury.	●	●	●	●	●
6. Other assessment techniques.	●	●	●	●	●
a. Lung sounds		●	●	●	●
b. Cardiac rhythm monitoring				●	●
c. Obtain 12-Lead ECG (notify receiving hospital with a transmission or the machine's interpretation)	o	●	●	●	●
d. Pulse oximetry		●	●	●	●
e. Blood glucometry		●	●	●	●
f. Capnography		●	●	●	●
7. Record examination findings.	●	●	●	●	●

Protocol 1.5 – GENERAL – UNIVERSAL PATIENT CARE / REASSESSMENT

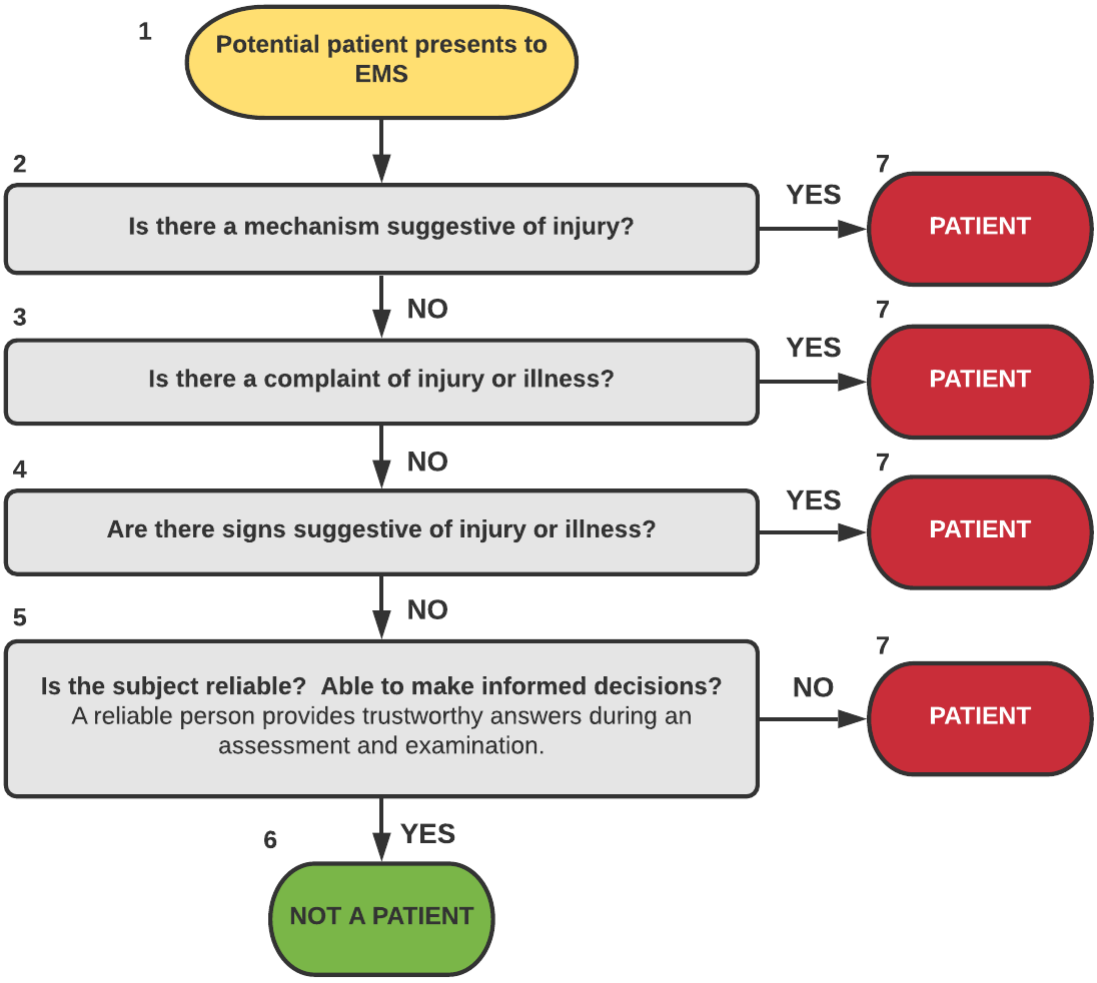
	EMR	EMT	AEMT	INT	PM
1. Repeat the **PRIMARY SURVEY**.	●	●	●	●	●
a. For a stable patient, repeat and record every 15 minutes.	●	●	●	●	●
b. For an unstable patient, repeat and record at a minimum every 5 minutes.	●	●	●	●	●
2. Reassess mental status.	●	●	●	●	●
3. Reassess airway.	●	●	●	●	●
4. Reassess breathing for rate and quality.	●	●	●	●	●
5. Reassess circulation including pulses, hemorrhage control, and skin perfusion.	●	●	●	●	●
6. Re-establish patient priority.	●	●	●	●	●
7. Reassess and record vital signs.	●	●	●	●	●
8. Repeat focused assessment regarding patient complaint or injuries.	●	●	●	●	●
9. Assess interventions.	●	●	●	●	●
a. Assess response to management.	●	●	●	●	●
b. Maintain or modify management plan.	●	●	●	●	●

Protocol 1.6 – PATIENT DETERMINATION (ALL INCIDENTS)

EMR	EMT	AEMT	INT	PM

Purpose:
To ensure that persons encountered by EMS Providers on all types of incidents are suitably determined to be a patient and subject to appropriate assessment and evaluation.

Considerations:
1. This protocol is applicable to all types of incidents in which EMS Providers may contact one or more persons with the potential for an illness and/or an injury.
2. The EMS Provider must make a reasonable attempt to determine whether any person involved in an incident, or for whom EMS was requested is sick or injured. This includes determining whether the patient can make an informed decision regarding treatment or transportation.
3. Whenever possible, obtain an informed "Patient Refusal" Patient Care Report (PCR). The approach towards patient determination must be very conservative to ensure that sick or injured patients are appropriately evaluated.



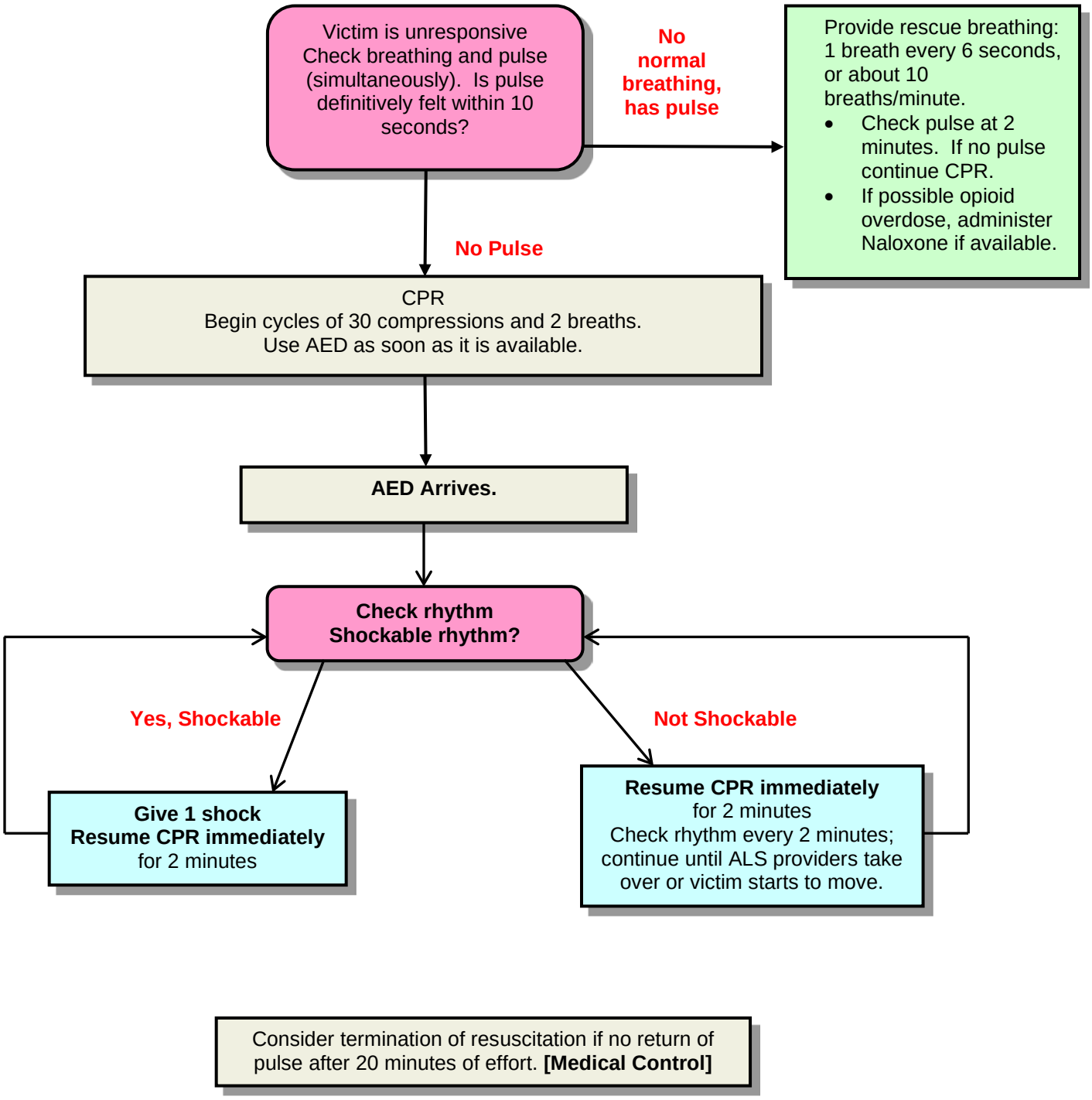
Protocol 1.6 – PATIENT DETERMINATION (ALL INCIDENTS)

EMR	EMT	AEMT	INT	PM

Procedure:

1. The algorithm is intended to be applied to individual potential patient contacts. During an incident with multiple potential patients, such as a multi-vehicle collision, it is expected that a reasonable effort will be made to identify all potential patients.
2. No protocol can anticipate every scenario. EMS Providers must use good judgement. **When in doubt as to whether a person presenting to EMS is a "patient", err on the side of caution and perform a full evaluation with appropriate documentation.**
3. Potential patients may present through a variety of means (**Box 1**). For example, a 9-1-1 call for service, a walk-in to the station, a public service call, or an event stand-by. In all circumstances, the EMS Provider has a duty to act, providing appropriate evaluation, treatment, and documentation.
4. The EMS provider must assess the scene to determine if there are indications suggestive of potential injury (**Box 2**). In cases where a third party is concerned the person may be sick or injured, the person should be considered a patient (**Box 2**).
5. EMS Providers should interview and assess each individual potential patient (**Boxes 3, 4**) to determine if there is a complaint of illness or injury. Furthermore, a focused examination should be performed to determine if there are any signs of illness or injury.
6. Various factors must be considered when determining that the patient is reliable and capable of making an informed decision (**Box 5**). Those factors include, but are not limited to:
    a. The person understands the nature of illness or injury or the consequences of refusal of care.
    b. The person is not intoxicated with drugs or alcohol.
    c. The person does not meet criteria for emergency custody in accordance with **Virginia Code §37.2-808** where the person has a mental illness and as a result of mental illness may cause serious physical harm to himself or harm to others, or suffer serious harm due to lack of capacity to protect himself from harm or to provide for his basic human needs and is in need of hospitalization or treatment, and is unwilling to volunteer or is incapable of volunteering for hospitalization or treatment.
7. At any point in the algorithm where the person is deemed a "patient," a complete evaluation should be performed (**Box 7**). Any patient refusing care and/or transportation requires a Patient Care Report (PCR) and an appropriately completed patient refusal.
8. Persons deemed "not a patient" do not require individual patient care reports (**Box 6**). Documentation is required for any incident in which one or more persons were interviewed by EMS Providers and determined to not be patients. The details of each interview are to be documented in the narrative. The name of each person interviewed should be listed in the narrative of the report.

NOTE: In cases of school bus or other bus type incidents, a copy of the passenger manifest may be substituted for an individual passenger listing in the narrative for all occupants deemed "not a patient." A signature of an authorized representative of the school system or third-party transportation company, who is responsible for the students / passengers, should be obtained.



Consider termination of resuscitation if no return of pulse after 20 minutes of effort. **[Medical Control]**

[1] For biphasic defibrillators, use the manufacturer's recommended energy dose (120 to 200 J). If the manufacturer's recommended dose is not known, deliver shocks at the maximum energy dose.

[2] Only EMS providers that have successfully completed local protocol training on the King LT airway are authorized to utilize the device. Other supraglottic airways are acceptable to utilize if approved by the Medical Direction Board.

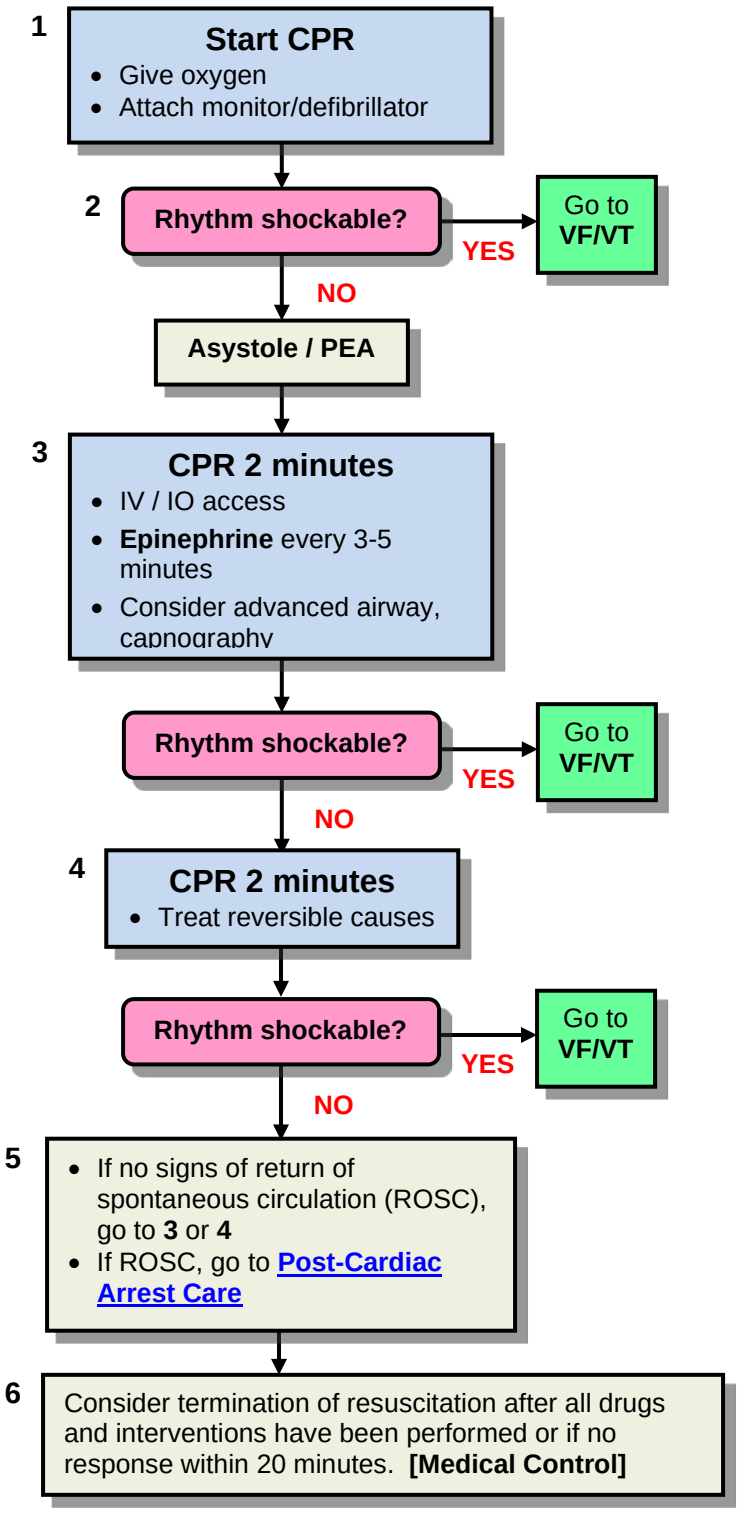
Key Points: CARDIAC ARREST – UNKNOWN RHYTHM

- The foundation of ALS care is good BLS care, beginning with prompt high-quality CPR and, for VF/pulseless VT, attempted defibrillation within minutes of collapse as soon as it can be accomplished.
- **The most critical interventions during the first minutes of VF or pulseless VT are immediate CPR, with minimal interruption in chest compressions, and defibrillation.**
- **Use the defibrillator as soon as it is available for all cardiac events.**
- When a rhythm check reveals VF / pulseless VT, CPR should be provided while the defibrillator charges (when possible), until it is time to "clear" the victim for shock delivery. Give the shock as quickly as possible. Immediately after shock delivery, resume chest compressions without delay and continue for 2 minutes and then check the rhythm.
- **Minimize the frequency and duration of interruptions in chest compressions to maximize the number of chest compressions delivered per minute (not more than 10 seconds).**
- **When providing ventilatory support, it is critical that ventilations not be given forcefully. Ten ventilations per minute (one breath every six seconds) is adequate while chest compressions are ongoing.**
- "Effective" chest compressions are essential for providing blood flow during resuscitation. To give "effective" chest compressions, "push hard and push fast." Compress the adult chest at a rate of 100 to 120 compressions per minute, with a compression depth of at least 2 inches (approximately 5 cm). Avoid excessive chest compression depths (greater than 2.4 inches [6 cm]). Allow the chest to recoil completely after each compression and allow approximately equal compression and relaxation times.
- Priorities for the pregnant woman in cardiac arrest are provision of high-quality CPR and relief of aortocaval compression. If the fundus height is at or above the level of the umbilicus, manual left uterine displacement can be beneficial in relieving aortocaval compression during chest compressions.
- If ALS care has been requested but is not available, consider transport after 10 minutes of CPR.
- Resuscitation may be terminated by BLS or ALS providers under the direction of **[Medical Control]** after 20 minutes of pre-hospital CPR.

Table 2.1.1. Summary of Key BLS Components for Adults, Children, and Infants

Maneuver	Recommendations		
Component	**Adult and Adolescents**	**Child (Age 1 Year to Puberty)**	**Infants (Age Less Than 1 Year, Excluding Newborns)**
Verifying Scene Safety	Make sure the environment is safe for rescuers and victim		
Recognizing Cardiac Arrest	Check for responsiveness No breathing or only gasping (i.e., no normal breathing) No definite pulse felt within 10 seconds (Breathing and pulse check can be performed simultaneously in less than 10 seconds)		
Activating Emergency Response System	***If a mobile device is available, phone emergency services (9-1-1)***		
	If you are alone with no mobile phone, leave the victim to activate the emergency response system and get the AED before beginning CPR. Otherwise, send someone and begin CPR immediately; use the AED as soon as it is available.	***Witnessed Collapse*** Follow steps for adults and adolescents on the left ***Unwitnessed Collapse, Single Rescuer*** Give 2 minutes of CPR Leave the victim to activate the emergency response system and get the AED. Return to the child or infant and resume CPR; use the AED as soon as it is available.	
Compression-Ventilation Ratio ***without advanced airway***	**1 or 2 Rescuers** 30:2	**1 Rescuer** → 30:2 **2 or More Rescuers** → 15:2	
Compression-Ventilation Ratio ***with advanced airway***	Continuous compressions at a rate of 100-120/minute **Give 1 breath every 6 seconds (10 breaths/minute)**	Continuous compressions at a rate of 100-120/minute Give 1 breath every 2-3 seconds (20-30 breaths/minute)	
Compression Rate	100-120/minute		
Compression Depth	At least 2 inches (5 cm)*	At least 1/3 AP diameter About 2 inches (5 cm)	At least 1/3 AP diameter About 1 ½ inches (4 cm)
Hand Placement	2 hands on the lower half of the breastbone (sternum)	2 hands or 1 hand (optional for very small child) on the lower half of the breastbone (sternum)	**1 Rescuer** 2 fingers in the center of the chest, just below the nipple line **2 or More Rescuers** 2 thumb-encircling hands in the center of the chest, just below the nipple line
Chest Recoil	Allow full recoil of chest after each compression; do not lean on the chest after each compression.		
Minimizing Interruptions	Limit interruptions in chest compressions to 10 seconds or less with a CCF goal of greater than 80%		
Defibrillation	Attach and use AED as soon as available. Minimize interruptions in chest compressions before and after shock; resume CPR beginning with chest compressions immediately after each shock.		

*Compression depth should be no more than 2.4 inches (6 cm).



High Quality CPR

- Push hard (≥2 inches) and fast (100-120/minute) and allow complete chest recoil
- Minimize interruptions in compressions
- Rotate compressor every 2 minutes
- Avoid excessive ventilation
- Quantitative waveform capnography
  - If $ETCO_2$ <10 mm Hg, attempt to improve CPR quality

Return of Spontaneous Circulation (ROSC)

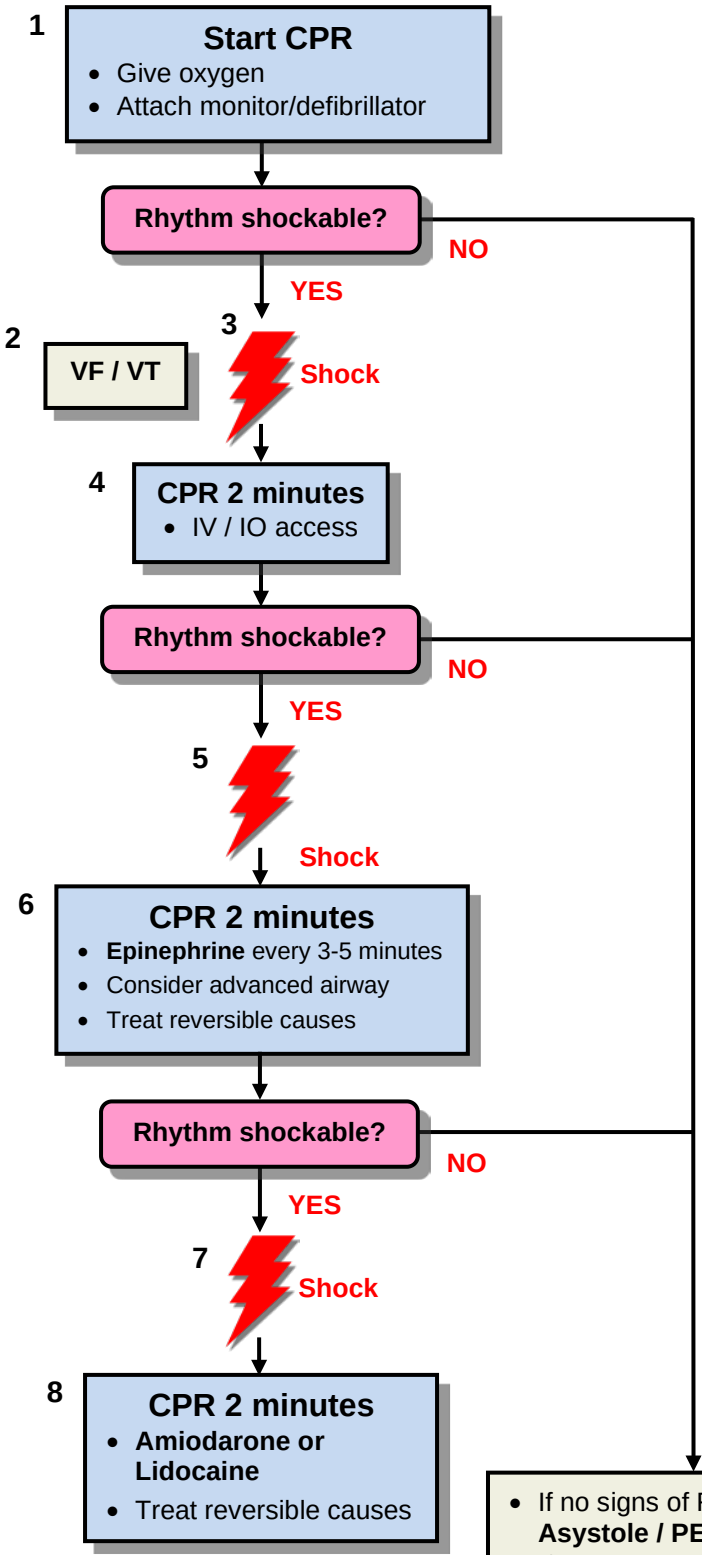
- Pulse and blood pressure
- Abrupt sustained increase in $ETCO_2$ (typically ≥40 mm Hg)

Drug Therapy

- **EPINEPHRINE IV / IO Dose:** 1 mg every 3-5 minutes

Advanced Airway

- Endotracheal intubation or King LT airway
- Waveform capnography required, if available, to confirm and monitor ET tube placement
- During CPR, ventilate one breath every 6 seconds **(MAX = 10 breaths / minute)** with continuous chest compressions



High Quality CPR

- Push hard (≥2 inches) and fast (100-120/minute) and allow complete chest recoil
- Minimize interruptions in compressions
- Rotate compressor every 2 minutes
- Avoid excessive ventilation
- Quantitative waveform capnography
  - If $ETCO_2$ <10 mm Hg, attempt to improve CPR quality

Shock Energy

- **Biphasic:** Manufacturer recommendation (120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.

Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in $ETCO_2$ (typically ≥40 mm Hg)

Drug Therapy

- **EPINEPHRINE IV / IO Dose:** 1 mg every 3-5 minutes
- **AMIODARONE IV / IO Dose:** 1st dose: 300 mg bolus; 2nd dose: 150 mg **or**
- **LIDOCAINE IV / IO Dose:** 1st dose: 1 – 1.5 mg/kg; 2nd dose: 0.5 – 0.75 mg/kg

Advanced Airway

- Endotracheal intubation or King LT airway
- Waveform capnography required, if available, to confirm and monitor ET tube placement
- During CPR, ventilate one breath every 6 seconds **(MAX = 10 breaths / minute)** with continuous chest compressions

- If no signs of ROSC, go to **Asystole / PEA**.
- If ROSC, go to **Post-Cardiac Arrest Care**

Consult **[Medical Control]** to consider termination of or continuation of resuscitative efforts after 20 minutes.

CARDIAC ARREST – V-FIB / PULSELESS V-TACH (ADULT)

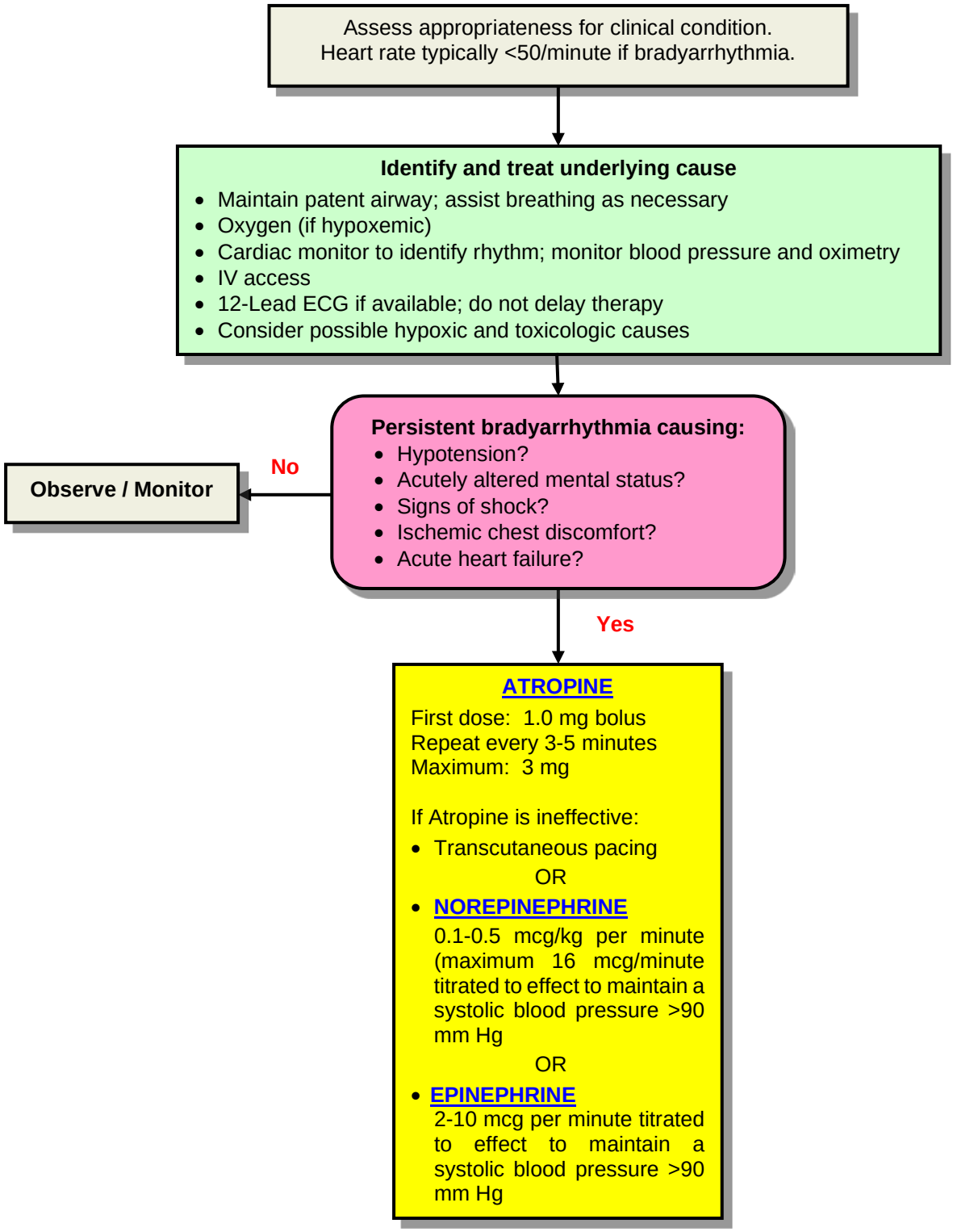
Scope	EMR	EMT	AEMT	INT	PM

Key Points: CARDIAC ARREST (GENERAL) – ADULT

- **Use the defibrillator as soon as it is available for all cardiac arrests.** Do not delay use of an AED, initial rhythm analysis or defibrillation to provide a period of chest compressions for patients in cardiac arrest.
- When VF / Pulseless VT cardiac arrest is associated with **torsades de pointes**, administer an IV / IO bolus of **MAGNESIUM SULFATE** **at a dose of 1 to 2 g** diluted in 100 mL Normal Saline.
- **The most critical interventions during the first minutes of VF or pulseless VT are immediate CPR, with minimal interruption in chest compressions, and defibrillation.**
- After an advanced airway is placed, rescuers no longer deliver "cycles" of CPR. Give continuous chest compressions without pauses for breaths. Give 10 breaths / minute. Check rhythm every 2 minutes.
- When a rhythm check reveals VF / Pulseless VT, CPR should be provided while the defibrillator charges (when possible), until it is time to "clear" the victim for shock delivery. Give the shock as quickly as possible. Immediately after shock delivery, resume CPR without delay and continue for 2 minutes and then check the rhythm.
- **Minimize the frequency and duration of interruptions in compressions to maximize the number of compressions delivered per minute.**
- **When providing ventilatory support, it is critical that ventilations not be given forcefully. Ten ventilations per minute (one breath every six seconds) is adequate while chest compressions are ongoing.**
- "Effective" chest compressions are essential for providing blood flow during CPR. To give "effective" chest compressions, "push hard and push fast." Compress the adult chest at a rate of 100-120 compressions per minute, with a compression depth of at least 2 inches (5 cm). Avoid excessive chest compression depths (greater than 2.4 inches [6 cm]). Allow the chest to recoil completely after each compression and allow approximately equal compression and relaxation times.
- Continuous waveform capnography is **required, if available,** in addition to clinical assessment to confirm and monitor correct placement of an endotracheal tube.
- Auditory or visual metronomes to guide providers in performing the recommended rate of chest compressions or ventilations are recommended.
- Routine use of Sodium Bicarbonate is not recommended for patients in cardiac arrest. In some special resuscitation situations, such as preexisting metabolic acidosis, hyperkalemia, or tricyclic antidepressant overdose, Sodium Bicarbonate can be beneficial after the initial ACLS drugs. Consider in patients with dialysis catheter or fistula.
- The routine use of cricoid pressure in cardiac arrest is not recommended.
- Use quantitative waveform capnography, if available, in intubated patients to monitor CPR quality, optimize chest compressions, and detect ROSC during chest compressions or when rhythm check reveals an organized rhythm. If $ETCO_2$ <10 mm Hg, consider trying to improve CPR quality by optimizing chest compression parameters. If $ETCO_2$ abruptly increases to a normal value (35 to 40 mm Hg), it is reasonable to consider that this is an indicator of ROSC.
- If patient converts from **shock refractory** VF / Pulseless VT and Amiodarone has NOT been given during the cardiac arrest, administer an infusion of AMIODARONE 150 mg IV over 10 minutes before starting the slow infusion at 1 mg/minute. **Post resuscitative drips should be in consultation with [Medical Control].**

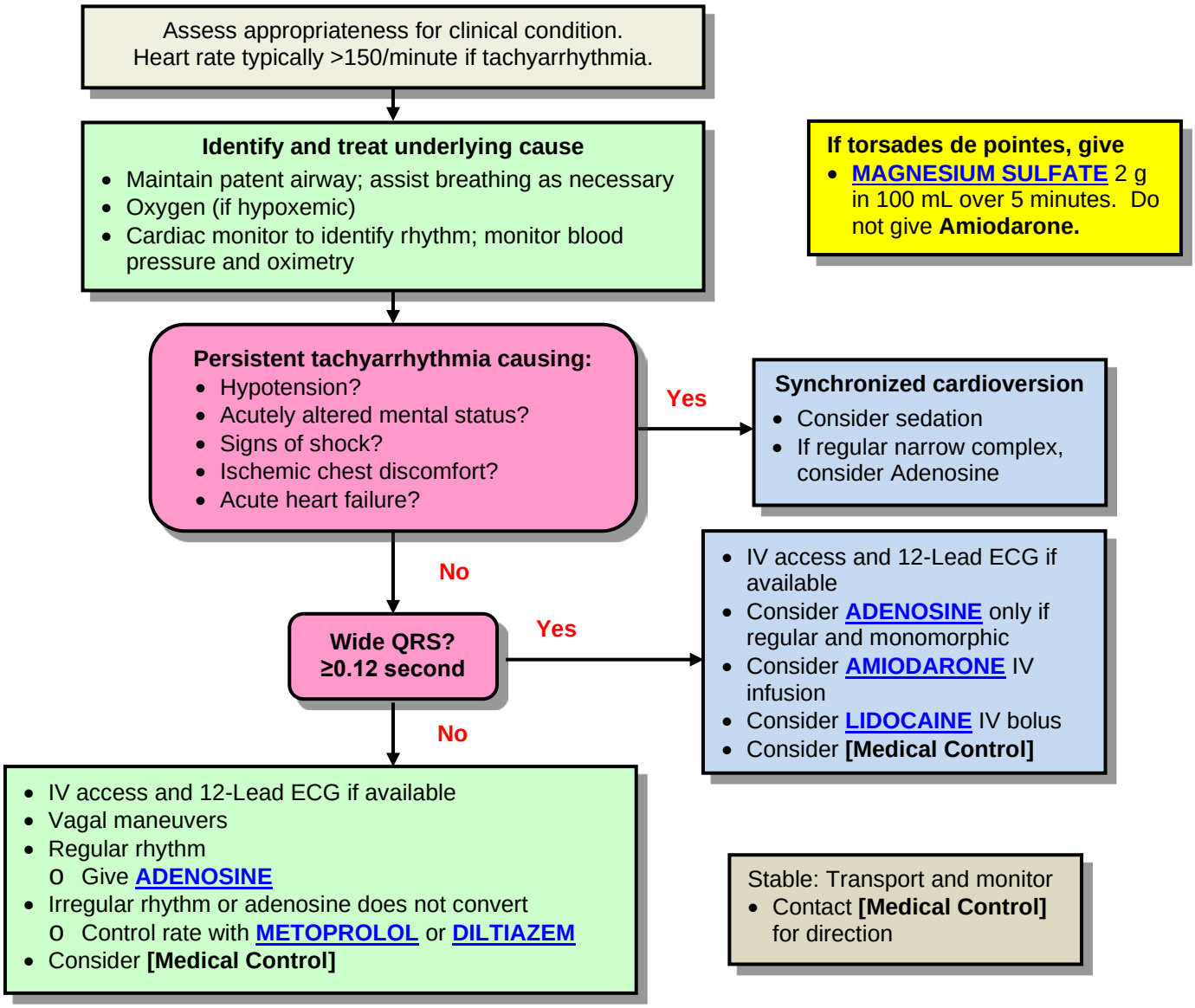
Search for and treat reversible causes.

- o Hypovolemia
- o Hypoxia
- o Hydrogen ion (acidosis)
- o Hypo-/hyperkalemia
- o Hypothermia
- o Hypoglycemia (Not AHA)
- o Tension pneumothorax
- o Tamponade, cardiac
- o Toxins
- o Thrombosis, pulmonary
- o Thrombosis, coronary



Key Points: BRADYCARDIA – ADULT

- Immediate pacing should be considered in unstable patients with high-degree AV block when IV access is not available.
- When bradycardia is the cause of symptoms, the rate is generally <50 beats per minute. A slow heart rate may be physiologically normal for some patients, whereas a heart rate of >50 beats per minute may be inadequate for others. Focus on management of clinically significant bradycardia (i.e., bradycardia that is inappropriate for the clinical condition).
- If pulseless arrest develops, go to the appropriate pulseless arrest algorithm.
- Because hypoxemia is a common cause of bradycardia, initial evaluation of any patient with bradycardia should focus on signs of increased work of breathing and oxyhemoglobin saturation as determined by pulse oximetry.
- While initiating treatment, evaluate the patient's clinical status and identify potentially reversible causes.
- If a toxicological etiology is identified as the cause of bradycardia, follow the appropriate toxicology protocol.
- If sedation is required, give **MIDAZOLAM** 2.5 mg to 5 mg slow IVP titrated to effect. May repeat dose every 5 minutes if needed.
- Transport as soon as possible. Only immediate stabilization measures should delay transport.
- Athletic patients may have sinus bradycardia as a normal presentation.



Synchronized Cardioversion
Initial recommended doses:
- Narrow regular: 50-100 J
- Narrow irregular: 120-200 J biphasic
- Wide regular: 100 J
- Wide irregular defibrillation dose (NOT synchronized)

ADENOSINE IV Dose:
- First dose: 6 mg rapid IV push; follow with NS flush.
- Second dose: 12 mg if required.

AMIODARONE IV Dose:
- First dose: 150 mg over 10 minutes. Repeat if needed if VT recurs. Follow by maintenance infusion of 1 mg/minute.

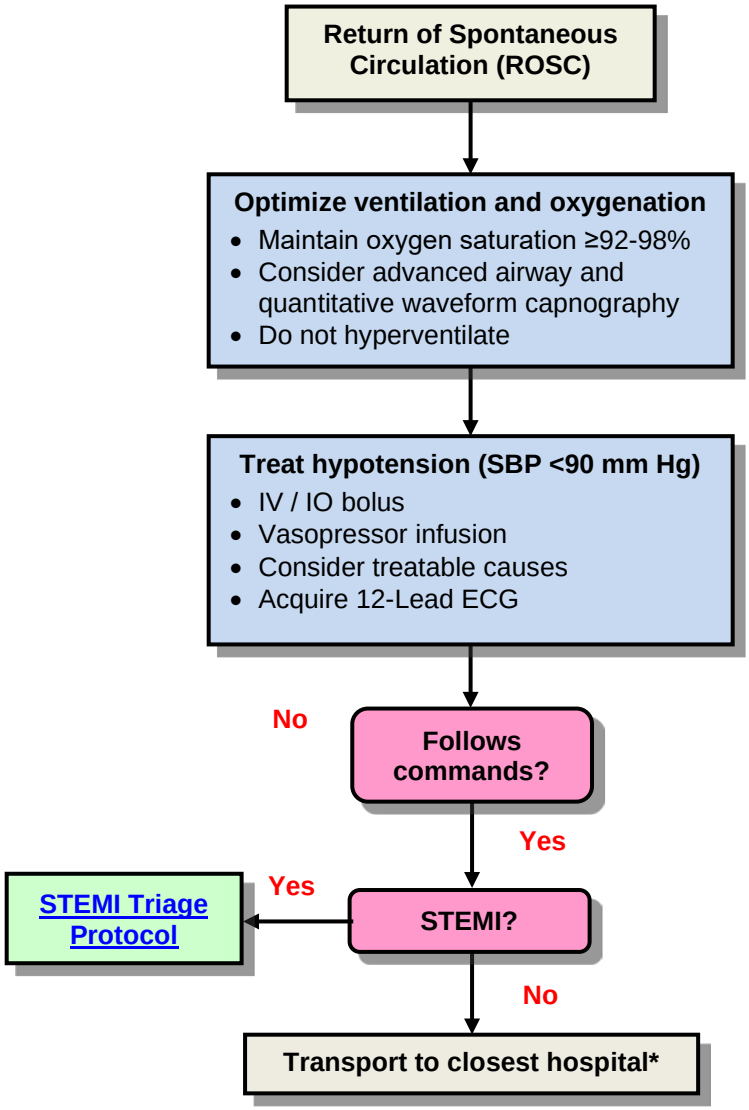
METOPROLOL IV Dose:
- First dose: 5 mg slow IV push. Repeat every 5 minutes to a maximum total dose of 15 mg to achieve a desired heart rate of less than 120.

DILTIAZEM IV Dose:
- First dose: 15-20 mg slow IV push over 2 minutes (maximum total dose 20 mg). Repeat dose 20-25 mg slow IV push in 15 minutes (maximum total dose 25 mg).

LIDOCAINE IV Dose:
- First dose: 1-1.5 mg/kg IV push.
- Second dose: 0.5-0.75 mg/kg IV push.

Key Points: TACHYCARDIA – ADULT

- Give Adenosine rapidly over 1 to 3 seconds through a large (e.g., antecubital) vein followed by a 10 mL Normal Saline flush and elevation of the arm.
- If possible, establish IV access before cardioversion and give **MIDAZOLAM** 2.5 mg to 5 mg slow IV push, titrated to effect, if the patient is conscious. May repeat every 5 minutes as needed for sedation. Do not delay cardioversion if the patient is extremely unstable.
- If available, obtain a 12-Lead ECG to better define the rhythm, but this should not delay immediate cardioversion if the patient is unstable.
- Adenosine is safe and effective in pregnancy. However, Adenosine does have several important drug interactions. Larger doses may be required for patients with a significant blood level of Theophylline, Caffeine, or Theobromine. The initial dose should be reduced to 3 mg in patients taking Dipyridamole or Carbamazepine or those with transplanted hearts.
- Adenosine should not be given for unstable or for irregular or polymorphic wide-complex tachycardias, as it may cause degeneration of the arrhythmia to VF.
- Patients with an atrial fibrillation duration of >48 hours are at increased risk for cardioembolic events, although shorter durations of atrial fibrillation do not exclude the possibility of such events. Electric or pharmacologic cardioversion (conversion to normal sinus rhythm) should not be attempted in these patients unless the patient is unstable.
- For **recurrent** VT with a pulse, consider a slow infusion of 150 mg **AMIODARONE** at 1 mg/minute IV. If Amiodarone has not been given prior to conversion of **recurrent** VT, administer an infusion of AMIODARONE 150 mg IV over 10 minutes before starting the slow infusion at 1 mg/minute. AMIODARONE is contraindicated if SBP <90 mm Hg.
- To perform synchronized cardioversion, provide an initial shock at the recommended energy dose. If there is no response to the first shock, increase the dose in a stepwise fashion (e.g., 100 J, 200 J, 300 J, 360 J). ***Providers should use the device-specific doses for synchronized cardioversion, as recommended by the monitor manufacturer. Following are the AHA recommendations.***
    - **Atrial Fibrillation** – Recommended initial biphasic energy dose for cardioversion is 120 to 200 J. If the initial shock fails, increase the dose in a stepwise fashion.
    - **SVT and Atrial Flutter** – Recommended initial biphasic energy dose for cardioversion of 50 J to 100 J is often sufficient. If the initial 50 J shock fails, increase the dose in a stepwise fashion.
    - **Monomorphic VT (with pulse)** – Recommended initial biphasic energy dose for cardioversion is 100 J. If there is no response to the first shock, increase the dose in a stepwise fashion.
    - **Polymorphic VT (such as torsades de pointes)** – Treat the rhythm as VF and deliver high-energy unsynchronized shocks (i.e., defibrillation doses).
- If cardioversion is needed and it is impossible to synchronize a shock (e.g., the patient's rhythm is irregular), use high-energy unsynchronized shocks.
- Check pulse and rhythm after each synchronized shock. Ensure monitor remains in ""SYNC" mode for subsequent shocks.
- If the 360 J shock does not convert a dysrhythmia, contact **[Medical Control]** for direction.



Ventilation / Oxygenation

- Start at 10 breaths/minute and titrate to target $ETCO_2$ of 35-45 mm Hg. Avoid excessive ventilation.
- Titrate oxygen to minimum necessary to achieve SpO_2 ≥92-98%.
  - o Start with 100% oxygen during the CPR phase
  - o After ROSC, rapidly reduce oxygen flow to the BVM until at room air or SpO_2 ≥94%.

IV Bolus for Hypotension

1 to 2 liters Normal Saline titrated to a systolic blood pressure of 90 mm Hg.

Norepinephrine Infusion

0.1-0.5 mcg/kg per minute titrated to maintain a systolic blood pressure >90 mm Hg.

Epinephrine Infusion

0.1 to 0.5 mcg/kg per minute titrated to maintain a systolic blood pressure >90 mmHg

Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia
- Hypoglycemia (not AHA)
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

CARDIAC ARREST – DETERMINATION OF DEATH (ALL AGES) / WITHHOLDING RESUSCITATIVE EFFORTS — Protocol 2.7

Scope	EMR	EMT	AEMT	INT	PM

Resuscitation efforts are to be withheld on patients in cardiopulmonary arrest in accordance with the criteria listed below.

- Patient has a valid Do Not Resuscitate (DNR) or Physician Order For Scope Of Treatment (POST) order in accordance with Virginia DDNR Regulations.
- Situations where attempts to perform CPR would place the rescuer at risk of serious injury or death.
- Clinical signs of obvious, irreversible death:
  - Decomposition.
  - Signs of rigor mortis such as rigidity or stiffening of muscular tissues and joints in the body, which occurs any time after death and usually appears in the head, face, and neck muscles first.
  - Obvious signs of venous pooling in dependent body parts, lividity such as mottled, bluish-tinged discoloration of the skin, often accompanied by cold extremities.
  - Decapitation.
  - Incineration of the torso and/or head.
  - Massive crush injury and/or penetrating injury with evisceration of the heart, and/or brain.
  - Gross dismemberment of the trunk.
  - Traumatic Arrest unwitnessed.
- Multi-system trauma victim(s) without vital signs on the scene should not have CPR started. Adult and pediatric patients found dead at the scene of a trauma are not to be resuscitated unless they have a viable ECG rhythm (INT, PM), are hypothermic, recently drowned, or electrocuted.

Procedure: When it is undetermined that the patient is a candidate for resuscitation or **[Medical Control]** has ordered discontinuation of resuscitative efforts, take the following steps.

1. Look, listen, and feel for breathing for one minute.
2. Check for a carotid pulse AND check one additional pulse point (i.e., femoral, radial).
3. Listen for heart sounds with a stethoscope.
4. When **immediately available on the scene**, attach a cardiac monitor to check for a **viable** ECG rhythm **[INT, PM]**.

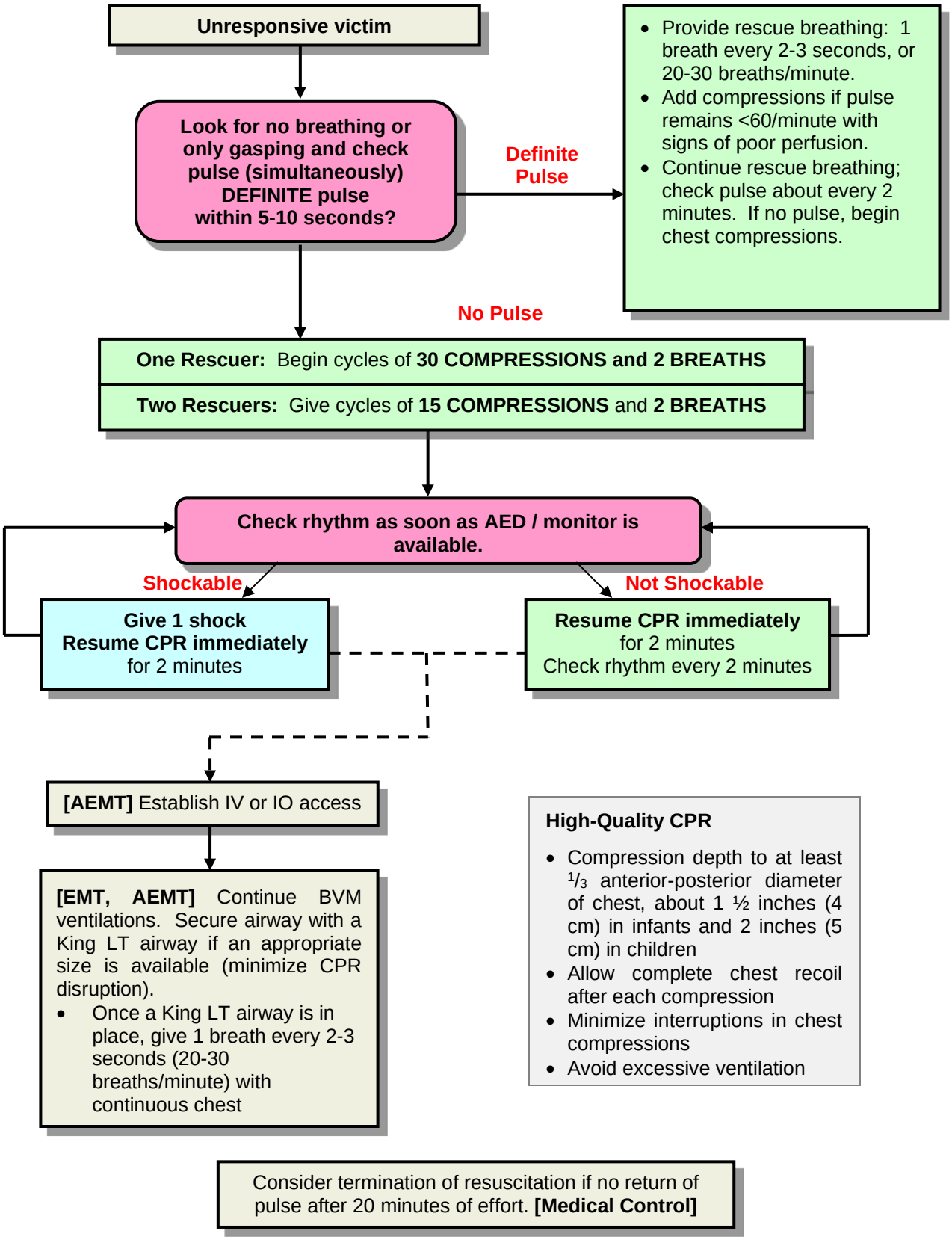
It is preferable these steps be performed by two (2) EMS Providers. Ideally, the assessments are performed by providers who are highly trained and experienced. Both providers must agree with the determination of death. If there's any disagreement, resuscitation is immediately initiated.

Once the death determination has been made, see **DECEASED PATIENT GUIDELINES**.

ETIOLOGY	INTERVENTION
Anaphylaxis	**Cardiac Arrest (BLS)**: Immediate use of an **EPINEPHRINE AUTO-INJECTOR** is recommended. **Cardiac Arrest (ALS)**: Standard ALS approach. Administer Epinephrine as soon as possible. *Adjuvant use of antihistamines, inhaled β-adrenergic agents, and IV corticosteroids has been successful in management of the patient with anaphylaxis and may be considered in cardiac arrest due to anaphylaxis. (Class IIb, LOE C)* **Post-Resuscitation:** *IV infusion of Epinephrine is a reasonable alternative to IV boluses for treatment of anaphylaxis in post-arrest management. (Class IIb, LOE C).*
Asthma	**Cardiac Arrest:** Standard BLS and ALS algorithms with the following considerations. Administer Epinephrine as soon as possible. 1. A ventilation strategy of low respiratory rate and tidal volume is reasonable. 2. During arrest, a brief disconnection from the bag-valve mask may be considered and compression of the chest wall to relieve air-trapping can be effective. 3. Consider 20 mL/kg Normal Saline bolus.
Benzodiazepines	**Cardiac Arrest:** Standard BLS and ALS algorithms (antidotes are not indicated).
Beta-Blockers	**Cardiac Arrest:** Standard BLS and ALS algorithms (antidotes are not indicated). **Post-Resuscitation:** For symptomatic presentation, follow the **BRADYCARDIA** protocol. Other therapeutic options include: **GLUCAGON** or **CALCIUM GLUCONATE** (preferred) or **CALCIUM CHLORIDE**.
Calcium Channel Blockers	**Cardiac Arrest:** Standard BLS and ALS algorithms (antidotes are not indicated). **Post-Resuscitation:** For symptomatic presentation, follow the **CALCIUM CHANNEL BLOCKER OVERDOSE** protocol.
Cocaine	**Cardiac Arrest:** Standard BLS and ALS algorithms (antidotes are not indicated). **Post-Resuscitation:** For symptomatic presentation, follow the **STIMULANT OVERDOSE** protocol.
Cyanide / Smoke Inhalation	**Cardiac Arrest:** Administration of **HYDROXOCOBALAMIN** is recommended.
Digoxin (and Related Cardiac Glycosides)	**Cardiac Arrest:** Standard BLS and ALS algorithms (antidotes are not indicated).

ETIOLOGY	INTERVENTION
Drowning	**Cardiac Arrest:** DO NOT use abdominal thrusts or the Heimlich maneuver for drowning victims. **Post-Resuscitation:** All victims of drowning who require any form of resuscitation (including rescue breathing alone) should be transported to the hospital for evaluation and monitoring, even if they appear to be alert and demonstrate effective cardiorespiratory function at the scene.
Hyperkalemia (Suspected)	**Cardiac Arrest:** Standard BLS and ALS algorithms. Additionally, consider administration of **CALCIUM GLUCONATE** (preferred) or **CALCIUM CHLORIDE** to stabilize myocardial cell membrane and **SODIUM BICARBONATE** to shift potassium into the cells.
Hypoglycemia	**Cardiac Arrest:** Standard BLS and ALS algorithms. **DEXTROSE** should only be administered in the following circumstances. 1. Neonatal resuscitation (see algorithm). 2. Pediatric cardiac arrest (see algorithm). **Note:** Assessment of venous or capillary blood glucose is unreliable during cardiac arrest. **Post-Resuscitation:** Consider titrating **DEXTROSE** to achieve the specific therapeutic goals of restoring normal blood sugar levels. Avoid hyperglycemia.
Opioids	**Cardiac Arrest:** Standard BLS and ALS algorithms. **Post-Resuscitation:** Consider **NALOXONE** to achieve the specific therapeutic goals of reversing the effects of long-acting opioids. Follow Post Resuscitation Protocol and **Opioid Overdose Protocol**.
Pregnancy (Twenty Weeks and Above)	**Cardiac Arrest:** Perform high-quality CPR with increased emphasis on airway management and oxygenation, due to increased susceptibility for hypoxia during pregnancy. If the fundus height is at or above the level of the umbilicus, manual lateral uterine displacement can be beneficial in relieving aortocaval compression during chest compressions. Contact **[Medical Control]** to consider transport to the hospital for perimortem cesarean delivery at four (4) minutes after onset of cardiac arrest or resuscitative efforts (for unwitnessed arrest) if there is no ROSC.
Tricyclic Antidepressants	**Cardiac Arrest**: Administration of **SODIUM BICARBONATE** may be considered. **Post-Resuscitation**: For symptomatic presentation, follow the **TRICYCLIC ANTIDEPRESSANTS OVERDOSE** protocol.

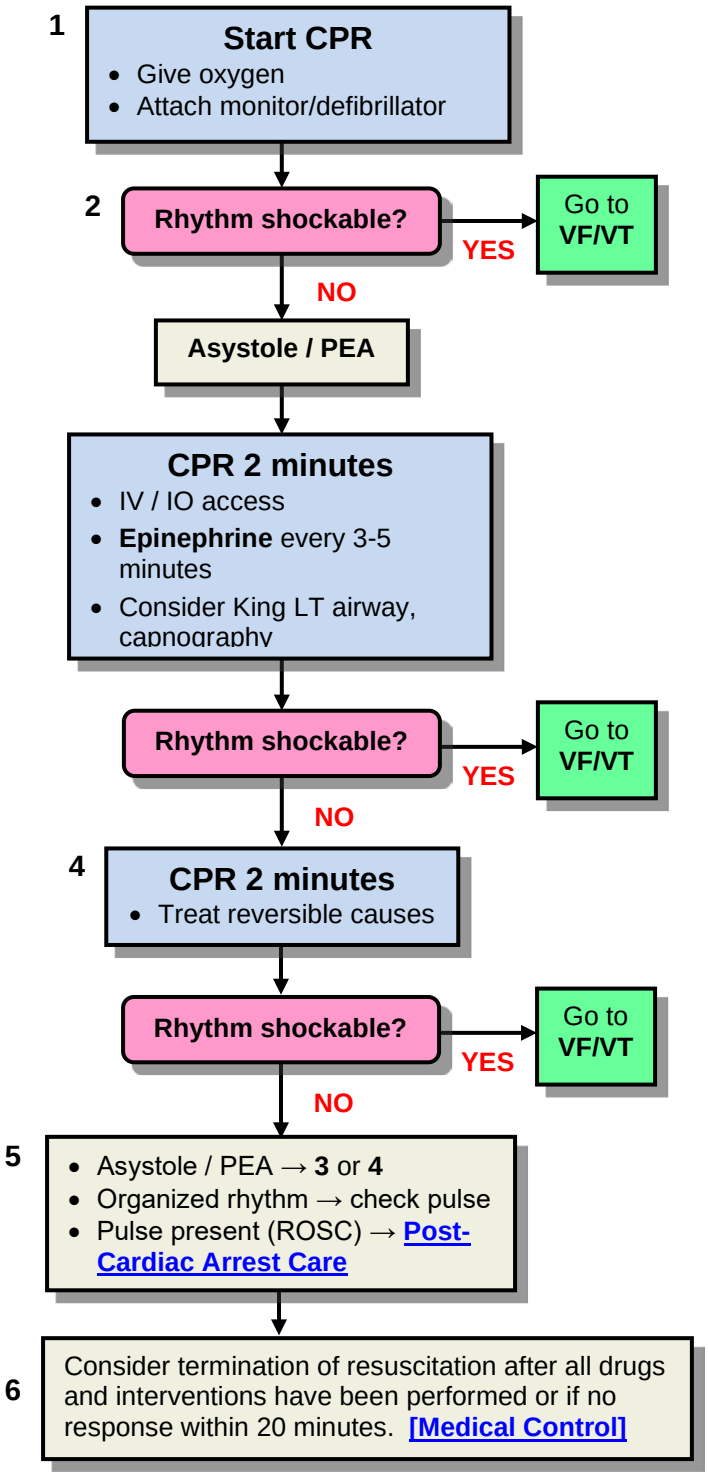
Scope: EMR | EMT | AEMT | INT | PM



Scope	EMR	EMT	AEMT	INT	PM

Key Points: CARDIAC ARREST – PEDIATRIC

- **The most critical interventions during the first minutes of VF or Pulseless VT are immediate CPR, with minimal interruption in chest compressions, and defibrillation.**
- Attempt defibrillation immediately. The earlier you attempt defibrillation, the more likely the attempt will be successful.
- Provide CPR until the defibrillator is ready to deliver a shock. Resume CPR, beginning with chest compressions, immediately after shock delivery.
- **Minimize the number of times that chest compressions are interrupted.**
- "Effective" chest compressions are essential for providing blood flow during CPR. Good chest compressions require an adequate compression rate (100-120 compressions per minute), an adequate compression depth (about one third to one half of the anterior-posterior diameter), full recoil of the chest after each compression, and minimal interruptions in compressions.
- Use of an AED for infants: For infants, manual defibrillator is preferred to an AED. If a manual defibrillator is not available, an AED equipped with a pediatric dose attenuator is preferred. If neither is available, an AED without a pediatric dose attenuator may be used.
- Use of a length-based resuscitation tape and/or other pediatric resources for quick references are preferred during pediatric resuscitation efforts.
- Resuscitation may be terminated by BLS or ALS providers under the direction of **[Medical Control]** after 20 minutes of pre-hospital CPR.



High Quality CPR

- Push hard (≥1/3 of anterior-posterior diameter of chest) and fast (100-120/minute) and allow complete chest recoil
- Minimize interruptions in compressions
- Rotate compressor every 2 minutes
- Avoid excessive ventilation
- Quantitative waveform capnography
  - If $ETCO_2$ <10 mm Hg, attempt to improve CPR quality

Drug Therapy

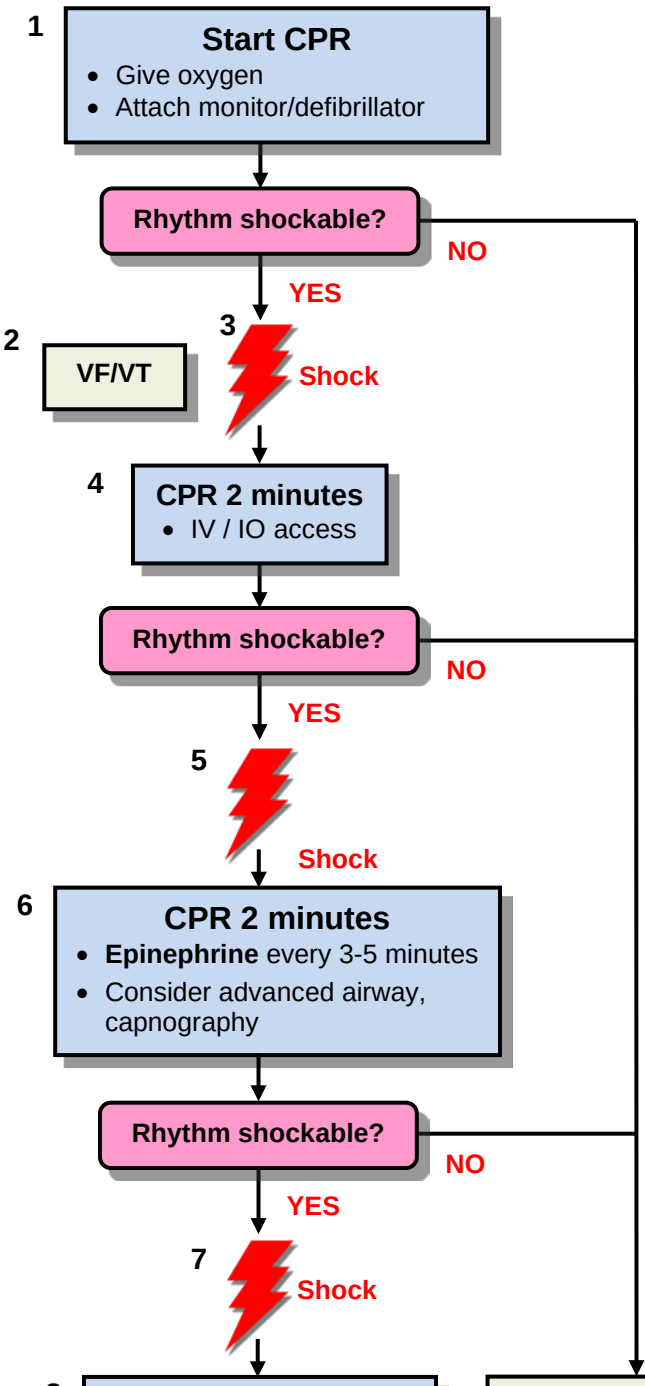
- **EPINEPHRINE IV / IO Dose:** 0.01 mg/kg (0.1 mL/kg of 1:10,000 concentration). Repeat every 3-5 minutes.

Advanced Airway

- King LT airway or Endotracheal Intubation
- Quantitative waveform capnography required, if available, recommended to confirm and monitor airway placement
- Once advanced airway in place give 1 breath every 2-3 seconds (20-30 breaths per minute)

Reversible Causes

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



High Quality CPR

- Push hard (≥1/3 of anterior-posterior diameter of chest) and fast (at least 100/minute) and allow complete chest recoil
- Minimize interruptions in compressions
- Avoid excessive ventilation
- Rotate compressor every 2 minutes

Shock Energy for Defibrillation

First shock 2 J/kg, second shock 4 J/kg, subsequent shocks ≥4 J/kg, maximum 10 J/kg, or adult dose.

Drug Therapy

- **EPINEPHRINE IV / IO Dose:** 0.01 mg/kg (0/1 mL/kg of 1:10,000 concentration). Repeat every 3-5 minutes.
- **AMIODARONE IV / IO Dose:** 5 mg/kg bolus during cardiac arrest. May repeat up to 2 times for refractory VT / pulseless VT. Maximum dosage 300 mg. **or**
- **LIDOCAINE IV / IO Dose:**
- 1st dose: 1 mg/kg; 2nd dose: 0.5 mg/kg

Advanced Airway

- King LT airway or Endotracheal Intubation
- Quantitative waveform capnography required, if available, to confirm and monitor airway placement
- Once advanced airway in place give 1 breath every 2-3 seconds (20-30 breaths per minute)

Reversible Causes

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

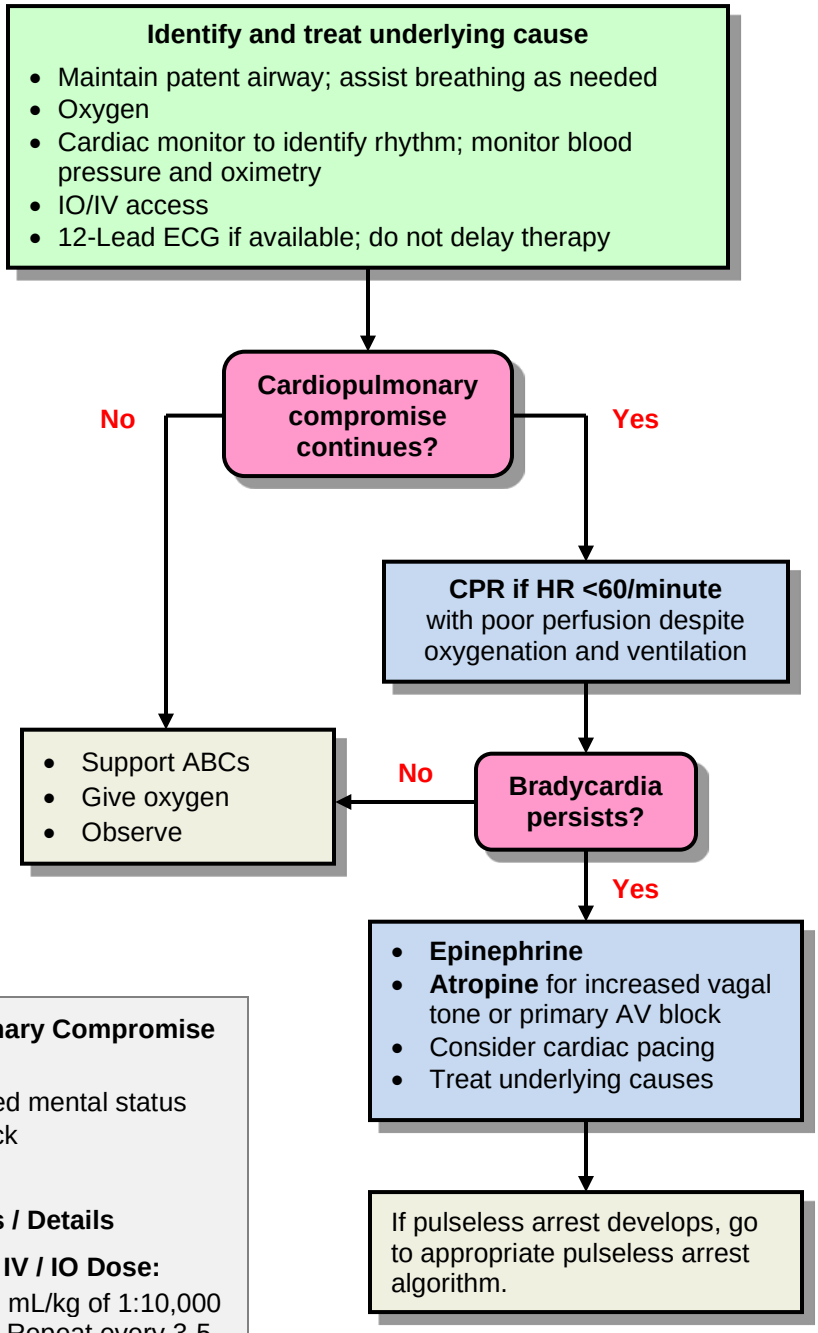
- If no signs of ROSC, go to **Asystole/PEA**.
- Organized rhythm→ check pulse
- Pulse present (ROSC)→ Post-Cardiac Arrest Care

Consider termination of resuscitation after all drugs and interventions have been performed or if no response within 20 minutes [Medical Control].

Key Points: CARDIAC ARREST – PEDIATRIC

- Use of a length-based resuscitation tape and/or other pediatric resources for quick references are preferred during pediatric resuscitation efforts.
- Consider **MAGNESIUM SULFATE** **25-50 mg/kg IV / IO, maximum 2 g for torsades de pointes** diluted in 100 mL Normal Saline.
- The most common ECG findings in infants and children in cardiac arrest are asystole and PEA. PEA is organized electrical activity—most commonly slow, wide QRS complexes—without palpable pulses. Less frequently there is a sudden impairment of cardiac output with an initially normal rhythm but without pulses and with poor perfusion. This subcategory is more likely to be treatable.
- **The most critical interventions during the first minutes of VF or Pulseless VT are immediate CPR, with minimal interruption in chest compressions, and defibrillation.**
- Attempt defibrillation immediately. The earlier you attempt defibrillation, the more likely the attempt will be successful.
- Provide CPR until the defibrillator is ready to deliver a shock. Resume CPR, beginning with chest compressions, immediately after shock delivery.
- **Minimize the number of times that chest compressions are interrupted.**
- Rhythm checks should be brief, and pulse checks should generally be performed only if an organized rhythm is observed.
- Pediatric advanced life support techniques are useless without effective circulation, which is supported by good chest compressions during cardiac arrest. Good chest compressions require an adequate compression rate (100-120 compressions per minute), an adequate compression depth (about one third to one half of the anterior-posterior diameter), full recoil of the chest after each compression, and minimal interruptions in compressions.
- Search for and treat reversible causes.

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



Cardiopulmonary Compromise

- Hypotension
- Acutely altered mental status
- Signs of shock

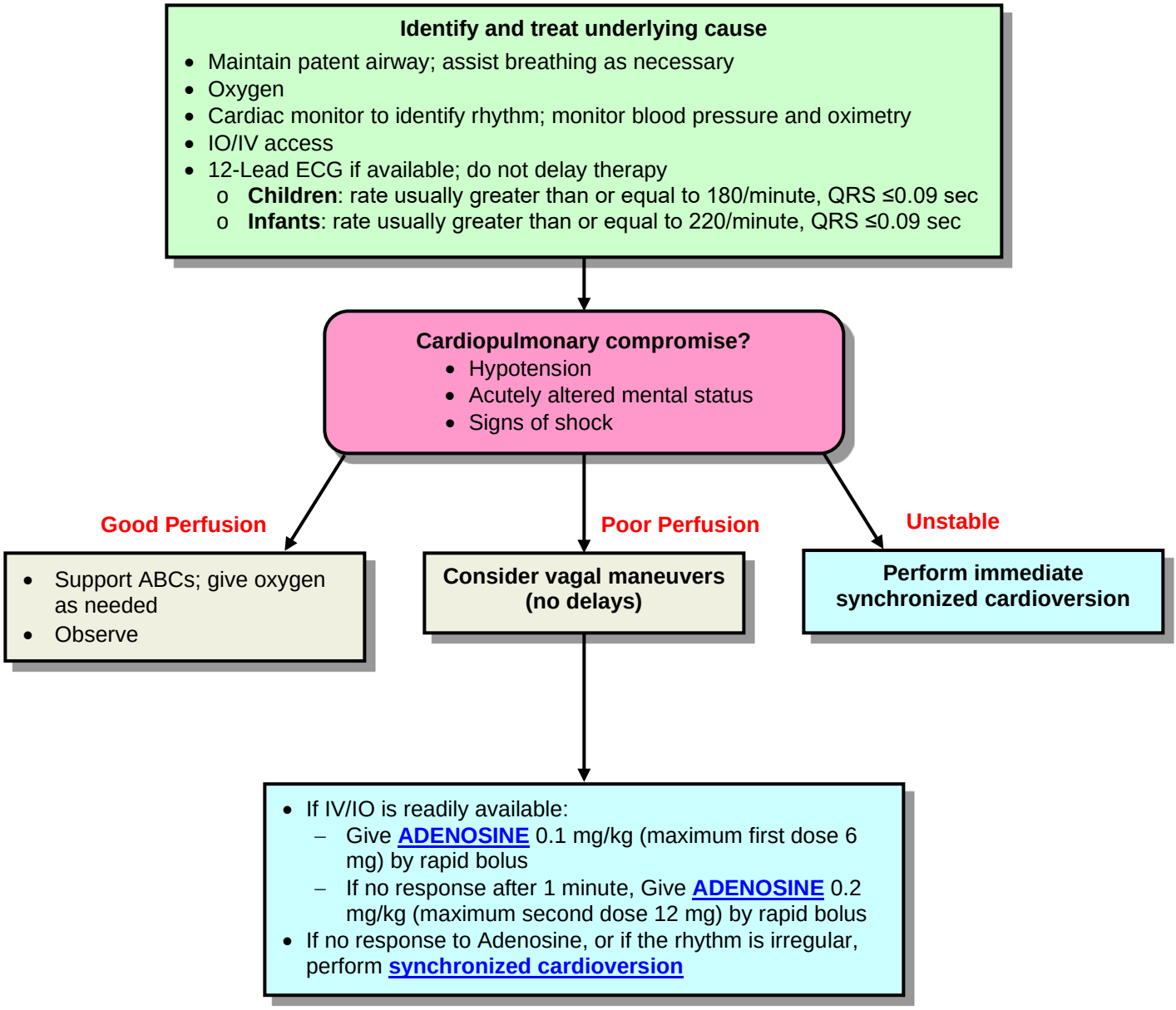
Doses / Details

EPINEPHRINE IV / IO Dose:
0.01 mg/kg (0.1 mL/kg of 1:10,000 concentration). Repeat every 3-5 minutes.

ATROPINE IV / IO Dose:
0.02 mg/kg. May repeat once. Minimum dose 0.1 mg and maximum single dose 0.5 mg.

Key Points: BRADYCARDIA – PEDIATRIC

- Use of a length-based resuscitation tape and/or other pediatric resources for quick references are preferred during pediatric resuscitation efforts.
- Most pediatric bradycardias are from hypoxia. Focus on airway, ventilation, and oxygenation.
- If bradycardia is due to vagal stimulation, give Atropine.
- Emergency transcutaneous pacing may be lifesaving if the bradycardia is due to complete heart block or sinus node dysfunction unresponsive to ventilation, oxygenation, chest compressions, and medications, especially if it is associated with congenital or acquired heart disease.
- Pacing is not useful for asystole or bradycardia due to post-arrest hypoxic / ischemic myocardial insult or respiratory failure.
- Search for and treat reversible causes.
  - Hypovolemia
  - Hypoxia
  - Hydrogen ion (acidosis)
  - Hypo-/hyperkalemia
  - Hypothermia
  - Hypoglycemia
  - Tension pneumothorax
  - Tamponade, cardiac
  - Toxins
  - Thrombosis, pulmonary
  - Thrombosis, coronary


Identify and treat underlying cause
Maintain patent airway; assist breathing as necessary
Oxygen
Cardiac monitor to identify rhythm; monitor blood pressure and oximetry
IO/IV access
12-Lead ECG if available; do not delay therapy
Children: rate usually greater than or equal to 180/minute, QRS ≤0.09 sec
Infants: rate usually greater than or equal to 220/minute, QRS ≤0.09 sec
Cardiopulmonary compromise?
Hypotension
Acutely altered mental status
Signs of shock
Good Perfusion
Poor Perfusion
Unstable
Support ABCs; give oxygen as needed
Observe
Consider vagal maneuvers (no delays)
Perform immediate synchronized cardioversion
If IV/IO is readily available:
Give ADENOSINE 0.1 mg/kg (maximum first dose 6 mg) by rapid bolus
If no response after 1 minute, Give ADENOSINE 0.2 mg/kg (maximum second dose 12 mg) by rapid bolus
If no response to Adenosine, or if the rhythm is irregular, perform synchronized cardioversion

Key Points: NARROW QRS TACHYCARDIA - PEDIATRIC

- Use of a length-based resuscitation tape and/or other pediatric resources for quick references are preferred during pediatric resuscitation efforts.
- Evaluation of the ECG and the patient's clinical presentation and history should help you differentiate probable sinus tachycardia from probable supraventricular tachycardia (SVT). If the rhythm is sinus tachycardia, search for and treat reversible causes.

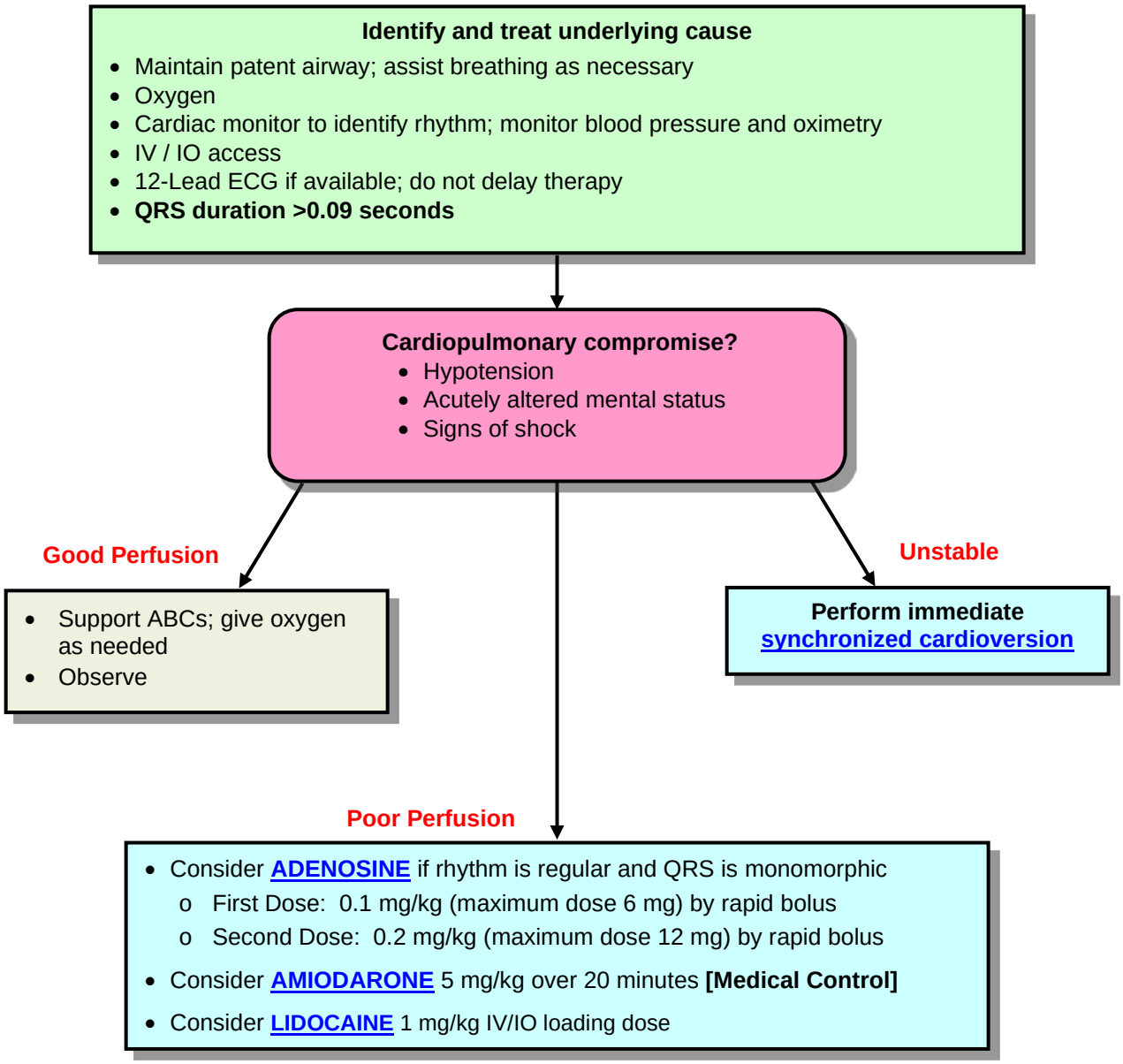
Probable Sinus Tachycardia

- Compatible history consistent with known cause
- P waves present / normal
- Variable R-R; constant P-R
- Infants: rate usually less than 220 bpm
- Children: rate usually less than 180 bpm

Probable Supraventricular Tachycardia

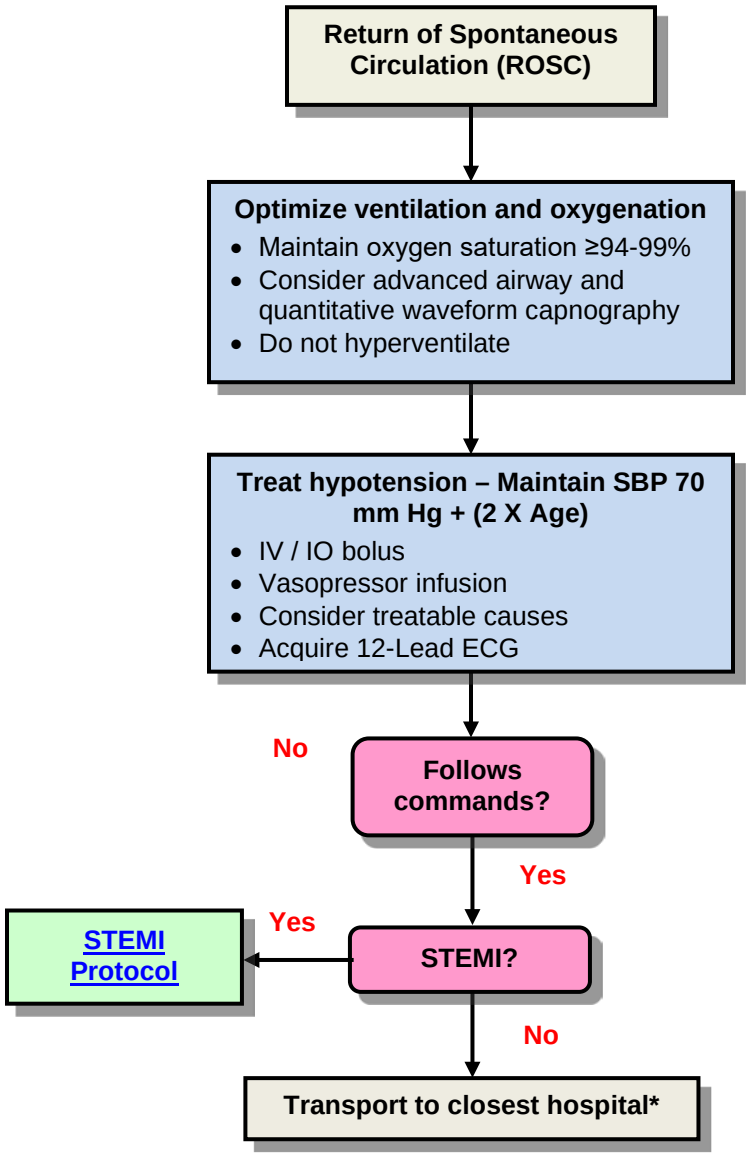
- Compatible history (vague, nonspecific)
- P waves absent / abnormal
- HR not variable
- History of abrupt rate changes
- Infants: rate usually ≥220 bpm
- Children: rate usually ≥180 bpm

- If hypovolemia is suspected, give IV fluids according to the **SHOCK – HYPOVOLEMIA** protocol.
- Give Adenosine rapidly over 1 to 3 seconds through a large (e.g., antecubital) vein or IO site, followed by a 5 mL Normal Saline flush and elevation of the extremity.
- Synchronized cardioversion
  - To perform synchronized cardioversion, provide an initial shock of 1 J/kg. If there is no response to the first shock, provide subsequent shocks at 2 J/kg. ***Providers should use the device-specific doses for synchronized cardioversion, as recommended by the monitor manufacturer, if different from protocol-recommended energies.***
  - If cardioversion is needed and it is impossible to synchronize a shock (e.g., the patient's rhythm is irregular), use high-energy unsynchronized shocks.
- Check pulse and rhythm after each synchronized shock. Ensure monitor remains in "SYNC" mode for subsequent shocks. Search for and treat reversible causes.
  - Hypovolemia
  - Hypoxia
  - Hydrogen ion (acidosis)
  - Hypo-/hyperkalemia
  - Hypothermia
  - Hypoglycemia
  - Tension pneumothorax
  - Tamponade, cardiac
  - Toxins
  - Thrombosis, pulmonary
  - Thrombosis, coronary


Identify and treat underlying cause
Maintain patent airway; assist breathing as necessary
Oxygen
Cardiac monitor to identify rhythm; monitor blood pressure and oximetry
IV / IO access
12-Lead ECG if available; do not delay therapy
QRS duration >0.09 seconds
Cardiopulmonary compromise?
Hypotension
Acutely altered mental status
Signs of shock
Good Perfusion
Support ABCs; give oxygen as needed
Observe
Unstable
Perform immediate synchronized cardioversion
Poor Perfusion
Consider ADENOSINE if rhythm is regular and QRS is monomorphic
First Dose: 0.1 mg/kg (maximum dose 6 mg) by rapid bolus
Second Dose: 0.2 mg/kg (maximum dose 12 mg) by rapid bolus
Consider AMIODARONE 5 mg/kg over 20 minutes [Medical Control]
Consider LIDOCAINE 1 mg/kg IV/IO loading dose

Key Points: WIDE QRS TACHYCARDIA - PEDIATRIC

- Use of a length-based resuscitation tape and/or other pediatric resources for quick references are preferred during pediatric resuscitation efforts.
- Generally, unstable wide complex tachycardia should be treated with synchronized electrical cardioversion.
- If it does not delay cardioversion, try a dose of Adenosine first to determine if the rhythm is SVT with aberrant conduction.
- If a second shock (2 J/kg) is unsuccessful or if the tachycardia recurs quickly, consider Amiodarone before a third shock. **[Medical Control]**
- Give Adenosine rapidly over 1 to 3 seconds through a large (e.g., antecubital) vein or IO site, followed by a 5 mL Normal Saline flush and elevation of the extremity.
- Synchronized cardioversion
    - To perform synchronized cardioversion, provide an initial shock of 1 J/kg. If there is no response to the first shock, provide subsequent shocks at 2 J/kg. ***Providers should use the device-specific doses for synchronized cardioversion, as recommended by the monitor manufacturer, if different from protocol-recommended energies.***
    - If cardioversion is needed and it is impossible to synchronize a shock (e.g., the patient's rhythm is irregular), use high-energy unsynchronized shocks.
    - Check pulse and rhythm after each synchronized shock. Ensure monitor remains in "SYNC" mode for subsequent shocks.
- Search for and treat reversible causes.
    - Hypovolemia
    - Hypoxia
    - Hydrogen ion (acidosis)
    - Hypo-/hyperkalemia
    - Hypothermia
    - Hypoglycemia
    - Tension pneumothorax
    - Tamponade, cardiac
    - Toxins
    - Thrombosis, pulmonary
    - Thrombosis, coronary



Ventilation / Oxygenation

- Start at 1 breath / 2-3 seconds (20-30/minute) and titrate to target $ETCO_2$ of 35-45 mm Hg. Avoid excessive ventilation.
- Titrate oxygen to minimum necessary to achieve SpO_2 ≥94-99%.
  - o Start with 100% oxygen during the CPR phase
  - o After ROSC, rapidly reduce oxygen flow to the BVM until at room air or SpO_2 ≥94%.

IV Bolus for Hypotension

1 to 2 liters Normal Saline titrated to a systolic blood pressure of 70 mm Hg + (2 X Age).

Norepinephrine Infusion

0.05-0.1 mcg/kg per minute titrated to maintain a systolic blood pressure >70 mm Hg + (2 X Age).

Epinephrine Infusion

0.1 to 0.5 mcg/kg per minute titrated to maintain a systolic blood pressure >70 mm Hg + (2 X Age) **[Medical Control]**

Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia
- Hypoglycemia (not AHA)
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

Protocol 4.1

MEDICAL – ALTERED MENTAL STATUS

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Assess for signs of trauma. Provide spinal immobilization as necessary.	●	●	●	●	●
4. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	●	●	●	●	●
5. For altered mental status, perform rapid glucose determination.	●	●	●	●	●
6. Establish an INT or IV of Normal Saline at KVO.			●	●	●
7. For glucose less than 60 mg/dL for adults and children, refer to the **HYPOGLYCEMIA** protocol.		●	●	●	●
8. For glucose less than 45 mg/dL for infants, refer to the **HYPOGLYCEMIA** protocol.		●	●	●	●
9. For glucose greater than 300 mg/dL, if symptomatic, refer to the **HYPERGLYCEMIA** protocol.		●	●	●	●
10. For a suspected narcotic overdose complicated by respiratory depression, refer to the **TOXICOLOGY – POISONING / OVERDOSE** protocol.	●	●	●	●	●
11. Place patient on cardiac monitor.				●	●
12. Transport as soon as possible.		●	●	●	●

Key Points: ALTERED MENTAL STATUS

- The unconscious patient is one of the most difficult patient management problems in pre-hospital care. Causes range from benign problems to potentially life-threatening cardiopulmonary or central nervous system disorders. Frequently, a diabetic patient may present with an altered mental status. This may be due to hypoglycemia or hyperglycemia. However, the patient often is unable to give any history and the physical assessment may be inconclusive. The pre-hospital goal is to maintain stable vital signs, protect the patient's airway and C-spine, and assess for possible causes. Get as complete a history as possible. Treat any potentially reversible cause such as narcotic overdose or hypoglycemia.
- Possible causes of unconsciousness or altered mental status (AEIOU-TIPS):

A Acidosis, alcohol
E Epilepsy
I Infection
O Overdose
U Uremia (kidney failure)
T Trauma, tumor
I Insulin
P Psychosis
S Stroke

Protocol 4.2

MEDICAL – ALLERGIC REACTION / ANAPHYLAXIS

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (SECTION 1).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	●	●	●	●	●
4. Transport as soon as possible.	●	●	●	●	●
For severe symptoms including airway compromise, respiratory distress, and hypotension:					
5. Give Epinephrine via an EpiPen® or EpiPen Jr.® autoinjector. Repeat EpiPen or EpiPen Jr. in 10 minutes if available and no response from patient. or		●	●	●	●
6. Give EPINEPHRINE 1:1,000 0.3 mg IM for adult and 0.15 mg IM for child. Repeat dose in 5 minutes if no response.			●	●	●
7. Establish an INT or IV of Normal Saline at KVO.			●	●	●
8. Give DIPHENHYDRAMINE 1 mg/kg up to 50 mg IM or IV. The IV route is preferred for the patient in severe shock. If an IV cannot be readily established, give Diphenhydramine via the IM route.			●	●	●
9. If the patient is in severe distress. Give METHYLPREDNISOLONE 2 mg/kg up to 125 mg IV over 1 to 2 minutes or IM.			●	●	●
10. If the patient is experiencing respiratory distress with wheezing, give ALBUTEROL 2.5 mg (0.083% solution). Repeat as needed.		●	●	●	●
11. If hypoperfusion persists following the first dose of Epinephrine, consider administration of 20 mL/kg Normal Saline IV. While administering a fluid bolus, frequently reassess perfusion for improvement. If perfusion improves, slow the IV to KVO and monitor closely. If patient develops fluid overload respiratory distress (dyspnea, crackles, rhonchi, decreasing SpO_2), slow the IV to KVO.			●	●	●
12. Perform reassessment as indicated.	●	●	●	●	●
13. EPINEPHRINE 1:10,000 0.3 mg to 0.5 mg IV for dire circumstances.				●	●
14. Give EPINEPHRINE INFUSION 0.1 – 0.5 mcg/kg/minute IV infusion. Titrate to response.				●	●

Key Points: ANAPHYLAXIS

- Anaphylaxis is a serious and potentially life-threatening medical emergency. It is the body's adverse reaction to a foreign protein. Anaphylaxis is a severe allergic reaction and can be characterized by flushing, itching, hives, swelling, cyanosis, dyspnea, sneezing, coughing, wheezing, stridor, laryngeal edema, laryngospasm, bronchospasm, vasodilation, increased heart rate, decreased blood pressure, nausea/vomiting, abdominal cramping, diarrhea, dizziness, headache, and convulsions. Constant monitoring of the patient's airway and breathing is mandatory. Support / assist ventilations in critical respiratory distress with bag-valve-mask ventilation.
- Give Epinephrine cautiously with geriatric and cardiac patients.
- The care of a patient with a mild allergic reaction is generally supportive in nature. Administration of Diphenhydramine alone may be appropriate when vital signs are normal, there are no respiratory symptoms and the only manifestations are itching, rash, and/or swelling on the outside of the body.

Protocol 4.3

INJURY – BURNS

	EMR	EMT	AEMT	INT	PM
1. Stop the burning process:	•	•	•	•	•
a. **Thermal burns:** Stop the burning process. Do not attempt to wipe off semisolids (grease, tar, wax, etc.). Do not apply ice.	•	•	•	•	•
b. **Dry chemical burns:** Brush off dry powder, then lavage with copious amounts of tepid water (sterile, if possible) for 20 minutes. Continue en route to the hospital.	•	•	•	•	•
c. **Liquid chemical burns:** Lavage the burned area with copious amounts of tepid water (sterile, if possible) for 20 minutes. Continue en route to the hospital.	•	•	•	•	•
2. Perform general patient management (**SECTION 1**).	•	•	•	•	•
3. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
4. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	•	•	•	•	•
5. If the patient is in critical respiratory distress, consider placement of an advanced airway.				•	•
6. Dry the body and follow the HYPOTHERMIA protocol as needed. Remove clothing from around burned area, but do not remove / peel off skin or tissue. Remove and secure all jewelry and tight-fitting clothing.	•	•	•	•	•
7. Assess the extent of the burn using the **Rule of Nines** and the degree of burn severity.	•	•	•	•	•
8. Cover the burned area with a clean, dry dressing.	•	•	•	•	•
9. If a ***partial or full thickness burn*** involves more than 20% BSA. Infuse fluid based on the amounts listed in the table below. If the patient develops signs and symptoms of fluid overload respiratory distress (dyspnea, crackles, rhonchi, decreasing SpO_2), slow the IV to KVO.			•	•	•
10. For pain control, give **FENTANYL** 0.5-2 mcg/kg or a maximum single dose of 100 mcg. Titrate to effect. Reassess and may repeat every 5 minutes at ½ the initial dose. or Consider **KETAMINE** 0.4 mg/kg IV over 1-2 minutes or a maximum single dose of 60 mg. May repeat as needed every 10 to 15 minutes to a maximum of three doses. Contact **[Medical Control]** for additional dosing. Do not administer **KETAMINE** in patients under the age of 12 years and/or under 50 kg (Intermediate Level Only).				•	•
11. For pain control for patients under the age of 12 years and/or under 50 kg, consider **KETAMINE** 0.1 mg/kg IM.					•
12. Perform reassessment as indicated.	•	•	•	•	•

Age	Infusion Rate	Drip Rate *(15 Drop Set)*
5 years or younger	125 mL/hour	**31** drops per minute
6 – 13 years	250 mL/hour	**63** drops per minute
14 year or older	500 mL/hour	**125** drops per minute

American Burn Association – BURN UNIT REFERRAL CRITERIA

- Partial thickness and full thickness burns greater than 10% of the total body surface area (BSA).
- Partial thickness and full thickness burns involving the face, eyes, ears, hands, feet, genitalia, or perineum, or those that involve skin overlying major joints.
- Full thickness burns in any age group.
- Electrical burns, including lightning injuries; (significant volumes of tissue beneath the surface may be injured and result in acute renal failure and other complications).
- Significant chemical burns.
- Inhalation injuries.
- Burn injury in patients with pre-existing medical disorders that could complicate management, prolongs recovery, or affects mortality.
- Any burn patient in whom concomitant trauma (such as fractures) poses an increased risk of morbidity or mortality may be treated initially in a trauma center until stable before transfer to a burn center. Physician judgment will be necessary in such situations and should be in concert with the Regional Medical Control Plan and Triage Protocols.
- Children with burns seen in hospitals without qualified personnel or equipment for their care should be transferred to a burn center with these capabilities.
- Burn injury in patients who will require special social, emotional, or long-term rehabilitative support, including cases involving child abuse and neglect.

Protocol 4.3 – INJURY – BURNS

Key Points: BURNS

- Burns can be caused by direct thermal injury, exposure to caustic chemicals, and contact with electrical sources. Factors to be considered when treating burn patients include the nature of the burn, whether the patient was in an enclosed space, the source of the burn, the patient's history, the duration of the contact, and the temperature of the thermal agent. Always protect providers from exposures to hazardous materials. Extrication and removal should be done by trained personnel. Move the patient to a safe environment, administer 100% oxygen, protect the airway, and assist ventilations if indicated. Treat for shock. Rapid transport to an appropriate receiving facility is indicated for any patient presenting with altered mental status, difficulty breathing, or cardiovascular compromise. Guidelines for transfer to a burn center are listed in the key points box.
- **Thermal Burns:**
  - Cool water immersion of minor localized burns may be effective if accomplished in the first few minutes after a burn.
  - Cover extensive partial and full thickness burns with a dry, sterile dressing. Keep the patient warm and infuse the fluid amounts listed in the **SHOCK – HYPOVOLEMIA** protocol.
  - Use soft, non-adherent dressings between areas of full thickness burns, as between the fingers and toes, to prevent adhesion.
  - Be cautious and conservative when administering fluids to the burn patient with inhalation injury.
- **Electrical Injuries:**
  - Assess for multiple entrance and exit wounds.
  - Perform ECG monitoring for possible cardiac disturbances. Electrical current may induce dysrhythmias such as bradycardias, tachycardias, ventricular fibrillation, and asystole.
  - For serious electrical burn injuries, establish large bore IVs and administer IV fluid in accordance with the **SHOCK – HYPOVOLEMIA** protocol.
- **Chemical Burns:**
  - **Phenol** is a gelatinous caustic used as an industrial cleaner. It is difficult to remove because it is insoluble in water. Use alcohol, which may be found in areas where Phenol is regularly used, to dissolve the product. Follow removal with irrigation using large volumes of cool water.
  - **Dry Lime** is a strong corrosive that reacts with water. It produces heat and subsequent chemical and thermal injuries. Brush dry lime off the patient gently, but as completely as possible. Then rinse the contaminated area with large volumes of cool to cold water.
  - **Sodium** is an unstable metal that reacts destructively with many substances, including human tissue and water. Decontaminate the patient quickly with gentle brushing. Then, cover the wound with oil used to store the substance.
  - **Riot Control Agents** (Mace, Pepper Spray, etc.) cause intense irritation of the eyes, mucous membranes, and respiratory tract. Treatment is supportive and most patients recover in 10 to 20 minutes of exposure to fresh air. If necessary, irrigate the patient's eyes with Normal Saline if you suspect the agent remains in the eyes.

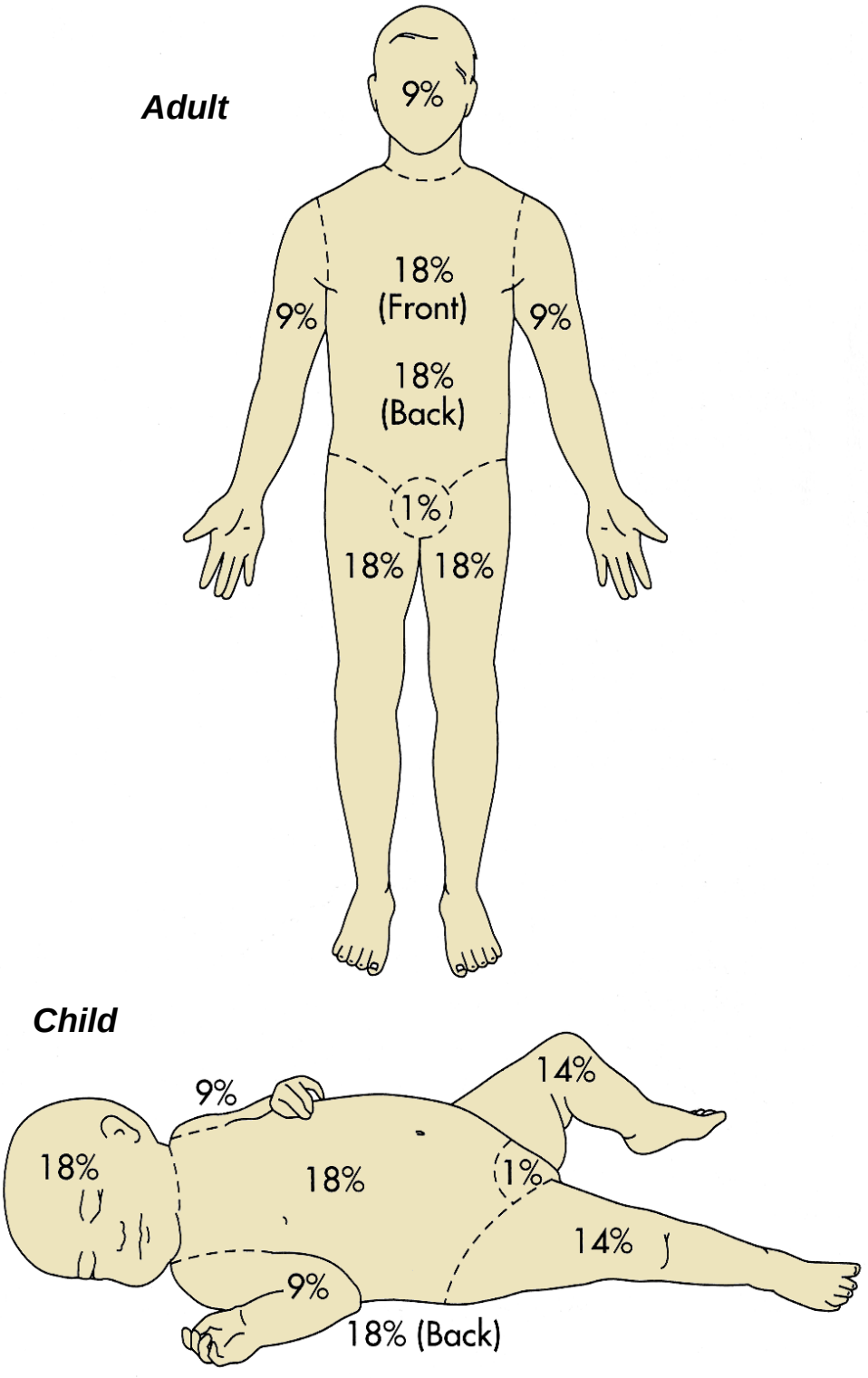


Figure 4.2.1 Rule of Nines

Protocol 4.4

MEDICAL – CHEST PAIN – CARDIAC SUSPECTED

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Treat dysrhythmias. Be prepared to initiate CPR and defibrillation, if necessary.	●	●	●	●	●
4. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	●	●	●	●	●
5. Obtain patient history. Reassure the patient.	●	●	●	●	●
6. Transport as soon as feasible.	●	●	●	●	●
7. Place patient on cardiac monitor.		●	●	●	●
a. Obtain a 12-Lead ECG in accordance with **12-LEAD ECG ACQUISITION**. ***NOTE: 12-Lead ECG should be acquired within 10 minutes of patient contact.***	o	●	●	●	●
b. When the 12-Lead indicates the patient is experiencing an acute myocardial infarction; consider application of defibrillation electrodes; be prepared to defibrillate if needed.		●	●	●	●
c. When a 12-Lead ECG indicates "ACUTE MI" or "…INFARCT, ACUTE,", or interpretation identifies a Myocardial Infarction, notify **[Medical Control]** immediately and, if able, transmit 12-Lead ECG to hospital. Consider air medical support if the transport time to the cardiac catheterization facility is greater than 30 minutes.		●	●	●	●
d. Follow the **ST–ELEVATION MYOCARDIAL INFARCTION (STEMI) TRIAGE** guidelines.		●	●	●	●
8. Give **ASPIRIN** 324 mg PO.		●	●	●	●
9. Establish an INT or IV of Normal Saline at KVO.			●	●	●
10. Give **NITROGLYCERIN**.					
a. Assist patient with **PRESCRIBED NITROGLYCERIN**.		●	●	●	●
b. Give Nitroglycerin 0.4 mg SL. If the pain persists, repeat Nitroglycerin 0.4 mg SL in 3 to 5 minutes (up to total of three SL doses).		●	●	●	●
11. For severe nausea, vomiting or vertigo, give **ONDANSETRON** 4 mg IV over 2 to 5 minutes (may repeat in 10 minutes if needed) or IM.		●	●	●	●
a. [ODT/SL] Give 4 mg tablet ODT/SL. May repeat once in 10 minutes if needed.					
12. If pain persists following administration of Nitroglycerin SL, apply one (1) inch of Nitroglycerin Paste.		●	●	●	●
13. If pain persists following administration of a minimum of two (2) SL Nitroglycerin tablets, consider **FENTANYL** to a maximum of 0.5-2 mcg/kg or a maximum single dose of 100 mcg. Reassess and may repeat every 5 minutes at ½ the initial dose, if needed.				●	●
14. Perform reassessment as indicated.	●	●	●	●	●

Key Points: CHEST PAIN (NON-TRAUMATIC)

- Non-traumatic chest pain is a common pre-hospital patient complaint. It should be considered life threatening until proven otherwise. The pain or discomfort is often associated with acute myocardial infarction or angina pectoris which is a sign of inadequate oxygen supply to the heart muscle. Common signs and symptoms associated with the pain are dyspnea, diaphoresis, nausea, vomiting, weakness, fatigue, anxiety, and restlessness.
- First Medical Contact (FMC) to ECG <10 minutes, ECG to Decision <10 minutes, Scene Time <10 minutes to provide early identification and pre-hospital arrival notification for suspected myocardial infarction or STEMI. Ideally, 12-Lead ECG acquisition and treatment of the patient (i.e., administration of Oxygen, Aspirin, etc.) should occur concurrently.
- The preferred IV site location is left arm, especially for STEMI patients. STEMI patients should have 2 IVs.
- Bradycardia with hypotension may be due to inferior wall MI associated with right ventricular MI. In this instance, pacing and IV fluids may improve patient's hemodynamic status. Provided that SBP is greater than 90 mm Hg, chest pain relief is warranted as specified in this protocol. Avoid use of Nitroglycerin and Beta Blockers.
- Avoid Nitroglycerin and Beta Blockers with hypotension (SBP less than 90 mm Hg) or bradycardia (less than 60/minute).
- Administration of Nitroglycerin is contraindicated in patients who are using anti-impotence agents (Cialis, Levitra, Viagra, etc.) since these agents have been shown to potentiate the hypotensive effects of organic nitrates.
- ST-segment elevation >1 mm (0.1 mV) in 2 or more contiguous precordial leads or 2 or more adjacent limb leads is classified as ST-Elevation MI (STEMI). ST-segment depression >2 mm (0.2 mV) in leads V1-V3 is classified as an infero-basal myocardial ischemia (posterior infarction).
- Diagnostic ST elevation in the absence of left ventricular (LV) hypertrophy or left bundle branch block (LBBB) is defined by the European Society of Cardiology/ACCF/AHA/World Heart Federation Task Force for the Universal Definition of Myocardial Infarction as new ST elevation at the J point in at least 2 contiguous leads of ≥2 mm (0.2 mV) in men or ≥1.5 mm (0.15 mV) in women in leads V2-V3 and/or of ≥1 mm (0.1 mV) in other contiguous chest leads or the limb leads.
- The majority of patients will evolve ECG evidence of Q-Wave infarction. New or presumably new LBBB at time of presentation, however, are "not known to be old" because of prior electrocardiogram (ECG) is not available for comparison. New or presumably new LBBB at presentation occurs infrequently, may interfere with ST-Elevation analysis, and should not be considered diagnostic of acute myocardial infarction (MI) in isolation.
- Transport performing interventions en route. **Time is muscle!**

SGARBOSSA (SMITH'S MODIFIED) CRITERIA

- In patients with LBBB or a paced ventricular rhythm, STEMI diagnosis is difficult. Smith's Modified Sgarbossa Criteria has been shown 80% sensitive and 99% specific for acute coronary occlusion. Smith-Modified Sgarbossa Criteria suggests a presumptive diagnosis of Acute Myocardial Infarction (AMI) based upon the following criteria:
    - ≥ 1 lead with ≥ 1 mm of concordant ST elevation (5 points)
    - ≥ 1 lead of V1-V3 with ≥ 1 mm of concordant ST depression (3 points)
    - ≥ 1 lead anywhere with ≥ 1 mm ST elevation and proportionally excessive discordant ST elevation, as defined by ≥ 25% of the depth of the preceding S-Wave (2 points)
- The specificity of Smith's Modified Sgarbossa Criteria increases with score. A score of ≥ 3 suggests 90% specificity. However, the score is not necessarily sensitive, and a low score should not be used to rule out an Acute Myocardial Infarction (AMI).
- https://litfl.com/sgarbossa-criteria-ecg-library/

Protocol 4.5

GENERAL – BEHAVIORAL / PATIENT RESTRAINT

	EMR	EMT	AEMT	INT	PM
1. Assure scene safety. Do not engage patient unless risk of harm is minimized by law enforcement.	•	•	•	•	•
2. Perform general patient management (**SECTION 1**).	•	•	•	•	•
3. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
4. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	•	•	•	•	•
5. For altered mental status, perform rapid glucose determination.	•	•	•	•	•
6. Control environmental factors: attempt to move patient to a private area free of family and bystanders. **MAINTAIN ESCAPE ROUTE.**	•	•	•	•	•
7. Attempt de-escalation, utilize an empathetic approach. Ensure patient safety and comfort. **AVOID CONFRONTATION.**	•	•	•	•	•
8. Ensure patient competency. If patient is competent, consent is required. If patient is incompetent consent is not required.	•	•	•	•	•
9. Physical restraint: Must be performed under the direction of law enforcement at the scene. See key points.	•	•	•	•	•
10. Chemical Restraint:					
a. If chemical agitation (i.e., stimulants) is suspected, refer to the **TOXICOLOGY–STIMULANTS** protocol.	•	•	•	•	•
b. If agitation from alcohol withdrawal is suspected, refer to the **TOXICOLOGY– ALCOHOL WITHDRAWAL** protocol.	•	•	•	•	•
c. If psychotic / behavioral agitation is suspected, give **HALOPERIDOL** 5 mg IM, **MIDAZOLAM** 5 mg IM. Contact **[Medical Control]** for repeat dosing.				•	•
d. Consider **DIPHENHYDRAMINE** 25 mg IM for potential dystonic side effects.					
e. Consider **KETAMINE** 3 mg/kg IM up to 150 mg in a single loading dose. May repeat as needed every 10 minutes. Monitor quantitative waveform capnography.					•
11. Transport as soon as possible.		•	•	•	•

Key Points: COMBATIVE PATIENT

- Patients may present with a psycho-social condition exhibiting extreme anxiety and/or combative / violent behavior. If the patient presents a substantial risk of bodily harm or injury to themselves, others, or emergency personnel; consider involving law enforcement whenever possible. Dystonic side effects following the administration of Haloperidol may be treated with Diphenhydramine.
- Administer Midazolam cautiously when alcohol intoxication is suspected.
- Considerations when performing physical restraint include:
  - Restrain in the supine or left lateral recumbent position. Ensure method of restraint does not affect breathing or circulation and move to chemical restraint as soon as possible.
- Haloperidol should not be given to patients suffering from Delirium Tremens (DTs) from long-term alcohol abuse as it reduces seizure threshold.

Protocol 4.6

ENVIRONMENTAL – HEAT EXPOSURE / EXHAUSTION

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Remove the patient from the hot environment to a cool environment.	●	●	●	●	●
4. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	●	●	●	●	●
5. **Heat Cramps:** Signs and symptoms include muscle twitching, followed by painful spasms, especially involving the lower extremities and abdomen, nausea and vomiting, weakness, and diaphoresis.	●	●	●	●	●
a. Starting with rehydration formulas such as Gatorade™ may be given as long as the patient maintains a patent airway.		●	●	●	●
6. **Heat Exhaustion:** Signs and symptoms include pallor, profuse sweating, orthostatic hypotension, headache, weakness, fatigue, and thirst.	●	●	●	●	●
a. If patient is alert and can maintain open airway, give salt-containing or rehydration solution as for heat cramps.		●	●	●	●
b. Establish an IV of Normal Saline. Infuse the fluid amounts listed in the **SHOCK – HYPOVOLEMIA** protocol. If the patient develops signs and symptoms of fluid overload respiratory distress (dyspnea, crackles, rhonchi, decreasing SpO_2), slow the IV to KVO.			●	●	●
c. Place on cardiac monitor.				●	●
7. **Heat Stroke:** Signs and symptoms include altered mental status, increased body temperature, minimal or no sweating, collapse, shock, shortness of breath, nausea, and vomiting.	●	●	●	●	●
a. Remove the patient's clothing.	●	●	●	●	●
b. **Do not** give anything by mouth.	●	●	●	●	●
c. Spray the patient's skin with a lukewarm water mist and fan the patient. Continue misting and fanning during transport.	●	●	●	●	●
d. Wrap the patient with wet sheets if there is good ambient airflow present.	●	●	●	●	●
e. Establish an IV of Normal Saline. Infuse the fluid amounts listed in the **SHOCK – HYPOVOLEMIA** protocol. If the patient develops signs and symptoms of fluid overload respiratory distress (dyspnea, crackles, rhonchi, decreasing SpO_2), slow the IV to KVO.			●	●	●
f. Place on cardiac monitor.				●	●

Key Points: ENVIRONMENTAL – HYPERTHERMIA

- Hyperthermia should be considered in any patient presenting with an altered level of consciousness who has been exposed to environmental heat. Hyperthermia is more likely in a humid environment. Children and the elderly are at increased risk. Blood pressure medications make people more vulnerable to heat emergencies. The pre-hospital goal is to reduce body temperature by transferring the patient to a cool environment and initiating cooling measures as indicated. Altered mental status is the hallmark of heat stroke. Any patient who develops altered mental status in a hot environment should be suspected of having heat stroke.
- For Exertional Heat Illnesses (Exhaustion / Stroke) – the source of the excess heat is from both the inside and the outside (environment).
- Exertional Heat Exhaustion and Exertional Heat Stroke present with similar symptoms, and may include: confusion, altered mental status, dry or sweaty skin, headache, weakness, fatigue, dizziness, orthostatic changes in vitals, and/or nausea.
- Exertional Heat Stroke differs from Environmental Hyperthermia in that there is internal heat generation from the extreme exertion on the part of the athlete. Only core temperature measurements are sufficient to make clinical decisions.
- Ice bath emersion cooling is effective with Exertional Hyperthermia. This process may take several minutes (10 to 15) to work as the body continues to generate internal heat for some time.
- Reflex vasoconstriction and shivering are not commonly seen in response to active and aggressive cooling measures for Exertional Heat Illness.
- Rapid cooling is vital for the victim of Heat Stroke. If the victim's body temperature is not quickly lowered, permanent brain damage may result.
- Thermometers are typically not used by EMS; however, they may be present where patients are being treated by Certified Athletic Trainers.

Protocol 4.7

ENVIRONMENTAL – HYPOTHERMIA

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	●	●	●	●	●
4. **Hypothermia WITH a perfusing rhythm (pulse).**	●	●	●	●	●
a. Prevent additional evaporative heat loss by ***removing wet garments*** and insulating the victim from further environmental exposures.	●	●	●	●	●
b. Initiate passive rewarming with warmed blankets and a warm environment.	●	●	●	●	●
c. Perform procedures gently. These patients are prone to develop ventricular fibrillation.	●	●	●	●	●
5. **Hypothermia WITHOUT a perfusing rhythm (pulse).**	●	●	●	●	●
a. Initiate rewarming procedures as noted in step #3 above.	●	●	●	●	●
b. Assess the pulse for a period of 30 seconds.	●	●	●	●	●
c. If not breathing, start rescue breathing immediately. If possible, administer warmed, humidified oxygen.	●	●	●	●	●
d. If pulseless with no detectable signs of circulation, start chest compressions immediately. If there is any doubt about whether a pulse is present, begin compressions.	●	●	●	●	●
e. Assess cardiac rhythm:					
i. Attach AED / cardiac monitor. Defibrillation shall be utilized if indicated.	●	●	●	●	●
f. Consider securing airway with an endotracheal tube **[INT, PM]** or a King LT airway.		●	●	●	●
g. Establish an IV of Normal Saline (warm if possible).			●	●	●
h. Administer **EPINEPHRINE** as recommended in the Standard Cardiac Arrest algorithms. Give initial cardiovascular drugs based on presenting rhythm. If the patient fails to respond to the initial drug therapy, defer additional boluses of medication.				●	●
i. Continue CPR and transport immediately.	●	●	●	●	●
6. Perform reassessment as indicated.	●	●	●	●	●

Protocol 4.7 – ENVIRONMENTAL – HYPOTHERMIA

Key Points: ENVIRONMENTAL – HYPOTHERMIA

- Severe hypothermia (body temperature less than 30°C [86°F]) is associated with marked depression of critical body functions that may make the victim appear clinically dead during the initial assessment. But in some cases, hypothermia may exert a protective effect on the brain and organs in cardiac arrest. Intact neurologic recovery may be possible after hypothermic cardiac arrest. Lifesaving procedures should not be withheld on the basis of clinical presentation. Victims should be transported as soon as possible to a center where monitored rewarming is possible. Perform procedures gently. Hypothermic patients are prone to develop ventricular fibrillation.
- Hypothermia is defined as a patient with a core temperature of less than 95° F (35° C) based on the AHA Guidelines. Mild hypothermia 93.2° F to 96.8° F (34° C to 36° C), moderate hypothermia 86° F to 93.2° F (30° C to 34° C), and severe hypothermia is below 86° F (30° C).
- Avoid active external warming of severe hypothermic patients due to the “afterdrop” syndrome. Caution when rewarming as acidosis occurs when pooled lactic acid from the peripheral joints and central circulation.
- Consider helicopter transport to a center capable of heart / lung bypass for severely hypothermic patients.
- Resuscitation may be withheld if the victim has obvious lethal injuries or if the body is frozen so that nose and mouth are blocked by ice and chest compressions are impossible.
- Initiate CPR in the profoundly bradycardic victim.
- Sinus bradycardia may be physiologic in severe hypothermia (i.e., appropriate to maintain sufficient oxygen delivery when hypothermia is present), and cardiac pacing is usually not indicated.

Protocol 4.8

INJURY – BITES AND ENVENOMATION – LAND

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (SECTION 1).	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	•	•	•	•	•
4. Treat for shock and conserve body heat. Keep the patient calm.	•	•	•	•	•
5. Locate the fang marks and clean the site with soap and water. Note: There may be only one fang mark.	•	•	•	•	•
6. Remove any rings, bracelets, or other constricting items on the bitten extremity.	•	•	•	•	•
7. Keep any bitten extremities immobilized – the application of a splint will help. Keep the bite at the level of the heart.	•	•	•	•	•
8. **DO NOT** apply constricting bands.	•	•	•	•	•
9. Every 15 minutes, use a pen to mark the border of the advancing edema and document the time.	•	•	•	•	•
10. Consult **[Medical Control]**. For serious envenomation, the patient may need to be transported or evacuated to a hospital with the appropriate antivenin.	•	•	•	•	•
11. If the snake is dead or alive and captured at the scene, take a digital photograph of the snake and bring the photograph with the patient to the hospital. Do not transport a dead or live snake in the ambulance. **DO NOT BRING ANY ANIMALS INTO THE EMERGENCY DEPARTMENT!!!**	•	•	•	•	•
12. Start an INT or IV of Normal Saline at KVO.			•	•	•
13. For signs and symptoms of shock, follow the SHOCK – HYPOVOLEMIA protocol	•	•	•	•	•
14. Perform reassessment as indicated.	•	•	•	•	•

Key Points: ENVIRONMENTAL – SNAKE BITE

- Life-threatening snake bites are unusual, if not rare. Only if the patient shows clear signs of envenomation in the field are there serious risks to life or limb. Copperheads, water moccasins, and eastern diamondback rattlesnakes pose the most serious threat to humans in Virginia. The pre-hospital goal is to transport the patient promptly and calmly to the nearest appropriate medical facility and obtain a history including type of snake, if possible. Do not chill or apply ice to the wound – severe tissue damage can occur.
- Do not apply a tourniquet.
- Do not cut into the bite and suction or squeeze.
- Signs and symptoms of moderate to severe envenomation by a pit viper:
  - Presence of one or more fang marks, pain, and edema beyond the bite site.
  - Weakness, diaphoresis, nausea, vomiting, and paresthesia (numbness, tingling).
  - Shock
- There are many other types of bites and/or stings by insects, exotic animals, and non-indigenous species that EMS providers will likely respond to. Identification of the animal (performed in a safe manner) that caused the injury is extremely important in determining specific antivenin or otherwise guiding therapy.

Protocol 4.9

MEDICAL – DIABETIC – HYPERGLYCEMIA

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Assess for signs of trauma. Provide spinal immobilization as necessary.	●	●	●	●	●
4. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	●	●	●	●	●
5. For altered mental status or clinical signs / symptoms suggestive of hyperglycemia, perform rapid glucose determination.	●	●	●	●	●
6. If glucose greater than 300 mg/dL and clinical signs and symptoms indicate hyperglycemia, start an IV of Normal Saline.			●	●	●
7. For signs and symptoms of hypovolemic shock or dehydration, follow the **SHOCK – HYPOVOLEMIA** protocol. Use caution with fluid administration in renal failure patients.	●	●	●	●	●
8. Transport as soon as possible.		●	●	●	●
9. Perform reassessment as indicated.	●	●	●	●	●

Key Points: HYPERGLYCEMIA

- Hyperglycemia is the condition where blood glucose levels rise excessively. Hyperglycemia is usually the result of an inadequate supply of Insulin to meet the body's needs. The body will spill the excess sugar into the urine causing an osmotic diuresis. As the body uses other sources of fuel for metabolism, ketone and acid production occurs. This results in an acidotic state. The pre-hospital goal is to maintain stable vital signs, protect the patient's airway and C-spine, and assess for possible causes. Get as complete a history as possible. Treat dehydration of the patient with IV fluids and transport to the hospital.
- Consider nasal capnography, if available. Capnography in conjunction with clinical assessment may be predictive of DKA.

Protocol 4.10

MEDICAL – DIABETIC – HYPOGLYCEMIA

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Assess for signs of trauma. Provide spinal immobilization as necessary.	●	●	●	●	●
4. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	●	●	●	●	●
5. For altered mental status or clinical signs / symptoms suggestive of hypoglycemia, perform rapid glucose determination.	●	●	●	●	●
6. If glucose less than 60 mg/dL or clinical signs and symptoms indicate hypoglycemia:					
a. If the patient can protect airway, give **ORAL GLUCOSE** maximum of 30 grams. Repeat in 15 minutes if necessary.		●	●	●	●
7. If glucose less than 60 mg/dL or clinical signs and symptoms indicate hypoglycemia and oral glucose is contraindicated:					
a. Establish an IV of Normal Saline at KVO.			●	●	●
b. ***Patient > 5 years old:*** Give **DEXTROSE** 50% 1 g/kg up to 25 g IV. Repeat once in 2 minutes if altered mental status persists.			●	●	●
c. ***Child (1 year old or 10 kg):*** Give **DEXTROSE** 25% 0.5 g/kg up to 25 g IV. Repeat once in 2 minutes if altered mental status persists.			●	●	●
d. ***Neonate (birth to 1 month old):*** Give **DEXTROSE** 12.5% 0.5 g/kg (5 mL/kg).			●	●	●
8. If glucose less than 60 mg/dL or clinical signs and symptoms indicate hypoglycemia and an IV is not available, give **GLUCAGON** 1 mg IM.		●	●	●	●
9. For signs and symptoms of hypovolemic shock or dehydration, follow the **SHOCK – HYPOVOLEMIA** protocol.	●	●	●	●	●
10. Place on cardiac monitor.				●	●
11. Transport as soon as possible.		●	●	●	●
12. Perform reassessment as indicated.	●	●	●	●	●

Key Points: HYPOGLYCEMIA

- The body requires a constant supply of glucose to maintain normal function. Known hypoglycemic patients need glucose levels restored as soon as possible to reduce brain and other organ damage. Hypoglycemia is a life-threatening problem. The pre-hospital goal is to maintain stable vital signs, protect the patient's airway and C-spine, and assess for possible causes. Get as complete a history as possible. Restore glucose levels as soon as possible. Glucometer reminders:
  - Use aseptic techniques to draw blood from a finger. Always use fresh blood.
  - Allow alcohol to dry completely before drawing blood.
  - After lancing finger, use only moderate pressure to squeeze blood out. Excessive pressure may cause rupture of cells, skewing results.

Protocol 4.11

MEDICAL – NAUSEA / VOMITING

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	•	•	•	•	•
4. Allow the patient to lie in a comfortable position.	•	•	•	•	•
5. Establish an IV of Normal Saline.			•	•	•
6. Assess for signs of shock. If shock is suspected, follow the **SHOCK – HYPOVOLEMIA** protocol.	•	•	•	•	•
7. For severe nausea, vomiting, or vertigo, give **ONDANSETRON** 4 mg tablet ODT/SL. May repeat once in 10 minutes if needed.		•	•	•	•
8. For severe nausea, vomiting, or vertigo, give **ONDANSETRON** 4 mg IV over 2 to 5 minutes (may repeat in 10 minutes if needed) or IM.			•	•	•
9. Perform reassessment as indicated.	•	•	•	•	•

Key Points: NAUSEA – VOMITING

- Nausea and vomiting are frequently associated with many conditions including obstruction and distention of the stomach and intestines, motility disorders, irritation and inflammation of the peritoneum, drug overdose, acute myocardial infarction, increased ICP, as well as many other conditions including motion sickness related to flying.

Protocol 4.12

OB / GYN – CHILDBIRTH / LABOR / DELIVERY

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	●	●	●	●	●
3. If time permits, establish an INT or an IV of Normal Saline at KVO.			●	●	●
4. Apply gloves, mask, gown, eye protection for infection control precautions.	●	●	●	●	●
5. Have mother lie with knees drawn up and spread apart.	●	●	●	●	●
6. Elevate buttocks – with blankets or pillow.	●	●	●	●	●
7. Create sterile field around vaginal opening.	●	●	●	●	●
8. When the head appears during crowning, place fingers on bony part of skull (not fontanelle or face) and exert very gentle pressure to prevent explosive delivery. Use caution to avoid any pressure on the fontanelle.	●	●	●	●	●
9. If the amniotic sac has not broken, use a clamp to puncture the sac and push it away from the head and mouth as they appear.	●	●	●	●	●
10. As the head is being born, determine if the umbilical cord is around the neck; slip over the shoulder or clamp, cut, and unwrap.	●	●	●	●	●
11. As the torso and full body are born, support the newborn with both hands.	●	●	●	●	●
12. Wipe blood and mucus from mouth and nose with sterile gauze, suction mouth and nose for newborns that have an obvious obstruction to spontaneous breathing or require positive-pressure ventilation. Otherwise, routine suctioning of amniotic fluid is not recommended.	●	●	●	●	●
13. Wrap newborn in a warm blanket and place on its side, head slightly lower than trunk.	●	●	●	●	●
14. Keep newborn level with vagina until the cord is cut.	●	●	●	●	●
15. Assign partner to monitor newborn and complete initial **CARE OF THE NEWBORN**.	●	●	●	●	●
16. Clamp, tie, and cut umbilical cord (between the clamps). Delay cord clamping for at least 30 seconds in term and preterm infants not requiring resuscitation. Apply the first clamp approximately 4 inches from newborn and the second clamp approximately 6 inches from the newborn.	●	●	●	●	●
17. Observe for delivery of placenta while preparing mother and newborn for transport.	●	●	●	●	●
18. If delivered, wrap placenta in towel and put in plastic bag; transport placenta to hospital with mother.	●	●	●	●	●
19. Place sterile pad over vaginal opening, lower mother's legs, help her hold them together.	●	●	●	●	●
20. Record time of delivery and transport mother, newborn, and placenta to hospital.	●	●	●	●	●

Protocol 4.12 – OB / GYN – CHILDBIRTH / LABOR / DELIVERY

Key Points: OB / GYN – CHILDBIRTH / LABOR / DELIVERY

- Normal labor and delivery should pose no problems for the pre-hospital provider. The pre-hospital goal is to determine whether the delivery will occur on scene, and, if so, assist the mother as she delivers the child. Signs of imminent delivery include:
    - Frequent contractions, typically less than 2 minutes apart.
    - Intense maternal urge to push.
    - Crowning of the presenting part of the newborn.
- If birth is not imminent, place the mother on her left side (as tolerated) and transport to the hospital.
- As a general rule, multiparous mothers will progress through labor much more rapidly than primiparous mothers.
- To deliver the shoulders, hold the head in your hands and gently guide it downward to deliver the upper shoulder, then gently guide it upward to deliver the lower shoulder.
- Routine suctioning of amniotic fluid is not recommended.
- Considerations for delivery of the placenta:
    - Allow placenta to deliver spontaneously. Delivery typically occurs in 5 to 20 minutes after the newborn is delivered.
    - When delivered, place the placenta in a plastic bag or clean container and transport to the hospital for examination.
    - Do not delay transport while waiting for delivery of the placenta.
    - Care of the newborn and mother receive the highest priority. Do not focus all your attention on delivery of the placenta.
- Postpartum hemorrhage is best managed by permitting breastfeeding and massaging the fundus. If heavy bleeding continues, follow the **SHOCK – HYPOVOLEMIA** protocol.

Protocol 4.13

MEDICAL – NEWBORN / NEONATAL RESUSCITATION

EMR	EMT	AEMT	INT	PM
1. If the newborn does not cry, rub the back, and begin drying.	●	●	●	●	●
2. **Ensure preservation of newborn warmth.**	●	●	●	●	●
3. Give oxygen at 8-12 L/minute by blow-by if the newborn is not centrally pink and vigorous.	●	●	●	●	●
4. If newborn does not cry, has central cyanosis or heart rate less than 100, see **OBSTETRICS – NEWBORN / NEONATAL RESUSCITATION**.	●	●	●	●	●
5. Complete drying of the newborn, wrap in a dry towel and apply head cover. Keep the newborn warm.	●	●	●	●	●
6. Record the newborn's APGAR scores at 1 and 5 minutes after delivery.	●	●	●	●	●
7. Check the umbilical cord for bleeding. If necessary, place an additional clamp.	●	●	●	●	●
8. Breastfeeding may begin. Keep the newborn warm.	●	●	●	●	●
9. Resume transport as soon as possible.		●	●	●	●

THE APGAR SCORE			
Element	0	1	2
Appearance (Skin color)	Body and extremities blue, pale	Body pink, extremities blue	Completely pink
Pulse rate	Absent	Below 100/minute	100/minute or above
Grimace (Irritability)	No response	Grimace	Cough, sneeze, cry
Activity (Muscle tone)	Limp	Some flexion of extremities	Active motion
Respiratory effort	Absent	Slow and irregular	Strong cry
			TOTAL SCORE =

Protocol 4.14

MEDICAL – NEWBORN / NEONATAL RESUSCITATION

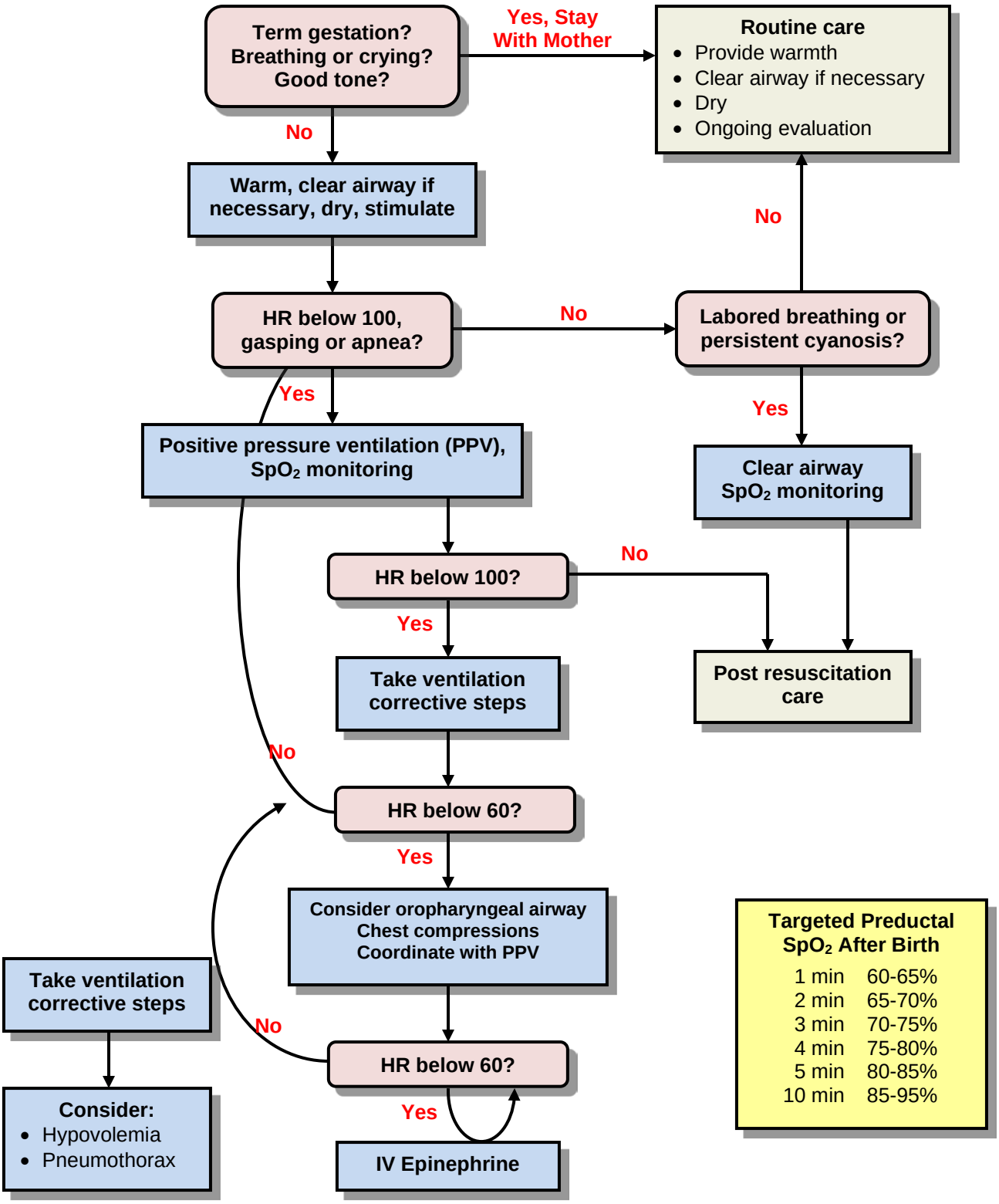
	EMR	EMT	AEMT	INT	PM
1. Rub the newborns back vigorously. Simultaneously begin drying and warming measures. Suction newborns that have obvious obstruction to spontaneous breathing or require positive-pressure ventilation. Otherwise, routine suctioning of amniotic fluid is not recommended.	•	•	•	•	•
2. For newborns with meconium-stained amniotic fluid presenting with poor muscle tone and inadequate breathing efforts, positive-pressure ventilation (PPV) should be initiated if the infant is not breathing, or the heart rate is less than 100/minute after the initial steps are completed.	•	•	•	•	•
3. ***KEEP THE NEWBORN WARM AND DRY.***	•	•	•	•	•
4. Evaluate respirations, heart rate (apical pulse or pulse at the base of the umbilical cord), skin color, and oxygen saturation.	•	•	•	•	•
5. **If HR less than 100 bpm, gasping, or apnea:**					
a. Properly position newborn; do not hyperextend the neck. Initiate positive pressure ventilation (PPV) with room air. Titrate the oxygen concentration to achieve a SpO_2 in the target range listed in ***Table 4.14.1, Targeted Preductal SpO_2 After Birth***.	•	•	•	•	•
b. Deliver 40 to 60 breaths per minute. Use only enough volume to make the newborn's chest rise.	•	•	•	•	•
c. Reassess of ventilatory interventions if HR remains less than 100 bpm.	•	•	•	•	•
6. **If labored breathing or persistent cyanosis:**					
a. Properly position newborn; do not hyperextend the neck. Clear the airway.	•	•	•	•	•
b. Initiate resuscitation with room air. Titrate the oxygen concentration to achieve a SpO_2 in the target range listed in ***Table 4.14.1, Targeted Preductal SpO_2 After Birth***.	•	•	•	•	•
7. **If HR less than 60 bpm after 30 seconds of positive-pressure ventilation:**					
a. Initiate chest compressions at a ***rate*** of 120/minute and a compression to ventilation ratio of 3:1. Consider using higher ratios (e.g., 15:2) if the arrest is believed to be of cardiac origin.	•	•	•	•	•
b. Continue chest compressions until HR greater than 60 bpm.	•	•	•	•	•
c. Consider placing an oropharyngeal airway if available.			•	•	•

CONTINUED ON NEXT PAGE

	EMR	EMT	AEMT	INT	PM
8. **If HR remains less than 60 bpm despite positive-pressure ventilation and chest compressions:**					
a. Establish IV / IO access.			•	•	•
b. Give **EPINEPHRINE 1:10,000** 0.01 mg/kg IV/IO (0.1 mL/kg).				•	•
c. Repeat Epinephrine every 3 to 5 minutes if HR remains less than 60 bpm.				•	•
d. Check blood glucose level and consider **DEXTROSE 12.5%** 0.2 g/kg (2 mL/kg).			•	•	•
e. Consider 10 mL/kg Normal Saline. Administer fluid bolus using a syringe and a three-way stopcock.			•	•	•

Key Points: OBSTETRICS – NEWBORN / NEONATAL RESUSCITATION

- Use of a length-based resuscitation tape and/or other pediatric resources for quick references are preferred during newborn / neonatal resuscitation efforts.
- Once positive-pressure ventilation or supplementary oxygen administration is begun, assessment should consist of simultaneous evaluation of 3 clinical characteristics: heart rate, respiratory rate, and evaluation of the state of oxygenation (optimally determined by pulse oximetry rather than assessment of color).
- Pulse oximetry, with the probe attached to the right upper extremity, should be used to assess any need for supplementary oxygen. For babies born at term, it is best to begin resuscitation with air rather than 100% oxygen. Administration of supplementary oxygen should be regulated by blending oxygen and air, and the amount to be delivered should be guided by oximetry monitored from the right upper extremity (i.e., usually the wrist or palm).
- Routine suctioning of amniotic fluid is not recommended.
- It is imperative that the newborn be kept warm during resuscitation and transportation. Make sure the newborn is well wrapped and has a head cover. The ambulance should be warm enough to be uncomfortably hot for the EMS providers.
- The 2 thumb–encircling hands technique is recommended for performing chest compressions in newly born infants.
- During CPR, compressions and ventilations should be coordinated to avoid simultaneous delivery. The chest should be permitted to fully re-expand during relaxation, but the rescuer's thumbs should not leave the chest. There should be a 3:1 ratio of compressions to ventilations with 90 compressions and 30 breaths to achieve approximately 120 events per minute to maximize ventilation at an achievable rate. Thus, each event will be allotted approximately ½ second, with exhalation occurring during the first compression after each ventilation. Consider using higher ratios (e.g., 15:2) if the arrest is believed to be of cardiac origin.
- When administering a fluid bolus of Normal Saline, consider the volume of fluid given with Dextrose 12.5% and adjust accordingly.


Term gestation?
Breathing or crying?
Good tone?
Yes, Stay With Mother
Routine care
Provide warmth
Clear airway if necessary
Dry
Ongoing evaluation
No
Warm, clear airway if necessary, dry, stimulate
No
HR below 100, gasping or apnea?
No
Labored breathing or persistent cyanosis?
Yes
Yes
Positive pressure ventilation (PPV), SpO2 monitoring
Clear airway SpO2 monitoring
No
HR below 100?
Yes
Take ventilation corrective steps
Post resuscitation care
No
HR below 60?
Yes
Consider oropharyngeal airway
Chest compressions
Coordinate with PPV
Take ventilation corrective steps
No
HR below 60?
Consider:
Hypovolemia
Pneumothorax
Yes
IV Epinephrine
Targeted Preductal SpO2 After Birth
1 min 60-65%
2 min 65-70%
3 min 70-75%
4 min 75-80%
5 min 80-85%
10 min 85-95%

Protocol 4.15.1

OB / GYN – PREGNANCY RELATED EMERGENCIES
PROLAPSED UMBILICAL CORD

	EMR	EMT	AEMT	INT	PM
1. Administer oxygen to the mother and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	●	●	●	●	●
2. Position the mother with hips elevated, either in head and torso down position (on hands and knees with knees to chest) or the Trendelenburg position.	●	●	●	●	●
3. Elevate the newborn off the cord by inserting a gloved hand in the vagina and pushing up on the newborn's head.	●	●	●	●	●
4. Cover the exposed cord with a warm, moist gauze or cloth pad.	●	●	●	●	●
5. Monitor for pulsations in the cord. A pulsating cord indicates a viable newborn.	●	●	●	●	●
6. Ask the mother to pant during contractions and to NOT bear down.	●	●	●	●	●
7. Do not push the cord back in under any circumstances.	●	●	●	●	●
8. If time permits, establish an INT or IV or Normal Saline at KVO.			●	●	●
9. Initiate transport upon recognition of a prolapsed cord. Notify the receiving hospital as early as possible.		●	●	●	●

Protocol 4.15.2

OB / GYN – PREGNANCY RELATED EMERGENCIES
BREECH PRESENTATION

	EMR	EMT	AEMT	INT	PM
1. Administer oxygen to the mother and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	•	•	•	•	•
2. Never attempt to deliver the newborn by pulling on the legs.	•	•	•	•	•
3. Position the mother with hips elevated, either on hands and knees with knees to chest or in the McRoberts Maneuver (on her back and hyperflex her knees back towards her chest.	•	•	•	•	•
4. As the newborn's body is delivered, support it, and prevent an explosive delivery. If delivery is incomplete, wrap the torso in a towel to achieve a stable grip and rotate the torso so the fetus is face down in the birth canal. This is the best position to prevent head entrapment. Do not actively dry the torso or legs, as this may stimulate attempts to breathe. Keep the torso wrapped in a towel to maintain warmth. Avoid pressure on the cord.	•	•	•	•	•
5. Have an assistant apply **GENTLE** suprapubic pressure to keep the head flexed. After the shoulder blades appear, sweep the arms in front of the chest to deliver them. Rotate the torso slightly counterclockwise to sweep the right arm and clockwise to sweep the left arm. After the arms are delivered, elevate the torso upwards to facilitate delivery of the head. **Note:** *Never pull hard. If the delivery is not progressing just do your best to keep any body part elevated off the cord (might not be able to see the cord in which case don't go looking for it).* **Note:** *Except for the arm sweeps, only do the maneuvers while the mother is pushing with contractions. If she is not contracting, she does not need to push, just hold position, and wait for the next contraction. Do Not try to pull on the infant while she is not contracting / pushing.*	•	•	•	•	•
6. If the newborn completely delivers, follow **CARE OF THE NEWBORN**.	•	•	•	•	•
7. If time permits, establish an INT or IV or Normal Saline at KVO.			•	•	•
8. Initiate rapid transport upon recognition of a breech presentation.		•	•	•	•

Protocol 4.15.3

OB / GYN – PREGNANCY RELATED EMERGENCIES
LIMB PRESENTATION

EMR	EMT	AEMT	INT	PM
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
		•	•	•
	•	•	•	•

1. Administer oxygen to the mother and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.
2. Position the mother with hips elevated, either in head and torso down position (on hands and knees with knees to chest) or the Trendelenburg position.
3. If there is a prolapsed cord, follow the **PROLAPSED UMBILICAL CORD** protocol.
4. If time permits, establish an INT or IV or Normal Saline at KVO.
5. Initiate rapid transport upon recognition of a limb presentation.

Protocol 4.15.4

OB / GYN – PREGNANCY RELATED EMERGENCIES
SHOULDER DYSTOCIA

EMR	EMT	AEMT	INT	PM
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
		•	•	•

1. Administer oxygen to the mother and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.
2. Once the head delivers, assess for the presence of a nuchal cord. (Umbilical cord around the neck.)
3. If the anterior shoulder does not spontaneously deliver, when there is a contraction apply **GENTLE** downward traction on the infant's head.
4. If the mother is not already in position, lie her on her back and hyperflex her knees back towards her chest (McRoberts Maneuver). Additionally, ask her to open her knees laterally and apply **GENTLE** downward traction during a contraction.
5. If the McRoberts Maneuver fails, have an assistant apply downward suprapubic pressure to drive the fetal shoulder downward and under the pubic bone. Apply coordinated, **GENTLE** traction on the infant.
6. If downward suprapubic pressure is insufficient, have the assistant move their hand just lateral from the midline on the same side as the infant's back. Have them reapply suprapubic pressure moving from lateral to midline in an effort to rotate the infant's anterior shoulder under the pubic bone.
7. If the above maneuvers fail, have the mother roll over onto all fours (hands and knees position). Apply **GENTLE** traction downward in an attempt to deliver the posterior shoulder.
8. If the deliver does not progress, transport immediately with the mother in the left lateral recumbent position or knee-to-chest position.
9. If time permits, establish an INT or IV or Normal Saline at KVO.

Protocol 4.15.5

OB / GYN – PREGNANCY RELATED EMERGENCIES
POSTPARTUM HEMORRHAGE

EMR	EMT	AEMT	INT	PM
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
		•	•	•

1. Administer oxygen to the mother and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.
2. Perform a fundal massage. This should be performed aggressively and without delay.
3. Reference the **HYPOVOLEMIC SHOCK** and the **HEMORRHAGE / BLEEDING CONTROL** protocols.

   Note: Treat this condition like any other hemorrhage – check vital signs frequently.
4. Administer **TRANEXAMIC ACID** 1 Gram infusion over 10 minutes if the fundal massage is unsuccessful. Reference the formulary for additional instruction if needed.
   a. If bleeding continues after 30 minutes, administer a second dose of **TRANEXAMIC ACID** 1 Gram infusion over 10 minutes.

Key Points: OBSTETRICS – CHILDBIRTH COMPLICATIONS

- **PROLAPSED UMBILICAL CORD:** A prolapsed cord is a condition in which the umbilical cord is the presenting part during delivery. This condition is an emergency complication of delivery, because the cord may be compressed between the newborn and the mother's pelvis, cutting off fetal circulation before delivery.
- **BREECH PRESENTATION:** Breech presentation is the most common abnormal delivery. It involves the buttocks or both-legs-first delivery. The risk of trauma to the baby is high in breech deliveries. In addition, there is an increased risk of a prolapsed cord and meconium staining.
- **LIMB PRESENTATION:** Limb presentation occurs when a limb of a newborn protrudes from the vagina. The presenting limb is commonly a foot when the baby is in the breech position. Limb presentations cannot be delivered in the pre-hospital setting. Rapid transport is essential to the baby's survival.
- **SHOULDER DYSTOCIA:** Only attempt a traction maneuver when coordinated with the mother's contractions and pushing efforts. NEVER apply fundal pressure (this could worsen the shoulder impaction) or excessive traction to the infant's head.
- **POSTPARTUM HEMORRHAGE:** Postpartum hemorrhage is life-threatening for the mother. **Firm** pressure on the fundus of the uterus must be applied in a motion similar to that of kneading bread. The word "massage" should not be taken literally; this procedure is very painful. **Tranexamic Acid (TXA) for postpartum hemorrhage treatment should not be initiated more than 3 hours after birth.**

Protocol 4.16

GENERAL – PAIN CONTROL

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	●	●	●	●	●
4. For pain associated with a specific protocol (i.e., Medical – Chest Pain, Injury – Burns, Injury – Crush Syndrome, Intraosseous Insertion – EZ-IO®), refer to the appropriate protocol.	●	●	●	●	●
5. Assess pain severity. Use a combination of a pain scale, circumstances of the event, mechanism of injury, and the severity of the injury or illness.	●	●	●	●	●
6. Place patient in position of comfort. Employ non-pharmacological interventions such as splinting or cold therapy for joint / isolated trauma.	●	●	●	●	●
7. Establish an INT or IV of Normal Saline at KVO.			●	●	●
8. Monitor patient's respiratory status with quantitative waveform capnography, if available.		●	●	●	●
9. Utilize cardiac monitor at earliest availability.				●	●
10. NOTE: Consider Ondansetron as a prophylactic adjunct to prevent nausea and vomiting when administering narcotic analgesics Give **ONDANSETRON** 4 mg IV over 2 to 5 minutes (may repeat once in 10 minutes if needed) or IM.				●	●
11. For mild to moderate pain control, give **TORADOL** 15 mg IV or IM. Do not administer **TORADOL** to patients under the age of 17 years.			●	●	●
12. For pain control, give **FENTANYL** 0.5-2 mcg/kg or a maximum single dose of 100 mcg. Reassess and may repeat every 5 minutes at ½ the initial dose, if needed. or Consider **KETAMINE** 0.4 mg/kg IV over 1-2 minutes or a maximum single dose of 60 mg. May repeat as needed every 10 to 15 minutes to a maximum of three doses. Contact **[Medical Control]** for additional dosing. Do not administer **KETAMINE** in patients under the age of 12 years and/or under 50 kg (Intermediate Level Only). a. Use caution in geriatric patients [age >65 years] and refer to specific medication formularies.				●	●
13. For pain control for patients under the age of 12 years and/or under 50 kg, consider **KETAMINE** 0.1 mg/kg IM.					●

Protocol 4.17.1

AIRWAY – OBSTRUCTION / FOREIGN BODY
FBAO – CONSCIOUS PATIENT ≥1 YEAR OF AGE

EMR	EMT	AEMT	INT	PM
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•

1. For the suspected conscious choking victim, quickly ask, "Are you choking?" If the victim indicates "yes" by nodding his head without speaking, this will verify that the victim has severe airway obstruction.
    a. **Note:** If the patient has a mild obstruction and is coughing forcefully, do not interfere with the patient's spontaneous coughing and breathing efforts.
2. Apply abdominal thrusts (Heimlich Maneuver) in rapid sequence until the obstruction is relieved.
    a. If the choking patient is obese and the rescuer cannot encircle the patient's abdomen, use chest thrusts instead of abdominal thrusts.
    b. If the choking patient is in the late stages of pregnancy, use chest thrusts instead of abdominal thrusts.
3. If the patient becomes unresponsive, carefully support the patient to the ground and follow the **FBAO – UNCONSCIOUS PATIENT GREATER THAN OR EQUAL TO 1 YEAR OF AGE** protocol.

Protocol 4.17.2

AIRWAY – OBSTRUCTION / FOREIGN BODY
FBAO – CONSCIOUS PATIENT <1 YEAR OF AGE

EMR	EMT	AEMT	INT	PM
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•

1. Assess the patient to determine the extent of the obstruction. When the airway obstruction is mild, the infant can cough and make some sounds. When the airway obstruction is severe, the infant cannot cough or make any sound.
2. If FBAO is **mild**, do not interfere. Allow the victim to clear the airway by coughing while you observe for signs of severe FBAO.
3. If the FBAO is **severe** (i.e., the victim is unable to make a sound), deliver 5 back blows (slaps) followed by 5 chest thrusts.
4. If the patient becomes unresponsive, follow the **FBAO – UNCONSCIOUS PATIENT LESS THAN 1 YEAR OF AGE** protocol.

Key Points: RESPIRATORY DISTRESS – AIRWAY OBSTRUCTION

Death from foreign body airway obstruction (FBAO) is an uncommon but preventable cause of death. Most reported cases of FBAO in adults are caused by impacted food and occur while the victim is eating. Most reported episodes of choking in infants and children occur during eating or play, when parents or childcare providers are present. Foreign bodies may cause either mild or severe airway obstruction. The rescuer should intervene if the choking victim has signs of severe airway obstruction. These include signs of poor air exchange and increased breathing difficulty, such as a silent cough, cyanosis, or inability to speak or breathe. When FBAO produces signs of severe airway obstruction, rescuers must act quickly to relieve the obstruction. If mild obstruction is present and the victim is coughing forcefully, do not interfere with the patient's spontaneous coughing and breathing efforts. Attempt to relieve the obstruction only if signs of severe obstruction develop.

Protocol 4.17.3

AIRWAY – OBSTRUCTION / FOREIGN BODY
FBAO – UNCONSCIOUS PATIENT ≥1 YEAR OF AGE

EMR	EMT	AEMT	INT	PM
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
			•	•
				•

1. If the patient was previously conscious with an airway obstruction, carefully support the patient to the ground.
2. Start **CPR**, beginning with chest compressions (do not check pulse).
3. Each time the airway is opened during CPR, look for an object in the victim's mouth and if found, remove it.
4. If the FBAO is not relieved by BLS maneuvers, attempt direct visualization of the airway via laryngoscopy. If the obstruction is visualized, use forceps to remove the obstruction.
5. If the FBAO is not relieved by BLS maneuvers or laryngoscopy, perform a **CRICOTHYROTOMY**.

Protocol 4.17.4

AIRWAY – OBSTRUCTION / FOREIGN BODY
FBAO – UNCONSCIOUS PATIENT <1 YEAR OF AGE

EMR	EMT	AEMT	INT	PM
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
			•	•

1. If the patient was previously conscious with an airway obstruction, carefully position the patient for CPR.
2. Start **CPR**, beginning with chest compressions (do not check pulse).
3. Each time the airway is opened during CPR, look for an object in the victim's mouth and if found, remove it.
4. If the FBAO is not relieved by BLS maneuvers, attempt direct visualization of the airway via laryngoscopy. If the obstruction is visualized, use forceps to remove the obstruction.

Key Points: RESPIRATORY DISTRESS – AIRWAY OBSTRUCTION

- BLS providers should request ALS assistance if BLS maneuvers do not clear the airway.

Protocol 4.18

MEDICAL – RESPIRATORY DISTRESS – ASTHMA / COPD / CROUP / REACTIVE AIRWAY DISEASE

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	●	●	●	●	●
4. Place patient in a position of comfort, typically sitting upright.	●	●	●	●	●
5. Monitor pulse oximetry.		●	●	●	●
6. Monitor capnography, if available.		●	●	●	●
7. Assist patient with prescribed **METERED DOSE INHALER** (MDI). If no dosing schedule is prescribed, repeat in 5 to 10 minutes as needed.		●	●	●	●
8. If in critical respiratory distress, provide BVM ventilation with patient's spontaneous efforts. If patient becomes unresponsive, perform BVM ventilation with an airway adjunct. If BVM ventilation is inadequate, secure airway with an endotracheal tube **[INT, PM]** or a King LT airway.		●	●	●	●
For patients in respiratory distress:					
9. Give **ALBUTEROL** 2.5 mg and **IPRATROPIUM** 0.5 mg via small volume nebulizer.		●	●	●	●
a. Less than 4 years of age – nebulizer held under the face		●	●	●	●
b. Greater than or equal to 4 years of age – nebulizer with mouthpiece or face mask.		●	●	●	●
c. Repeat Albuterol up to 4 treatments if respiratory distress persists and no contraindications develop. Note: Ipratropium Bromide is only administered with the first treatment.		●	●	●	●
10. Start an IV of Normal Saline.			●	●	●
11. If patient is in significant distress, give **METHYLPREDNISOLONE** 2 mg/kg up to 125 mg IV over 1 to 2 minutes or IM.			●	●	●
12. Administer **CPAP** per manufacturer specifications. The use of an in-line nebulization device is acceptable if available.		●	●	●	●
13. ***In the asthmatic patient***, for severe respiratory distress that is non-responsive to standard medications:			●	●	●
a. Consider administration of **MAGNESIUM SULFATE** IV 25 mg/kg up to 2 g diluted in 100 mL Normal Saline over 20 minutes.				●	●
b. Consider administration of **EPINEPHRINE 1:1,000** 0.01 mg/kg up to 0.3 mg IM in the patient with a known history of asthma.			●	●	●
14. Place on cardiac monitor.				●	●
15. Perform reassessment as indicated.	●	●	●	●	●
16. **EPINEPHRINE** 1:10,000 0.3 mg to 0.5 mg IV for dire circumstances for asthmatics only.				●	●

Protocol 4.18 – MEDICAL – RESPIRATORY DISTRESS – ASTHMA / COPD / CROUP / REACTIVE AIRWAY DISEASE

Key Points: RESPIRATORY DISTRESS – ASTHMA

- Decompensated asthma may range from mild respiratory distress to respiratory failure. Bronchospasm is often worsened by environmental exposure (smoke, dust, heat, cold, etc.), infection (bronchitis, upper respiratory infection, or pneumonia) or medication noncompliance. Asthma often presents with wheezing. The pre-hospital goal is to maintain stable vital signs, support ventilations, obtain history, reduce bronchospasm, and improve oxygenation.
- Chronic Obstructive Pulmonary Disease (COPD) is a progressive and irreversible disease of the airway marked by decreased inspiratory and expiratory capacity of the lungs. COPD may result from chronic bronchitis (excess mucus production) or emphysema (lung tissue damage with loss of elastic recoil of the lungs). COPD patients usually suffer from a combination of chronic bronchitis and emphysema. Decompensated Chronic Obstructive Pulmonary Disease (COPD) may range from mild respiratory distress to respiratory failure. The pre-hospital goal is to maintain stable vital signs, support ventilations, obtain history, reduce bronchospasm, and improve oxygenation.
- Auscultation of a quiet sounding chest in a patient who is obviously short of breath is an ominous sign and should be treated with urgency.
- ***All that wheezes is not asthma!*** Wheezes may also be present with other diseases that cause dyspnea, such as COPD, heart failure, pulmonary embolism, pneumothorax, toxic inhalation, foreign body aspiration, and other pathological states. Always consider the possibility of a foreign body in the airway, especially in young children with wheezing and no history of asthma. A complete history and thorough patient examination are necessary for appropriate emergency care decisions.
- A patient with a history of CHF that has wheezing on auscultation of lung sounds should not be automatically classified as an “asthma patient”. If the CHF patient does not have a history of asthma or allergic reaction, the more prudent assessment would be that of CHF.
- Give Epinephrine cautiously with geriatric and cardiac patients.

Key Points: RESPIRATORY DISTRESS – COPD

- Never withhold oxygen from ill or injured patients based on the unlikely possibility that they may be Carbon Dioxide retainers.
- Some patients with COPD call their disease “asthma.” This use of terms is a misnomer since patients with COPD never have totally normal airway function.
- Auscultation of a quiet sounding chest in a patient who is obviously short of breath is an ominous sign and should be treated with urgency.

Protocol 4.19

MEDICAL – RESPIRATORY DISTRESS – CROUP / EPIGLOTTITIS

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (SECTION 1).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Administer *humidified* oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	●	●	●	●	●
4. Place patient in a position of comfort.	●	●	●	●	●
5. Consider monitoring quantitative waveform capnography, if available.		●	●	●	●
6. Do not attempt to visualize the airway or place anything in the patient's mouth.	●	●	●	●	●
7. Keep the patient as calm and comfortable as possible.	●	●	●	●	●
8. If the patient is experiencing moderate to severe respiratory distress, contact **[Medical Control]** and consider an Epinephrine nebulizer treatment.				●	●
a. Assemble nebulizer and place 3 mg (3 mL) of EPINEPHRINE 1:1,000 in the nebulizer. Connect to oxygen set to the appropriate flow rate.				●	●
i. Less than 4 years of age – nebulizer held under the face.				●	●
ii. Greater than or equal to 4 years of age – nebulizer with mouthpiece or face mask.				●	●
9. Establish an INT or IV of Normal Saline at KVO.			●	●	●
10. Consider METHYLPREDNISOLONE 2 mg/kg up to 125 mg IV over 1 to 2 minutes or IM for significant stridor. **[Medical Control]**			●	●	●
11. Place on cardiac monitor.				●	●
12. Perform reassessment as indicated.	●	●	●	●	●

Key Points: RESPIRATORY DISTRESS – CROUP / EPIGLOTTITIS

- Croup is a respiratory illness that typically occurs in children between 3 months and 3 years of age. Croup is usually a viral infection that has a slow onset following an upper respiratory infection and low fever. The patient commonly presents with hoarseness, respiratory stridor, and a characteristic "bark" in the form of a cough. Wheezing is possible with lower airway involvement.
- Epiglottitis is an inflammation of the epiglottis that typically occurs in children from 3 to 7 years of age. Epiglottitis is caused by bacteria and has a rapid progression. While the disease is rare, it is a true emergency because the child can progress to complete airway obstruction and respiratory arrest. Epiglottitis may occur in the adult population as well.

Protocol 4.20

MEDICAL – PULMONARY EDEMA / CHF

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation. Consider supporting respirations with a BVM.	●	●	●	●	●
4. Administer **CPAP** per manufacturer specifications.		●	●	●	●
5. Transport the patient immediately positioned in an upright position.	●	●	●	●	●
6. Monitor pulse oximetry.		●	●	●	●
7. Monitor capnography, if available.		●	●	●	●
8. Place patient on cardiac monitor.				●	●
9. Establish an INT or IV of Normal Saline at KVO.			●	●	●
10. Give Nitroglycerin.					
a. **SBP 90 mm Hg and higher:** Give 1 inch of **NITROPASTE 2%**.			●	●	●
11. Administer FUROSEMIDE 40 mg slow IV push over 2 to 3 minutes.				●	●
12. Consider endotracheal intubation for severe respiratory distress if tolerated by the patient.				●	●
13. Perform reassessment as indicated.	●	●	●	●	●

Pulmonary edema with SBP greater than or equal to 90 mm Hg
If SBP less than 90 mm Hg, see **SHOCK – NON-HYPOVOLEMIA** protocol.

Key Points: RESPIRATORY DISTRESS – PULMONARY EDEMA (CHF)

- Congestive Heart Failure (CHF) is an imbalance in pump function in which the heart fails to maintain the circulation of blood adequately. The most severe manifestation of CHF, pulmonary edema, develops when this imbalance causes an increase in lung fluid secondary to leakage from pulmonary capillaries into the interstitial space and alveoli of the lung. The onset may be gradual or acute. Constant monitoring of the patient's airway and breathing is mandatory. The pre-hospital goal is to maintain proper patient positioning, oxygenation, provide assisted ventilation if necessary. initiate drug therapy to reduce the amount of fluid in the lungs and improve gas exchange and heart function.
- BLS providers should call for ALS assistance if the patient is experiencing moderate to severe respiratory distress.
- Most patients with acute congestive heart failure have elevated blood pressure. Patients with acute pulmonary edema and hypotension are "priority" patients who may rapidly deteriorate and develop respiratory or cardiac arrest.
- Keep the patient in a sitting position with the legs below the level of the heart if possible. Most patients naturally assume this posture.
- Continually assess the need to provide positive pressure ventilations for these patients.
- Do not delay transport.
- Administration of Furosemide (Lasix) rapidly can produce ringing in the patient's ears.

Protocol 4.21

MEDICAL – SEIZURES

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
a. Suction the oro- and nasopharynx as necessary.	●	●	●	●	●
b. Place a nasopharyngeal airway as necessary.	●	●	●	●	●
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation. Support respirations as necessary with a BVM.	●	●	●	●	●
4. Do not restrain the patient. Let the seizure take its course. Place a pillow, rolled blanket, or other padding material beneath the patient's head to prevent injury.	●	●	●	●	●
5. Perform rapid glucose determination. If glucose less than 60 mg/dL or clinical signs and symptoms indicate hypoglycemia, refer to the **HYPOGLYCEMIA** protocol.	●	●	●	●	●
6. Establish an INT or IV of Normal Saline at KVO.			●	●	●
7. If the seizure persists and the rapid glucose determination is greater than 60 mg/dL, give **MIDAZOLAM** 2.5 mg to 5 mg slow IV push, titrated to effect.				●	●
a. Repeat dose in 5 minutes if seizure persists.				●	●
b. **Note:** If unable to establish an IV, give **MIDAZOLAM** 5 mg IM.				●	●
8. For a seizure refractory to 2 doses of Midazolam, contact **[Medical Control]** for further definitive treatment options.				●	●
9. Place patient on cardiac monitor (sometimes life-threatening dysrhythmias can cause seizure-like activity).				●	●
10. Consider placing the patient in the recovery position during the postictal period.	●	●	●	●	●
11. Perform reassessment as indicated.	●	●	●	●	●

For seizures due to THIRD TRIMESTER ECLAMPSIA:

12. Perform steps 1 through 5.	●	●	●	●	●
13. Place the patient on her left side and transport.	●	●	●	●	●
14. Establish an INT or IV of Normal Saline at KVO.			●	●	●
15. If seizure persists, give **MAGNESIUM SULFATE** 4 g [20% solution 20 mL] IV over 5 minutes or 4 g IM.				●	●
a. Repeat dose (if available) in 5 minutes if seizure persists **[Medical Control]**.				●	●
16. Give **MIDAZOLAM** mg slow IV push or 5 mg IM, titrated to effect. Repeat dose in 5 minutes if seizure persists.				●	●
17. Perform reassessment as indicated.	●	●	●	●	●

Protocol 4.21 – MEDICAL – SEIZURES

Key Points: SEIZURES

- There are different presentations for seizure disorders. Most commonly, seizures are generalized, tonic-clonic, or grand mal. These seizures may involve violent shaking of the upper and lower extremities, urinary incontinence, and often an injury such as tongue-biting. Other seizures may be localized to a single muscle group or may not involve visible seizure activity at all (i.e., partial seizure). The pre-hospital goal is to maintain stable vital signs, protect the patient's airway and c-spine, minimize trauma, and provide an accurate description of seizure activity for the emergency physician. Maintain the airway in the best way possible.
- Many patients with seizures develop transient airway obstruction during the seizure.
- Do not insert airways or bite bars between the teeth. Doing so could possibly damage the patient's teeth and your fingers.
- Be alert for violent postictal behavior.
- Some patients will have a neurological deficit following a seizure. This deficit may last up to two hours.
- A small number of patients actually suffer injury to the head or spine during the seizure. If spinal tenderness or neurological deficit is present, assume that spinal injury has occurred and immobilize the patient.
- Some patients fail to take antiseizure medication regularly. Some are compliant with medications but need to have the dosage adjusted. Transport to the hospital for evaluation is recommended for all patients who have had a seizure.
- Be alert for respiratory depression following the administration of Midazolam.
- If seizures result from excessive alcohol intake refer to **COMBATIVE PATIENT (NON-TRAUMATIC)** Protocol.

Protocol 4.22

MEDICAL – HYPOTENSION / SHOCK (NON-TRAUMA)

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Assess for signs of shock including, but not limited to: • Restlessness, altered mental status, hypoperfusion (cool, pale, moist skin), tachypnea (rapid breathing), rapid, weak pulse, orthostatic hypotension (blood pressure suddenly drops on standing up), nausea, and thirst.	●	●	●	●	●
4. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation. Support respirations as necessary with a BVM.	●	●	●	●	●
5. Transport as soon as possible.	●	●	●	●	●
6. Control external bleeding **(BLEEDING / HEMORRHAGE CONTROL)**.	●	●	●	●	●
7. Place patient in supine position unless head injury is suspected. If pregnant (uterine fundus above umbilicus), place the patient on her left side.	●	●	●	●	●
8. Maintain body temperature by protecting the patient from the environment, removing wet clothing, and covering the patient with a blanket.	●	●	●	●	●
9. Establish an IV of Normal Saline.			●	●	●
a. ***Do not delay transport to establish vascular access.***			●	●	●
10. Give fluid amounts as listed below. **While administering a fluid bolus, frequently reassess perfusion for improvement.** If perfusion improves, slow the IV to KVO and monitor closely. If patient develops fluid overload respiratory distress (dyspnea, crackles, rhonchi, decreasing SpO_2), slow the IV to KVO.			●	●	●
a. **ADULTS / CHILDREN**: Give a 20 mL/kg bolus. If no improvement after two 20 mL/kg boluses, contact **[Medical Control]** for direction.			●	●	●
b. **NEONATES**: Give a 10 mL/kg bolus. If no improvement after one 10 mL/kg bolus, contact **[Medical Control]** for direction.			●	●	●
11. Perform reassessment as indicated.	●	●	●	●	●

Key Points: SHOCK – HYPOVOLEMIA

- Shock results from inadequate perfusion because of a lack of blood volume and/or pressure. Shock can result from injuries, illness, infection, and allergic reactions. Shock is progressive and, if untreated, can result in death. The pre-hospital goal is to maintain a patent airway and increase oxygen delivery to the brain, increase blood pressure to maintain adequate perfusion, and treat for any potentially reversible cause.
- TRANSPORT AS SOON AS POSSIBLE. **TIME = BLOOD LOSS**.
- Decreased blood pressure is a late sign of shock. Do not depend on blood pressure measurements alone to determine the presence of shock.
  - o Pediatric note: Children often lose 30% of their blood supply before experiencing a drop in blood pressure.

Protocol 4.23

MEDICAL – SHOCK – NON-HYPOVOLEMIA (CARDIOGENIC)

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Assess for signs of shock including, but not limited to: • Altered mental status, cold, hypoperfusion (cold, ashen, moist skin), rapid and shallow respirations, rapid and thready pulse, hypotension (SPB less than 90 mm Hg), and lowered oxygen saturation on pulse oximetry.	●	●	●	●	●
4. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation. Support respirations as necessary with a BVM.	●	●	●	●	●
5. Transport as soon as possible.	●	●	●	●	●
6. Place patient in a supine position if respiratory effort is not compromised.	●	●	●	●	●
7. Start an IV of Normal Saline.			●	●	●
8. If breath sounds are clear, heart rate is between 60–150, SBP less than 90 mm Hg, and signs and symptoms of shock are present:					
a. Give a 250 mL bolus of Normal Saline.			●	●	●
b. If no response and no contraindications develop, repeat a 250 mL bolus of Normal Saline.			●	●	●
c. ***While administering fluid boluses, frequently reassess perfusion for improvement and/or fluid overload respiratory distress.*** If perfusion improves, slow the IV to KVO and monitor closely. If patient develops fluid overload respiratory distress (dyspnea, rales, crackles, decreasing SpO_2), slow the IV to KVO.			●	●	●
9. If perfusion does not improve with fluid boluses or if pulmonary edema is present prohibiting administration of fluid and SBP less than 90 mm Hg:					
a. Give a **NOREPINEPHRINE** IV infusion at 0.1–0.5 mcg/kg/minute IV (maximum of 16 mcg/minute). Titrate to SBP = 90 mm Hg.				●	●
10. Perform reassessment as indicated.	●	●	●	●	●

Key Points: SHOCK – NON-HYPOVOLEMIA (CARDIOGENIC)

- Variable hemodynamic states can accompany acute myocardial infarction depending on the nervous system's response or contractile damage to the heart as a pump. Shock can result from several pathologies including heart rate, damage to the pump, and/or hypovolemic states. Careful evaluation of the patient for the origin or other possible causes of hemodynamic alterations (i.e., pulmonary embolism, septic shock, cardiac tamponade, neurogenic shock, and aortic aneurysm) needs to be done prior to treatment. The pre-hospital goal is to maintain a patent airway and increase oxygen delivery to the organs of the body including the heart and the brain.
- Norepinephrine and Dopamine should not be given to a patient who is significantly volume depleted. Hypovolemia must be corrected prior to administration of a Norepinephrine and/or Dopamine infusion to maximize potential for improved perfusion.
- Most non-traumatic hypotension is a result of one of the shock syndromes or hypovolemia. It is important to manage the cause of the problem if it can be identified.
- Hypotension may be a result of a dysrhythmia. Bradycardia or tachycardia should be treated according to those protocols.
- Cardiogenic shock is caused by profound failure of the cardiac muscle, primarily the left ventricle. When greater than 40% of the left ventricle is nonfunctional, the heart loses its ability to pump blood into the circulatory system. Cardiogenic shock can be caused by several factors, including:
    - Severe myocardial infarction.
    - Severe heart failure.
    - Cardiac valve muscle rupture.
    - Trauma causing excessive pressure on the heart (e.g., cardiac tamponade, tension pneumothorax).

For pulmonary edema with SBP greater than or equal to 90 mm Hg,
see the **RESPIRATORY DISTRESS – PULMONARY EDEMA (CHF)** protocol.

Protocol 4.24

INJURY – SPINAL CORD

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Provide manual in-line stabilization of the head and neck.	●	●	●	●	●
3. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
4. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	●	●	●	●	●
5. Apply the **SELECTIVE SPINAL IMMOBILIZATION / CLEARANCE** procedure. If spinal immobilization is indicated, proceed to Step 4.	o	●	●	●	●
6. Apply an appropriately sized rigid cervical collar.	o	●	●	●	●
7. Assess sensory and motor function in all four extremities.	o	●	●	●	●
8. Based on the patient's priority, apply the appropriate spinal immobilization device, or perform the appropriate procedure, including, but not limited to:	o	●	●	●	●
a. **Spinal Motion Restriction (SMR)** – Cervical collar and ambulance stretcher; patient is self-assisting from position found directly onto stretcher in position of comfort, typically Semi-Fowler's position with < 30° elevation of the head of the stretcher.	o	●	●	●	●
b. **SMR With Board Assistance** – Cervical collar, spider straps, and head blocks on a long spine board or other rigid type immobilization device.	o	●	●	●	●
c. **If Standing** – Apply an appropriately sized cervical collar and instruct the patient to lie down onto the stretcher.	o	●	●	●	●
9. Reassess sensory and motor function in all four extremities.	●	●	●	●	●
10. Transport as soon as possible.	●	●	●	●	●
11. Perform reassessment as indicated.	●	●	●	●	●

o Spinal immobilization may be performed by an Emergency Medical Responder if the provider has received specific training on the procedure and authorization from the Agency EMS Physician.

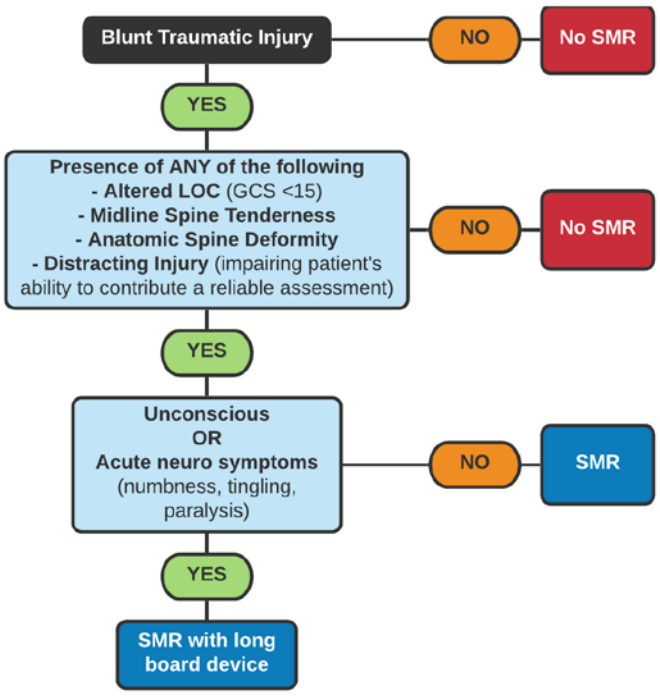
Protocol 4.24 – INJURY – SPINAL CORD

Key Points: SPINAL CORD INJURY
• Suspect spinal injury in vehicular trauma, diving accidents, jumps or falls from a height, significant injury above the clavicles, crush injuries, lightning or electrical injuries, gunshot wounds to the head, neck, chest, back, or abdomen, multi-trauma victims, patients who are unconscious after trauma, and any time the mechanism of injury suggests the possibility of a spinal cord injury. A normal neurological exam—or a patient who is ambulatory at the scene— does not rule out the possibility of a spinal cord injury. The neurological exam should be carried out before and after any type of Spinal Motion Restriction and must include assessment of motor, sensory, and distal circulation.
• There are no "standing take-down" processes. Ambulatory patients found at scenes are to be instructed to and be assisted with sitting on the stretcher.
• The backboard is considered a patient movement device and not a patient transport device; time spent on a long spine board should be kept to a minimum.
• When using a long spine board to move a patient to the stretcher, it is not necessary to use head blocks in instances when the board is going to be removed and SMR provided by the stretcher.
• Patients are NOT to receive Spinal Motion Restriction in cases of penetrating trauma. These patients are to be transported in a position that allows for appropriate management.
• Patients who experience shortness of breath and/or cannot tolerate being supine may have the head of stretcher elevated only to the point of resolving the complaint. SMR cannot be achieved in patients sitting upright.
• When arriving at the receiving facility, EMS Providers should use slide boards and/or additional staff to the point of reducing potential spinal motion.
• If critical patients are going to be loaded into air medical transport, the use of a Reeves™, scoop stretcher, or long spine board may facilitate patient movement, therefore facilitating a more rapid transport to tertiary care.
• No patients will be forced against their will or wrestled into a position of Spinal Motion Restriction.
• Severe pain associated with spinal trauma should be treated with ALS medications when available.

Protocol 4.24 – GENERAL – SPINAL IMMOBILIZATION / CLEARANCE

EMS providers may withhold spinal immobilization if the following algorithm is applied, and the endpoint is "Consider No Immobilization."

SELECTIVE SPINAL MOTION RESTRICTION



- Patients shall possess at least one of the four assessment findings to be placed in SMR.
- A cervical collar is placed on the patient, prior to any movement.
- When possible, patients should be allowed to assist in their movement / placement onto device.
- Any fall or MVC in the elderly population (~65 or above should present a higher index of suspicion for spinal injury.
- In pediatrics, there is no difference in approach except for a higher index of suspicion for spinal injury in children who have a significant torso injury or high-impact motor vehicle crash.
- Avoid instances where the patient will be on the board for long periods of time.
- Patients should be placed in the supine or head elevated no more than 30° position on stretchers unless priority treatments / management dictates otherwise.
- A long board, scoop stretcher, or Reeves® type device may be utilized to move someone to an ambulance cot or helicopter cot when available (expediting transport).

Key Points: SELECTIVE SPINAL MOTION RESTRICTION

- If the immobilization process is initiated prior to assessment, STOP, and perform spine injury assessment to determine best course of action.
- Penetrating trauma victims benefit most from rapid assessment and transport to a trauma center without spinal immobilization.

Protocol 4.25

MEDICAL – ST ELEVATION MYOCARDIAL INFARCTION (STEMI)

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Treat dysrhythmias. Be prepared to initiate CPR and defibrillation, if necessary.	●	●	●	●	●
4. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	●	●	●	●	●
5. Obtain a 12-Lead ECG in accordance with **12-LEAD ECG ACQUISITION**. ***NOTE: 12-Lead ECG should be acquired within 10 minutes of patient contact.*** a. If able, transmit the 12-Lead ECG to the receiving facility as soon as possible. b. If unable to transmit the 12-Lead ECG, contact **[Medical Control]** at the receiving facility and advise the ECG machine interpretation.	o	●	●	●	●
6. Triage the patient into one of the following two categories based on the 12-Lead ECG machine interpretation and clinical presentation:		●	●	●	●
CATEGORY 1 **DIRECT TRANSPORT TO CARDIAC CATHETERIZATION FACILITY**. o 12-Lead ECG interpretation with an "ACUTE MI" or "…INFARCT, ACUTE" statement. o Contact **[Medical Control]** at the receiving facility as soon as practical to provide a complete patient report. o If the transport time to the cardiac catheterization facility is greater than 30 minutes, consider rendezvous with air medical support. ***Do not delay patient transport*** (*Key Points*).		●	●	●	●
CATEGORY 2 **TRANSPORT TO CLOSEST HOSPITAL** o Any hemodynamically unstable patient (SBP less than 90 mm Hg, altered mental status, bradycardia, respiratory distress, etc.)		●	●	●	●
7. Apply defibrillation pads to a patient with an indicated myocardial infarction **(Intermediate and Paramedic level providers only)**. Be prepared to defibrillate if needed.				●	●
8. Perform reassessment as indicated. Notify the receiving medical facility of any changes in the patient's condition.		●	●	●	●

Key Points: STEMI TRIAGE

- Acute myocardial infarctions (AMIs) are one of the diseases identified as acute coronary syndromes (ACS). The 12-Lead ECG in ACS may include ST-segment elevation myocardial infarction (STEMI), ST-segment depression, and nondiagnostic ST-segment and T-wave abnormalities. Treatment of ACS, particularly STEMI, is extremely time sensitive. The pre-hospital caretakers of ACS patients can have a big impact on patient outcome if they provide efficient triage, stabilization, and referral for cardiology care. It is critical that BLS and ALS providers who care for ACS patients in the field, emergency department, and hospital be aware of the principles and priorities of assessment and stabilization of these patients. Patients with STEMI usually have complete blockage of a coronary vessel. The treatment is reperfusion through administration of fibrinolytics (pharmacologic reperfusion) or primary PCI (mechanical reperfusion).
- First Medical Contact (FMC) to ECG <10 minutes, ECG to Decision <10 minutes, Scene Time <10 minutes to provide early identification and pre-hospital arrival notification for suspected myocardial infarction or STEMI. Ideally, 12-Lead ECG acquisition and treatment of the patient (i.e., administration of Oxygen, Aspirin, etc.) should occur concurrently.
- The preferred IV site location is left arm, especially for STEMI patients. Avoid the right wrist area for IV insertion due to the intervention center being predominantly right radial.
- ST-segment elevation >1 mm (0.1 mV) in 2 or more contiguous precordial leads or 2 or more adjacent limb leads is classified as ST-Elevation MI (STEMI). ST-segment depression >2 mm (0.2 mV) in leads V1-V3 is classified as an infero-basal myocardial ischemia (posterior infarction).
- Diagnostic ST elevation in the absence of left ventricular (LV) hypertrophy or left bundle branch block (LBBB) is defined by the European Society of Cardiology / ACCF / AHA / World Heart Federation Task Force for the Universal Definition of Myocardial Infarction as new ST elevation at the J point in at least 2 contiguous leads of ≥2 mm (0.2 mV) in men or ≥1.5 mm (0.15 mV) in women in leads V2-V3 and/or of ≥1 mm (0.1 mV) in other contiguous chest leads or the limb leads.
- The majority of patients will evolve ECG evidence of Q-Wave infarction. New or presumably new LBBB at time of presentation, however, are “not known to be old” because of prior electrocardiogram (ECG) is not available for comparison. New or presumably new LBBB at presentation occurs infrequently, may interfere with ST-Elevation analysis, and should not be considered diagnostic of acute myocardial infarction (MI) in isolation.
- Pre-designated landing zones for helicopters are preferred. The landing zone should be selected in such a way that the helicopter would be expected to arrive before the ambulance that is transporting the patient.
- In some cases, with short transport times, transport to the closest facility may be advantageous for the administration of fibrinolytics based on the time of onset of signs and symptoms.
- Transport performing interventions en route. **Time is muscle!**

SGARBOSSA (SMITH'S MODIFIED) CRITERIA

- In patients with LBBB or a paced ventricular rhythm, STEMI diagnosis is difficult. Smith's Modified Sgarbossa Criteria has been shown 80% sensitive and 99% specific for acute coronary occlusion. Smith-Modified Sgarbossa Criteria suggests a presumptive diagnosis of Acute Myocardial Infarction (AMI) based upon the following criteria:
    - ≥ 1 lead with ≥ 1 mm of concordant ST elevation (5 points)
    - ≥ 1 lead of V1-V3 with ≥ 1 mm of concordant ST depression (3 points)
    - ≥ 1 lead anywhere with ≥ 1 mm ST elevation and proportionally excessive discordant ST elevation, as defined by ≥ 25% of the depth of the preceding S-Wave (2 points)
- The specificity of Smith's Modified Sgarbossa Criteria increases with score. A score of ≥ 3 suggests 90% specificity. However, the score is not necessarily sensitive, and a low score should not be used to rule out an Acute Myocardial Infarction (AMI).
- https://litfl.com/sgarbossa-criteria-ecg-library/

Protocol 4.26

MEDICAL – STROKE / TIA

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (SECTION 1).	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation. ***Be alert for aspiration, upper airway obstruction, and hypoventilation*.**	•	•	•	•	•
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	•	•	•	•	•
4. Determine time of last seen normal and time of onset of signs and symptoms. (See Key Points.)	•	•	•	•	•
5. Perform Cincinnati Pre-Hospital Stroke Scale evaluation. Initiate Stroke Protocol immediately after a positive Cincinnati Pre-Hospital Stroke Scale. If positive, perform Rapid Arterial Occlusion Evaluation (RACE).	•	•	•	•	•
6. Perform rapid glucose determination. If glucose less than 60 mg/dL or clinical signs and symptoms indicate hypoglycemia, refer to the HYPOGLYCEMIA protocol.	•	•	•	•	•
7. Position patient with head elevated 30° unless the patient shows signs or symptoms of hypoperfusion.	•	•	•	•	•
8. Transport rapidly, but carefully. ***Notify the receiving hospital as early as possible.*** Ensure hospital is notified of the time last seen normal and time of onset of signs and symptoms. Scene time should be less than 10 minutes.	•	•	•	•	•
9. Establish an INT or IV of Normal Saline at KVO. Unless the patient is hypotensive (SBP <90 mm Hg), intervention for blood pressure is not recommended.			•	•	•
10. Place patient on cardiac monitor and 12-Lead ECG if time permits.				•	•
11. Based on time of onset of symptoms.		•	•	•	•
a. If **≤6 hours since onset of symptoms**, preferentially transport to a Designated Stroke Center. Patients may be transported to Level 3 Thrombectomy-Capable Stroke Center (TSC) or Level 4 Acute Stroke Ready Hospital (ASRH) stroke-ready hospitals[1]. ***Note:*** *If patient does not have a patent airway and/or is hypotensive, consider transport to the closest hospital.*		•	•	•	•
b. If **>6 hours since onset of symptoms**, discuss case with **[Medical Control]** as a potential acute stroke for assistance in destination determination and mode of transport.		•	•	•	•
c. If **onset of symptoms is between 6 hours and 24 hours**, still consider transport to a Level 3 (Thrombectomy-Capable Stroke Center (TSC) if RACE score is higher than 7 which indicates a high level of suspicion for a Large Vessel Occlusion (LVO).		•	•	•	•
12. If RACE score is 7 or greater and if the transport time is greater than 30 minutes, consider rendezvous with air medical support. Do not delay patient transport.		•	•	•	•
13. **IMPORTANT**: Ensure that a witness accompanies the patient to the hospital / LZ or a contact telephone number for the witness is secured for the hospital. ***Record the time last seen normal and witness telephone number on a piece of tape across the patient's chest.***	•	•	•	•	•
14. Perform reassessment as indicated.	•	•	•	•	•

Cincinnati Pre-Hospital Stroke Scale	
F-(face)	**FACIAL DROOP: Have patient smile or show teeth. (Look for asymmetry.)** **Normal**: Both sides of the face move equally or not at all. **Abnormal**: One side of the patient's face droops.
A-(arm)	**MOTOR WEAKNESS: Arm drift (close eyes, extend arms, palms up)** **Normal**: Remain extended equally, drifts equally, or does not move at all. **Abnormal**: One arm drifts down when compared with the other.
S-(speech)	**"You can't teach an old dog new tricks." (repeat phrase)** **Normal**: Phrase is repeated clearly and correctly. **Abnormal**: Words are slurred (dysarthria) or abnormal (aphasia) or none.
T-Time	Time of **Symptom Onset**:_____

Rapid Arterial Occlusion Evaluation Scale (RACE)				
Item	**Instruction**	**Result**	**Score**	**NIHSS Equivalent**
Facial Palsy	Ask patient to show their teeth (smile)	**Absent** (symmetrical movement) **Mild** (slight asymmetrical) **Moderate to Severe** (completely asymmetrical)	**0** **1** **2**	0 – 3
Arm Motor Function	Extending the arm of the patient 90° (if sitting) or 45° (if supine)	**Normal to Mild** (limb upheld more than 10 seconds) **Moderate** (limb upheld less than 10 seconds) **Severe** (patient unable to raise arm against gravity)	**0** **1** **2**	0 – 4
Leg Motor Function	Extending the leg of the patient 30° (in supine)	**Normal to Mild** (limb upheld more than 5 seconds) **Moderate** (limb upheld less than 5 seconds) **Severe** (patient unable to raise leg against gravity)	**0** **1** **2**	0 – 4
Head and Gaze Deviation	Observe eyes and head deviation to one side	**Absent** (eye movements to both sides were possible and no head deviation was observed) **Present** (eyes and head deviation to one side was observed)	**0** **1**	0 – 2
Aphasia (Right Side)	Difficulty understanding spoken or written words. Ask patient to follow two simple commands: 1. Close your eyes. 2. Make a fist.	**Normal** (performs both tasks requested correctly) **Moderate** (performs only 1 of 2 tasks requested correctly) **Severe** (cannot perform either task requested correctly)	**0** **1** **2**	0 – 2
Agnosia (Neglect) (Left Side)	Inability to recognize familiar objects. Ask patient: 1. "Whose arm is this?" (while showing the affected arm) 2. "Can you move your arm?"	**Normal** (recognizes arm, and attempts to move arm) **Moderate** (does not recognize arm or is unaware of arm) **Severe** (does not recognize arm and is unaware of arm)	**0** **1** **2**	0 – 2
		RACE SCALE TOTAL		

A score above 7 is a high likelihood of a Large Vessel Occlusion (LVO)!

Key Points: STROKE / CVA

- A patient experiencing a Cerebrovascular Accident (CVA or stroke) may have a variety of presentations. Most commonly, the patient will experience a new onset of unilateral weakness (hemiparesis), paralysis (hemiplegia), difficulty speaking (aphasia), or a combination of these. The pre-hospital goal is to maintain stable vital signs, increase oxygen delivery, protect the patient's airway, and provide psychological support. Early recognition of stroke symptoms and early hospital notification is important.
- The Attendant-In-Charge should provide contact information to the receiving facility for any follow-up needed during transfer of care.
- Record time of onset of symptoms **on the patient**. Consider recording information on a tape and affixing to patient's chest.
- Stroke Center definitions:
  - Comprehensive Stroke Center (CSC) – Designated as a Level 1 Stroke Center that can provide a full spectrum of neurological and neurosurgical services to treat complex stroke patients.
  - Primary Stroke Center (PSC) – Designated as a Level 2 Stroke Center is equipped to provide emergent care, including clot-busting therapy, and more extensive evaluation and care than the average stroke-ready hospital does to help stabilize a patient. **(Winchester Medical Center)**
  - Thrombectomy-Capable Stroke Center (TSC) – Designated as a Level 3 Stroke Center does all that Primary Stroke Centers do, plus have the tools and expertise to perform mechanical thrombectomy, a minimally invasive surgical procedure to remove a blood clot from an artery.
  - Acute Stroke Ready Hospital (ASRH) – Designated as a Level 4 Stroke Center are certified to provide immediate care for strokes, including life-saving medications, and then transport the patient to a Primary or Comprehensive Stroke Center.

[1]Local Variance: In some circumstances, transporting to a "stroke-ready" hospital may be appropriate. Hospital should conduct telemedicine and administer tPa.

Key Points: RAPID ARTERIAL OCCLUSION EVALUATION SCALE (RACE)

- RACE is based on an abbreviated version of the National Institutes of Health Stroke Scale (NIHSS), the "gold standard" for evaluating stroke victims.
- The maximum score is 9 (not 11) because the evaluation is done on the left or right side not both simultaneously.
- The RACE is a 5 of 6 item scale. The last item is 1 of 2 based on which side the patient has deficits on previous scale items.
- The NIHSS equivalent is provided for the benefit of the receiving facility. The NIHSS score may be higher than the "snapshot" provided in the RACE because the NIHSS evaluates additional areas not covered in the RACE which is short by design for EMS field use.
- The RACE is a universal quantitative tool that is needed to determine the severity of a stroke and to identify strokes with large vessel occlusions (LVO) which would benefit going to a Stroke Center with interventional capabilities. This is similar to a 12-Lead ECG identifying a STEMI and being transported to a PCI Cardiac Center for intervention.
- The Cincinnati, the FAST, the Miami (MENDS), the Los Angeles (LAPSS) stroke scales are good scales that offer high degree of sensitivity for strokes, but they are all qualitative scores (positive or negative) and not quantitative (severity).
- A free online tool is available to calculate a RACE score at: http://www.rccc.eu/race/RACEen.html.
- For the study behind RACE see http://stroke.ahajournals.org/content/45/1/87.full.

Protocol 4.27.1

MEDICAL – OVERDOSE / POISONING / TOXIC INGESTION

GENERAL

	EMR	EMT	AEMT	INT	PM
1. Ensure scene safety (park upwind, use appropriate PPE, etc.). Identify substance and assure appropriate patient decontamination (completed by trained, equipped providers).	•	•	•	•	•
2. Perform general patient management (**SECTION 1**).	•	•	•	•	•
3. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
4. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	•	•	•	•	•
5. Contact **[Medical Control]** for direction for overdoses, poisonings, and exposures not specifically covered by protocol.	•	•	•	•	•
6. Perform reassessment as indicated.	•	•	•	•	•

Key Points: TOXICOLOGY – POISONING / OVERDOSE

- **Ingested Poisons:**
  - Protect airway.
  - Do not induce vomiting.
  - Transport the patient with all containers, bottles, and labels from the substance.
- **Inhaled Poisons:**
  - Immediate removal from hazardous environment.
  - Maintain airway and support respirations.
  - Transport the patient with all containers, bottles, and labels from the substance.
- **Absorbed Poisons:**
  - Remove the poison using procedures described in **BURNS**.
  - Transport the patient with all containers, bottles, and labels from the substance.
- **Injected Poisons:**
  - See treatment guidelines for specific substance.
  - See **ENVIRONMENTAL – SNAKE BITE** for bites by venomous snakes.
- If you are unable to safely seal the substance containers, bottles, or labels into a plastic bag, take clear photographs of the substance identifiers or contact **POISON CONTROL** for advice on what to transport.
- After decontamination procedures have been completed, do not delay transport.
- Poison Control should be consulted for overdoses, poisoning, and exposures (1-800-222-1222) if you are unable to contact **[Medical Control]** for direction.
- Helicopter transport resources should not transport contaminated patients.
- It is important to remember that a toxic exposure poses a significant risk to both the rescuer and patient; appropriate scene management and decontamination are critical.

Protocol 4.27.2

MEDICAL – OVERDOSE / POISONING / TOXIC INGESTION
ALCOHOL WITHDRAWAL

	EMR	EMT	AEMT	INT	PM
1. Consider hypoglycemia. Perform rapid glucose determination. If glucose less than 60 mg/dL or clinical signs and symptoms indicate hypoglycemia, refer to the **HYPOGLYCEMIA** protocol.	●	●	●	●	●
2. Consider other injuries.	●	●	●	●	●
3. For signs and symptoms of hypovolemic shock or dehydration, follow the **SHOCK – HYPOVOLEMIA** protocol.	●	●	●	●	●
4. Place patient on cardiac monitor.				●	●
5. For seizures due to alcohol withdrawal, refer to the **SEIZURES** protocol.	●	●	●	●	●
6. For alcohol withdrawal with severe agitation, tachycardia, hypertension, or hallucinations:					
a. Establish an IV of Normal Saline at KVO.			●	●	●
b. Give **MIDAZOLAM** 2.5 mg to 5 mg slow IV, titrated to effect.				●	●
c. Repeat dose in 5 minutes if needed.				●	●
d. If unable to start an IV, give **MIDAZOLAM** 5 mg IM.				●	●
7. Perform reassessment as indicated.	●	●	●	●	●

Key Points: ALCOHOL INTOXICATION / WITHDRAWAL

- Emergencies involving alcohol can range from acute intoxication to alcohol withdrawal and delirium tremens (DT's).
- Acute intoxication causes behavioral changes and can cause respiratory depression, particularly if other sedative drugs are involved.
- The possibility of another illness (diabetes / hypoglycemia) or injury (head injury) must always be considered.
- Alcohol withdrawal symptoms can range from tremor and nervousness, sweating, tachycardia, and hypertension, to hallucinations, bizarre or violent behavior, and seizures. The timing of symptoms usually peaks about 48 hours after the last drink, but vary widely, and symptoms can occur with some alcohol in the patient's bloodstream.
- True alcohol withdrawal can represent a medical emergency, particularly in patients with other illnesses.
- Haloperidol should not be given to patients suffering from Delirium Tremens (DTs) from long-term alcohol abuse as it reduces seizure threshold.

Protocol 4.27.3

MEDICAL – OVERDOSE / POISONING / TOXIC INGESTION
NARCOTICS / OPIATES

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation. ***Defer consideration of advanced airway management until after administration of Naloxone, if BVM ventilation is adequate.***	•	•	•	•	•
4. Consider hypoglycemia. Perform rapid glucose determination. If glucose is less than 60 mg/dL or clinical signs and symptoms indicate hypoglycemia, refer to the **HYPOGLYCEMIA** protocol.	•	•	•	•	•
5. Establish an INT or IV of Normal Saline at KVO.			•	•	•
6. For a suspected narcotic overdose complicated by respiratory depression:			•	•	•
a. Give **NALOXONE** 0.4 mg IN (1 mL in each nostril). May repeat in 5 minutes up to a total of 2 mg.		•	•	•	•
b. Give **NALOXONE** IV until respiratory effort improves or agitation occurs, or			•	•	•
i. If unable to obtain IV access, give Naloxone 0.8 mg IM for a total of 2 mL in each deltoid muscle. Repeat in 5 minutes.		•	•	•	•
7. For signs and symptoms of shock, follow the **SHOCK – HYPOVOLEMIA** protocol.	•	•	•	•	•

Key Points: OPIOIDS

- Appropriate management of the patient's airway with supportive ventilations is paramount in the care of the suspected Opioid overdose; nasopharyngeal airways are the preferred adjunct for these patients.
- **NALOXONE** **Narcan** should **only** be administered when there are **no spontaneous respirations** or if spontaneous respirations are **not enough to support life**. It is not the goal of EMS Providers to wake these patients up.
- Agitation in Opioid overdose patients who do wake up in the care of EMS Providers should be managed with a calm and reassuring demeanor.
- Respiratory depression can return as the duration of Naloxone is often shorter than the duration of Opioids, depending on the dose.
- Universal precautions are typically sufficient for protection from suspected Opioid powders (i.e., Fentanyl) on scene. Opioids are not readily absorbed through skin (it takes massive amounts over a long period of time) and are rarely an issue with inhalation unless there is extreme air movement as Opioid powders do not aerosolize.

Protocol 4.27.4

MEDICAL – OVERDOSE / POISONING / TOXIC INGESTION
ORAL HYPOGLYCEMIC AGENTS

EMR	EMT	AEMT	INT	PM
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
	•	•	•	•

1. Perform general patient management (**SECTION 1**).
2. Support life-threatening problems associated with airway, breathing, and circulation.
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation. Support respirations as necessary with a BVM.
4. Follow **HYPOGLYCEMIA** protocol for administration of Dextrose.

Key Points: ORAL HYPOGLYCEMIC AGENTS

- **Oral Hypoglycemic Agents include:** Acarbose (Prandase, Precose), Acetohexamide (Dymelor), Chlorpropamide (Diabinese), Glimepiride (Amaryl), Glipizide (Glucotrol, Glucotrol XL), Glyburide or Glibenclamide (DiaBeta, Glynase, Micronase), Metformin (Glucophage), Miglitol (Glyset), Phenformin, Pioglitazone (Actos), Rosiglitazone (Avandia), Repaglinide (Prandin), Tolazamide (Tolinase), Tolbutamide (Orinase), Troglitazone (Rezulin).
- **Sulfonylurea Agents include:** Glyburide or Glibenclamide (DiaBeta, Glynase, Micronase), Glimepiride (Amaryl), Chloropropamide (Diabinese), Glipizide (Glucotrol), Tolazamide (Tolinase), Tolbutamide.
- Overdose with an oral hypoglycemic agent creates long standing risks of hypoglycemia. Redosing of Glucose is frequently needed. Discourage refusal. Educate the patient of the potential hypoglycemic emergency and encourage transport.

Protocol 4.27.5

MEDICAL – OVERDOSE / POISONING / TOXIC INGESTION
TRICYCLIC ANTIDEPRESSANTS

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	•	•	•	•	•
For serious signs and symptoms [altered mental status, sustained tachycardia greater than 120 bpm, widened QRS complex (greater than 0.10 sec) or hypotension].					
4. Establish an IV of Normal Saline.			•	•	•
a. Infuse the fluid amounts listed in the **SHOCK – HYPOVOLEMIA** protocol. If the patient develops signs and symptoms of fluid overload respiratory distress (dyspnea, crackles, rhonchi, decreasing SpO_2), slow the IV to KVO.			•	•	•
b. Give **SODIUM BICARBONATE** 1 mEq/kg IV up to 100 mEq over 2 minutes. Repeat in 5 minutes if no improvement.				•	•
c. Consider **MAGNESIUM SULFATE** 2 g diluted in 100 mL Normal Saline over 5 minutes for VT unresponsive to alkalinization.				•	•

Key Points: TRICYCLIC ANTIDEPRESSANT

- **Tricyclic Antidepressants include:** Amitriptyline (Elavil), Amoxapine (Asendin), Clomipramine (Anafranil), Doxepin (Sinequan, Adepin), Imipramine (Tofranil) and Nortriptyline (Aventyl, Pamelor).
- If there is any question, give 100 mEq **SODIUM BICARBONATE** and 2 g **MAGNESIUM SULFATE** as they will not cause harm in the absence of a Tricyclic Antidepressant overdose.

Protocol 4.27.6

MEDICAL – OVERDOSE / POISONING / TOXIC INGESTION
CHOLINERGICS

EMR	EMT	AEMT	INT	PM
●	●	●	●	●
●	●	●	●	●
●	●	●	●	●
●	●	●	●	●
		●	●	●
			●	●

1. Ensure personal safety before attempting to provide patient care.
2. Perform general patient management (**SECTION 1**).
3. Support life-threatening problems associated with airway, breathing, and circulation.
4. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.

For serious signs and symptoms (respiratory distress, SLUDGEM syndrome, seizures, or HR less than 60 bpm)

5. Establish an IV of Normal Saline at KVO.
6. Give **ATROPINE** 2 mg IV. Repeat every 5 minutes if needed.

Key Points: CHOLINERGICS

- Pesticides (Organophosphates, Carbamates) and Nerve Gas agents (Sarin, Soman) are the most common exposures.

S – Salivation
L – Lacrimation
U – Urination
D – Defecation
G – Gastrointestinal cramping
E – Emesis
M – Muscle twitching and miosis

D – Diarrhea
U – Urination
M – Miosis (small pupils)
B – Bradycardia
E – Emesis
L – Lacrimation
L – Lethargy
S – Salivation

- For cholinergic poisoning / exposures involving multiple patients, consider activation of CHEMPAK Protocol.
- **Background Information:** The CHEMPACK Program began as an initiative of the Centers for Disease Control and Prevention (CDC) Division of Strategic National Stockpile (SNS) in 1983 before oversight and operational control of the SNS and CHEMPACK moved to the Assistant Secretary for Preparedness and Response (ASPR) in early 2018. It provides antidotes (three countermeasures used concomitantly) to nerve agents for pre-positioning by State, Local, and/or Tribal officials throughout the United States. Because these antidotes must be administered quickly, the CHEMPACK Team maintains 1,960 containers strategically placed in more than 1,340 locations in the United States. More than 90% of the United States population is within 1 hour of a CHEMPACK location. Most are located in hospitals or fire stations selected by local authorities to support a rapid hazardous materials response and can be accessed quickly if hospitals or first responders need them.
- **CHEMPACK Container Contents:** (EMS Container and Hospital Container – Quantities Vary)
  - Mark 1 Auto-Injector
  - Atropine Sulfate 0.4 mg/mL (20 mL Vial)
  - Pralidoxime 1 Gram Injectable (20 mL)
  - Atropen 0.5 mg
  - Atropen 1.0 mg
  - Diazepam 5 mg/mL Auto-Injector
  - Diazepam 5 mg/mL (10 mL Vial)
  - Sterile Water for injection (20 cc Vials)

Protocol 4.27.7

MEDICAL – OVERDOSE / POISONING / TOXIC INGESTION
CALCIUM CHANNEL BLOCKERS

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (SECTION 1).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	●	●	●	●	●
For serious signs and symptoms (altered mental status, HR less than 60 bpm, conduction delays, SBP less than 90 mm Hg, slurred speech, nausea / vomiting):					
4. Establish an IV of Normal Saline at KVO.			●	●	●
5. Give ATROPINE 1 mg IV.				●	●
6. If no response to the initial Atropine dose, consider CALCIUM CHLORIDE 8 mg/kg of 10% solution IV over 5 minutes **[Medical Control]**.				●	●
a. If no response, repeat Calcium Chloride dose in 10 minutes **[Medical Control]**.				●	●

Key Points: CALCIUM CHANNEL BLOCKERS

- **Calcium Channel Blockers include:** Verapamil (Calan, Isoptin), Nifedipine (Procardia, Procardia XL, Adalat, Adalat CC), Nicardipine (Cardene, Carden SR), Nimodipine (Nimotop), Nitrendipine, Isradipine (DynaCirc, DynaCirc SR), Amlodipine (Norvasc), Felodipine (Plendil), Nisoldipine (Sular), Diltiazem (Cardizem, Cardizem CD, Cardizem SR, Dilacor XR, Tiamate, Teczem, and Tiazac), and Bepridil (Vascor).
- CALCIUM CHLORIDE should be used with caution through peripheral IV access and never through a hand vein due to the potential of severe tissue damage in the event of extravasation.

Protocol 4.27.8

MEDICAL – OVERDOSE / POISONING / TOXIC INGESTION
BETA BLOCKERS

EMR	EMT	AEMT	INT	PM
●	●	●	●	●
●	●	●	●	●
●	●	●	●	●
		●	●	●
		●	●	●
		●	●	●
			●	●

1. Perform general patient management (**SECTION 1**).
2. Support life-threatening problems associated with airway, breathing, and circulation.
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.

For serious signs and symptoms (altered mental status, HR less than 60 bpm, conduction delays, SBP less than 90 mm Hg, slurred speech, nausea / vomiting):

4. Establish an IV of Normal Saline at KVO.
   a. Infuse the fluid amounts listed in the **SHOCK – HYPOVOLEMIA** protocol. If the patient develops signs and symptoms of fluid overload respiratory distress (dyspnea, crackles, rhonchi, decreasing SpO_2), slow the IV to KVO.
5. Give **GLUCAGON** 2 mg IV.
   a. If no response, repeat Glucagon dose in 10 minutes **[Medical Control]**.

Key Points: BETA BLOCKERS

- **Beta Blockers include:** Acebutolol (Sectral), Atenolol (Tenormin), Betaxolol (Kerlone, Betoptic, Betoptic S), Bisoprolol (Fumarate, Zebeta), Carteolol (Cartrol), Carvedilol (Coreg), Esmolol (Brevibloc), Labetalol (Trandate, Normodyne), Metoprolol (Lopressor, Toprol XL), Nadolol (Corgard), Nebivolol (Bystolic), Penbutolol (Levatol), Pindolol (Visken), Propranolol (Inderal, InnoPran), Sotalol (Betapace), Timolol (Blocadren), and Timolol Ophthalmic Solution (Timoptic).

Protocol 4.27.9

MEDICAL – OVERDOSE / POISONING / TOXIC INGESTION
STIMULANTS

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	●	●	●	●	●
Serious signs and symptoms (seizures, tachydysrhythmias)					
4. For seizures, follow the **SEIZURE** protocol.	●	●	●	●	●
5. Establish an IV of Normal Saline at KVO.			●	●	●
6. For tachydysrhythmias with HR greater than 120 bpm, give **MIDAZOLAM** 2.5 mg to 5 mg slow IV push, titrated to effect.				●	●
a. Repeat dose in 5 minutes if needed.				●	●
b. If unable to establish an IV, give **MIDAZOLAM** 5 mg IM.				●	●
7. For patients that are severely agitated or combative, follow the **COMBATIVE PATIENT (NON-TRAUMATIC)** protocol.				●	●

Key Points: COCAINE / METHAMPHETAMINE

- **Common stimulant drugs include:**
  - Amphetamine (Biphetamine, Dexedrine, black beauties, crosses, hearts)
  - Cocaine (Coke, crack, flake, rocks, snow)
  - Methamphetamine (Desoxyn, crank, glass, ice, speed)
  - Methylphenidate (Ritalin)
  - Methylenedioxyamphetamine (MDA, Adam)
  - Methylenedioxymethamphetamine (MDMA, Eve, Ecstasy)
  - Methylenedioxypyrovalerone (Bath Salts, Ivory Wave, Ivory Coast, Purple Wave, Vanilla Sky)

Protocol 4.27.10

EXPOSURE – CYANIDE

EMR	EMT	AEMT	INT	PM
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
		•	•	•
			•	•
			•	•

1. Perform general patient management (**SECTION 1**).
2. Support life-threatening problems associated with airway, breathing, and circulation.
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.

Serious signs and symptoms [altered mental status, confusion, disorientation, mydriasis (excessive pupil dilation), seizures, coma, and cardiovascular collapse; see drug reference for additional signs and symptoms]

4. Establish an IV of Normal Saline at KVO.
5. Give Cyanokit® 5 g of **HYDROXOCOBALAMIN** IV, infused over 15 minutes. Note: Pediatric dose is 70 mg/kg.
6. If signs and symptoms persist, a repeat dose can be administered **[Medical Control]**. The infusion rate for second dose is usually between 15 minutes and 2 hours.

Key Points: CYANIDE POISONING / CYANOKIT®

- Signs and symptoms of Cyanide poisoning include headache, confusion, dyspnea, chest tightness, nausea, altered mental status, seizures, coma, mydriasis, hypertension (early), hypotension (late), tachypnea (early), bradypnea (late), cardiovascular collapse, and vomiting.
- Preparation and Administration Instructions:
  1. **Reconstitute:** Place the vial in an upright position. Add 200 mL of 0.9% Sodium Chloride (not included) to the vial using the transfer spike. Fill to the line.
  2. **Mix:** The vial should be repeatedly inverted or rocked, not shaken, for at least 60 seconds prior to infusion. CYANOKIT solutions should be visually inspected for particulate matter and color prior to administration. Discard solution if particulate matter is present or solution is not dark red.
  3. **Infuse Vial:** Use vented intravenous tubing, hang, and infuse over 15 minutes. The standard administration drip set that comes with the CYANOKIT is 20 drops/mL.
- Comprehensive treatment of acute Cyanide intoxication requires support of vital functions. Cyanokit® should be administered in conjunction with appropriate airway, ventilatory, and circulatory support.

Protocol 4.28

INJURY – BLEEDING / HEMORRHAGE CONTROL

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	●	●	●	●	●
PATIENTS WITH EXTERNAL HEMORRHAGE:					
4. **STOP MAJOR HEMORRHAGE IMMEDIATELY!** Go directly to a tourniquet (commercial device) if needed.	●	●	●	●	●
5. With a gloved hand, apply direct pressure with a dressing to the site of bleeding.	●	●	●	●	●
6. If bleeding persists, consider application of a **TOURNIQUET** (commercial device) or wound packing with the use of a **HEMOSTATIC DRESSING**. The tourniquet (commercial device) should be tightened until the bleeding stops.	●	●	●	●	●
HEMOSTATIC DRESSING a. If bleeding is difficult to control, cut a generous length of gauze and stuff it into the wound or press it directly against the laceration. b. Hold firm pressure for five (5) minutes. c. If bleeding is controlled, apply a bandage.	●	●	●	●	●
7. If bleeding is still not controlled after the application of a tourniquet (commercial device) and/or wound packing, apply an additional tourniquet (commercial device) distal (below) the first tourniquet.	●	●	●	●	●
8. Once bleeding is controlled, bandage the dressing in place, maintaining pressure on the wound.	●	●	●	●	●
PATIENTS WITH SUSPECTED INTERNAL HEMORRHAGE					
9. For suspected internal hemorrhage with signs of shock, consider administration of **TRANEXAMIC ACID**. Loading dose is 1 Gram IV bolus. Maintenance dose is 1 Gram in 0.9% Sodium Chloride over 8 hours. (Mix 1 gram TXA in 1,000 mL of 0.9% Sodium Chloride and attach a 60-drop administration set and infuse at 125 drops/minute over 8 hours).			●	●	●
10. For patients with uncontrolled Epistaxis (nosebleeds), saturate gauze pad(s) with **TRANEXAMIC ACID** and place in the affected nostril or give **TRANEXAMIC ACID** 100 mg/1 mL IN in the affected nostril. A commercial device (RAPID RHINO) is available for Epistaxis control.			●	●	●
11. Assess for signs of shock. If shock is suspected, follow the **SHOCK – HYPOVOLEMIA** protocol.	●	●	●	●	●
12. Perform reassessment as indicated.	●	●	●	●	●
13. Consider air medical transport rendezvous.	●	●	●	●	●

Key Points: INJURY – CONTROL OF EXTERNAL BLEEDING

- When treating soft tissue injuries, control of blood loss, prevention of shock, and decontamination of affected areas take priority. Unless you note extensive bleeding, wound management by dressing and bandaging is a late priority in the care of trauma patients. Dress and bandage wounds whose bleeding does not represent a life threat only after you stabilize your patient by caring for higher priority injuries.
- Open chest wounds should be treated as "sucking chest wounds". Treatment of open chest wounds is applying an occlusive dressing to seal chest wound leaving one side unsealed.
- Eviscerations (extrusion of internal organs outside of the protective abdominal cavity). Treatment of eviscerations is covering with a moist sterile dressing, and then cover with plastic wrap. Keep dressing moist to avoid drying of tissue. **DO NOT PUSH / FORCE ORGANS BACK INTO CAVITY!**
- When treating the partial or complete severance of a digit or limb (i.e., amputation), control of blood loss, prevention of shock, and decontamination of affected areas take priority. Apply direct pressure to control hemorrhage and splint entire digit or limb in a physiologic position, if possible. Place part in damp (not wet) gauze, place in plastic bag, wrap in trauma dressing, and place on ice / water mix. **Never allow amputated part to freeze by placing it directly on the ice or by adding any other coolant, such as Dry Ice, which could cause irreversible damage to the tissue.**
- Hemostatic Agents is a technology that is rapidly changing, and there are many competing hemostatic products on the market. Product names include: Celox™, ChitoGauze®, QuikClot Combat Gauze®, HemCon®, and TraumaDex™. The use of hemostatic agents in the form of bandages and dressings are approved by the Medical Direction Board for use by EMS Providers. EMS Agencies are responsible for the purchase and replacement of these agents.
- Chitosan is a polysaccharide that aggregates red blood cells via an electrostatic charge. The source is shrimp shells, but shellfish allergy IS NOT a contraindication. This dressing can be very helpful if the patient is on blood thinning drugs like Coumadin.

Protocol 4.29

INJURY – CRUSH SYNDROME

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Administer oxygen via a non-rebreather mask at 10-15 l/min. *Oxygen administration should not be determined by oxygen saturation.* Support respirations as necessary with bag-valve mask ventilation. Ensure the use of a bacterial / viral filter if providing positive pressure ventilation.	●	●	●	●	●
4. Consider activation of a specialty physician, technical rescue team, and medical helicopter.	●	●	●	●	●
5. Start an IV of Normal Saline. Maintain perfusion by following the **SHOCK – HYPOVOLEMIA** protocol.			●	●	●
6. Attach ECG monitor. Carefully monitor for dysrhythmias during the period immediately after release of pressure and during transport (i.e., peaked T waves, wide QRS, lengthening QT interval, loss of P wave).				●	●
7. Transport as soon as possible.	●	●	●	●	●
8. For pain control, give **FENTANYL** 0.5-2 mcg/kg or a maximum single dose of 100 mcg. Reassess and may repeat every 5 minutes at ½ the initial dose, if needed. or Consider **KETAMINE** 0.4 mg/kg IV over 1-2 minutes or a maximum single dose of 60 mg. May repeat as needed every 10 to 15 minutes to a maximum of three doses. Contact **[Medical Control]** for additional dosing. Do not administer **KETAMINE** in patients under the age of 12 years and/or under 50 kg (Intermediate Level Only).				●	●
9. For pain control for patients under the age of 12 years and/or under 50 kg, consider **KETAMINE** 0.1 mg/kg IM.					●
10. For suspected internal hemorrhage with signs of shock, consider administration of **TRANEXAMIC ACID**. Loading dose is 1 Gram IV bolus. Maintenance dose is 1 Gram over 8 hours. (Mix 1 gram TXA in 1,000 mL of 0.9% Sodium Chloride and attach a 60-drop administration set and infuse at 125 drops/minute over 8 hours).			●	●	●
11. For patients entrapped more than 60 minutes, consider the following options in consultation with **[Medical Control]**.					
a. Continued boluses of Normal Saline.			●	●	●
b. **SODIUM BICARBONATE** 100 mEq IV over 2 minutes. **Note:** must be administered in a separate line from or adequately flushed before administration of **CALCIUM CHLORIDE** to prevent formation of precipitates.				●	●
c. **ALBUTEROL** 2.5 mg via small volume nebulizer.				●	●
d. **CALCIUM CHLORIDE** 2-4 grams IV over 5 minutes preferred. **Note:** must be administered in a separate line from or adequately flushed before administration of **SODIUM BICARBONATE** to prevent formation of precipitates.				●	●
12. Perform reassessment as indicated.	●	●	●	●	●

Protocol 4.29 – INJURY – CRUSH SYNDROME

Key Points: INJURY – CRUSH SYNDROME

- Crush syndrome is a life-threatening condition caused by prolonged compression or immobilization. Remember that the greater the body area compressed and the longer the time of entrapment, the greater the risk of crush syndrome. Signs and symptoms appear after the patient is released from the crushing mechanism or immobilization. Shock and possible metabolic acidosis occur as a result of release of toxins and end products of anaerobic metabolism.
- Sodium Bicarbonate 1 mEq/kg IV may be mixed in 1 liter of Normal Saline for subsequent doses.
- Physician may be called to scene for prolonged extrication or high-level compression, for additional medications, or more efficient medical direction.
- Crush syndrome development before prophylactic treatment may require volume load and concurrent critical medication administration.
- If medical and extrication conditions permit, initiate treatment prior to removal of compression mechanism.
- Many of these type injuries require a significant amount of time for the patient(s) to be extricated and transported to a medical facility. Consider requesting additional drug boxes early in the incident so that once treatment has begun, it can be continued throughout the prehospital timeframe.

Protocol 4.30

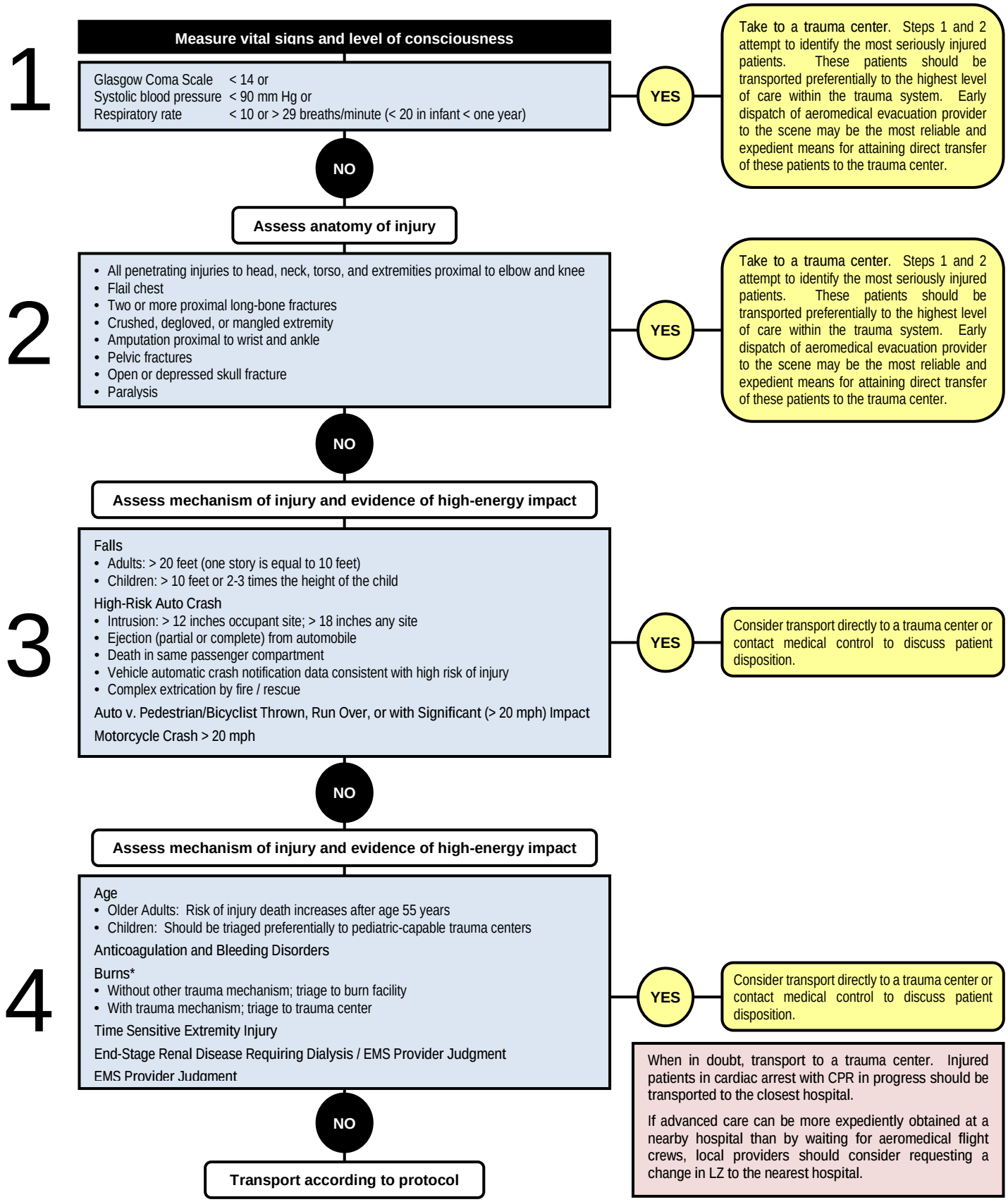
INJURY – HEAD INJURY

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	●	●	●	●	●
2. Support life-threatening problems associated with airway, breathing, and circulation.	●	●	●	●	●
3. Administer oxygen to maintain a SpO_2 of 90%. Support respirations as necessary with bag-valve mask ventilations. **Note: DO NOT HYPERVENTILATE!**	●	●	●	●	●
4. Determine the need for Spinal Motion Restriction.	O	●	●	●	●
5. Obtain a Glasgow Coma Scale score. Repeat evaluation of GCS as needed.	●	●	●	●	●
6. Start an IV of Normal Saline at KVO. Maintain perfusion following the **SHOCK – HYPOVOLEMIA** protocol if other traumatic injuries are present.			●	●	●
7. Place patient on cardiac monitor.				●	●
8. Monitor **END-TIDAL CO_2 DETECTION / MONITORING, CAPNOGRAPHY** if available. If assisting ventilations, maintain waveform capnography between 35-45 mmHg.		●	●	●	●
9. Administer **TRANEXAMIC ACID** 1 Gram IV bolus followed by an infusion of 1 Gram over 8 hours for patients with a GCS of 12 or less.			●	●	●
10. Maintain a systolic blood pressure of 90 mmHg			●	●	●
a. Administer Normal Saline 10 mL/kg bolus. Repeat the dose if no improvement is noted.			●	●	●
b. Consider **EPINEPHRINE PUSH DOSE** – Give 10 mcg (1 mL) and repeat every 2-3 minutes if needed.				●	●
11. Transport as soon as possible.	●	●	●	●	●

Key Points: INJURY – HEAD INJURY

- The most important item to monitor and document is a change in the level of consciousness.
- Do not hyperventilate head injury patients. Hyperventilation will lead to vasoconstriction of cerebral blood vessels, which when combined with an Increased Intracranial Pressure (ICP) can cause a cessation of blood flow to the brain.
- If ongoing evidence of brain herniation (blown pupil, decorticate or decerebrate posturing, or bradycardia), in the absence of capnography, increase ventilation rate based upon the age of the patient (adult 20 bpm, child 30 bpm, infant 35 bpm).
- Continuously reevaluating a patient's Glasgow Coma Scale score is the most reliable way to identify a worsening injury.
- Hypotension should be avoided at all costs in head injury patients. Aggressive resuscitation with limited fluids and early vasopressors is ideal.
- Increased Intracranial Pressure (ICP) can cause bradycardia, hypertension, and an abnormal respiratory pattern (Cushing's Reflex).

Field Trauma Triage Decision Scheme



* American Burn Association guidelines.

"Priority" patients are those that are critically ill or injured as defined by the Field Trauma Triage Decision Scheme.

UN-ENTRAPPED "PRIORITY" PATIENTS

Un-entrapped priority patients shall be treated in the following manner:

1. Perform rapid extrication to remove patient from the wreckage. It is acceptable to move the patient without immobilizing the extremities. C-spine control is to be maintained via an extrication collar and manual control in accordance with rapid extrication techniques. Extrication techniques should emphasize speed. Vest style immobilization devices and short backboards should not be used.
2. The following procedures are permitted before the patient is loaded in the ambulance for transport:
    a. Bag-valve-mask ventilation, oropharyngeal, and nasopharyngeal airways.
    b. Suctioning.
    c. Control of *life-threatening* hemorrhage.
    d. C-spine control and spinal immobilization.
    e. Follow the **HYPOTHERMIA** protocol as needed.
3. Move the patient rapidly to the ambulance. All procedures, with the exception of those listed above, should be performed during transport, not on the scene. Brief stops are acceptable at the Attendant-In-Charge's (AIC) discretion to facilitate lifesaving procedures.
4. The Emergency Communications Center (ECC) or on-scene command should notify the closest hospital as early as possible. If the incident is in close proximity to the hospital, provide notification to the hospital prior to arrival on the scene if there are reported priority patients.
5. EMS personnel are not to delay transport to wait on higher trained personnel. If ALS support is en route for a rendezvous, do not wait on the ALS personnel.

ENTRAPPED "PRIORITY" PATIENTS

Medical care should be provided to the extent the entrapment permits. Follow the **HYPOTHERMIA** protocol as needed. ALS personnel are to be requested to the incident scene. If possible, helicopter support is to be summoned to the scene.

CARDIAC ARREST IN TRAUMA PATIENTS

1. Adult and pediatric patients found dead at the scene of a trauma are not to be resuscitated unless they have a viable ECG rhythm (INT, PM), are hypothermic, recently drowned, or electrocuted. BLS airway and ventilation procedures may be attempted at the provider's discretion. If spontaneous respiration or circulation is not detected within one-minute, resuscitative efforts should be ceased. **Protocol 2.7, DEATH DETERMINATION – ALL AGES**, is to be followed when determining death.
2. Patients who lose vital signs while care is being administered are to be resuscitated. Prompt consultation with **[Medical Control]** is mandatory.

LANDING ZONES

Pre-designated landing zones are preferred. The landing zone should be selected in such a way that the helicopter would be expected to arrive before the ambulance that is transporting the patient.

SCENE TRANSFER CRITERIA

Transfer from the scene to a designated trauma center via helicopter should be made according to the following criteria. The decision to call for aeromedical services should be made by the first public safety entity to arrive and assess the patient, or responding personnel based on dispatch information. Aeromedical services should not be cancelled until the patient has been assessed by an AIC. Transport should not be unduly delayed while waiting on Advanced Life Support personnel to arrive at the scene. However, consideration must be given to the anticipated arrival time of the aeromedical provider when EMS providers are making decisions regarding the decision to transport critically injured patients to hospitals that are not designated trauma centers.

SCENE TRANSFER CRITERIA (continued)
If advanced care can be more expediently obtained at a nearby hospital than by waiting for aeromedical flight crews, local providers should consider requesting a change in LZ to the nearest hospital.

Patients who are entrapped or pinned and are critically ill as defined by the "Field Trauma Triage Decision Scheme" should have a helicopter summoned to the scene. When the patient becomes disentangled, the patient shall be rapidly transferred to the landing zone to rendezvous with the medevac helicopter OR proceed to an alternate landing zone between the scene and the closest hospital. The emergency communications center must be notified as soon as possible for every planned change in landing zone or rendezvous point.

Because of the possibility of bad weather, mechanical failure, or communication breakdown, all patients who have been extricated and prepared for transport prior to the arrival of the helicopter at the scene should consider initiating transport to the nearest medical facility.

Pre-designated landing zones (LZ) will continue to be developed. The ECC will assign the LZ in such a way that the helicopter would be expected to arrive before the ambulance transporting the patient.

Protocol 4.32

MEDICAL – SEPSIS / SEPTIC SHOCK

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation	•	•	•	•	•
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	•	•	•	•	•
4. Sepsis Pre-Alert Criteria:	•	•	•	•	•
Patient has a known or suspected infection **AND** Patient presents with two or more of the following: • Temperature of <96.8 or >100.4 degrees Fahrenheit • Respiratory rate >20 per minute or ETCO2 <25 mmHg • Heart rate >100 beats per minute • Serum lactate reading of 4 mmol/L or greater		•	•	•	•
If the above criterion has been met call a "CODE SEPSIS" and initiate treatment as outlined below.			•	•	•
5. Establish IV access, 2 preferred.			•	•	•
6. Follow the following when applicable:			•	•	•
• Adult: **Normotensive patient without signs of poor tissue perfusion:** o 1 liter of 0.9% Sodium Chloride rapid infusion. Reassess vital signs and determine need for further fluid therapy. If additional fluid therapy required, it should be administered in 250 mL boluses not to exceed total volume of 2 liters. • Adult: **Hypotensive patient and/or signs of poor tissue perfusion:** o Infuse 30 mL/kg of 0.9% Sodium Chloride within 30 minutes. • Pediatric: Rapid infusion of 20 mL/kg of 0.9% Sodium Chloride (or dosage directed on length-based resuscitation tape). Reassess. May be repeated twice not to exceed total fluid delivery of 60 mL/kg without authorization from **Medical Control.** • Neonate: 10 mL/kg rapid infusion of 0.9% Sodium Chloride (or dosage based on length-based resuscitation tape). Reassess. If further fluid resuscitation is needed contact **Medical Control.**			•	•	•
7. If patient remains hypotensive consider **NOREPINEPHRINE** IV infusion at 0.1–0.5 mcg/kg/minute IV (maximum of 16 mcg/minute). Titrate to SBP = 90 mm Hg.				•	•

Key Points: Sepsis / Septic Shock

- Sepsis and septic shock are potentially life-threatening. They are a result of complications to infection within the body. When the body attempts to fight infection, it releases chemicals into the bloodstream. These chemicals trigger inflammatory responses throughout the body. Left untreated, blood flow to vital organs will become increasingly impaired leading to organ shut down and eventual death.
- You should suspect sepsis in high-risk populations such as those from nursing homes, long term care facilities, and residential homes.
- Other signs of sepsis include hypovolemia, hot or unusually cold skin.
- Sepsis has a high mortality rate if left untreated. If the patient has two or more of the following, they are at a greater risk for poor outcome. Early recognition and treatment are essential for positive outcomes.
  - Altered Mental Status
  - Respiratory Rate >20 per minute
  - Systolic Blood Pressure <100 mmHg
  - Shock Index (SI) of >1
    - **SI = HR / SBP**
  - Modified Shock Index (MSI) of <0.7 or >1.3
    - **MSI = HR / MAP**
    - **MAP = [(Diastolic x 2) + Systolic]/3**

Protocol 4.33

MEDICAL – FEVER

EMR	EMT	AEMT	INT	PM
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
	•	•	•	•
	•	•	•	•
	•	•	•	•

1. Perform general patient management (**SECTION 1**).
2. Support life-threatening problems associated with airway, breathing, and circulation. If patient appears acutely ill, do not delay transport to check temperature. Transport and treat associated problems per appropriate protocol.
3. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.
4. Check temperature. If temperature is >102°F:
   - Facilitate passive cooling by removing excess clothing and blankets.
   - If patient has not been given Acetaminophen in the last 4 hours, administer ACETAMINOPHEN 15 mg/kg with the assistance of the parent of legal guardian to calm child, if within that age group.
5. If temperature is >105°F:
   - Treat as in number 4 above and facilitate active cooling by applying wet towels with tepid water to trunk and head.
   - Do not submerge patient in water or use ice or rubbing alcohol.
6. Contact **[Medical Control]** for further consideration.

Key Points: Fever

- Fever is defined as a measured temperature of 100.4°F (38°C) or greater. Fever is a sign of infection rather than a problem itself. Body temperature <105°F is not harmful in and of itself.
- Emergency management of the febrile child involves an assessment to determine if any associated problems are present which require emergent treatment.
- Febrile seizures are more likely in children with a history of febrile seizures and with a rapid elevation in temperature.
- Patients with a history of liver failure should not receive Acetaminophen.

Protocol 4.34

MEDICAL – VENTRICULAR ASSIST DEVICE (VAD) PATIENT CARE

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management (**SECTION 1**).	•	•	•	•	•
2. Contact Vascular Assist Device (VAD) Coordinator at Implanting Center for direction and instructions.	•	•	•	•	•
3. Support life-threatening problems associated with airway, breathing, and circulation. • Pulse oximetry readings may be inaccurate in VAD patients. Skin color, waveform capnography, mental status, and capillary refill will be most helpful in determining oxygenation and volume status. • If available, a patient's MAP can be obtained using a vascular doppler. • **DO NOT** administer Tranexamic Acid to any VAD patient. • It is appropriate to defibrillate with VAD in-place for Unstable Ventricular Tachycardia and Ventricular Fibrillation. • Avoid chest compressions (CPR) unless advised by VAD Coordinator or waveform capnography is less than 20 mmHg, VAD is not functioning, and there are no signs of life.	•	•	•	•	•
4. Administer oxygen and titrate to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation.	•	•	•	•	•
5. FOR VAD Related Issues: a. Assess the patient's Ventricular Assist Device (VAD) • If no hum is heard, ask patient how long pump has been off for. If time unknown DO NOT restart VAD as this could cause a thromboembolism. b. Check the console for alarms, use the VAD Guide to assist with your assessment. • For suction alarms, consider hypovolemia and give a bolus of 250 mL 0.9% Sodium Chloride. Caution with excessive fluid administration as it can cause pulmonary edema. c. Check all connections, patency of driveline, battery level, and driveline insertion site. • Do not remove dressing on insertion site. Dressings are supposed to be sterile and changed daily. Consider sepsis if signs of infection are present.		•	•	•	•
6. Transport to VAD Center, unless directed by VAD Coordinator. Consider Air Medical Transport if patient is unstable and/or VAD Center is more than 45 minutes away. Bring all extra VAD supplies with patient. a. Careful when loading to ensure driveline does not get kinked or damaged. b. **DO NOT** let controller or batteries dangle off stretcher.		•	•	•	•
7. FOR Non-VAD Related Issues: a. Treat patient according to appropriate Protocol. b. Assess patient's VAD and vital signs. c. Transport to a local hospital most appropriate. Contact **[Medical Control]** to determine appropriate facility.		•	•	•	•

Scope	EMR	EMT	AEMT	INT	PM

Out-of-hospital 12-Lead ECGs and advance notification to the receiving facility speeds the diagnosis, shortens the time to fibrinolysis or catheterization, and may be associated with decreased mortality rates. The reduction in door-to-reperfusion therapy interval in most studies ranges from 10 to 60 minutes.

TRAINING
Providers shall complete training for 12-Lead ECG acquisition prior to utilizing this protocol and ECG machines.

INDICATIONS (any of the following):
1. Chest pain >35 years of age
2. Atypical chest pain >35 years of age
3. Epigastric pain >35 years of age
4. Back, neck, jaw, or arm pain without chest pain >35 years of age
5. Dyspnea / shortness of breath
6. Palpitations
7. Syncope or near syncope
8. Pulmonary edema
9. General weakness or dizziness
10. Feeling of anxiety or impending doom
11. Activation of an implantable cardioverter defibrillator (ICD)
12. Provider discretion

PRECAUTIONS
1. Treatment of lethal dysrhythmias (e.g., VF, pulseless VT) and life-threatening problems associated with airway, breathing, and circulation should be initiated prior to obtaining a 12-Lead ECG.
2. Treatments such as Oxygen, Aspirin, and Nitroglycerin, or requesting advanced life support, should never be delayed acquiring a 12-Lead ECG. Ideally, 12-Lead acquisition and treatment of the patient should occur concurrently.
3. Dirt, oil, sweat, and other materials on the skin can interfere with obtaining a quality tracing.
4. Being in a moving vehicle and engine vibration can interfere with obtaining a quality tracing.

PROCEDURE
1. It is preferred that the initial 12-Lead ECG be performed prior to moving the patient.
2. Prepare all the equipment and ensure the cable is in good repair. Check to make sure there are adequate leads and materials for prepping the skin.
3. Prep the skin by first drying sweat or water. Lightly buff the electrode placement areas with an alcohol prep or the abrasive pad which may be found on the removable cover of some electrodes.
4. Place the four limb leads in accordance with manufacturer's recommendations. Limb lead electrodes are typically placed on the deltoid area and the lower leg or thigh as shown in Figure 5.1-A. Move limb leads proximally if artifact is experienced. Avoid placing limb leads on the torso unless necessary to minimize artifact. ***Avoid placing limb leads over bony prominences.***

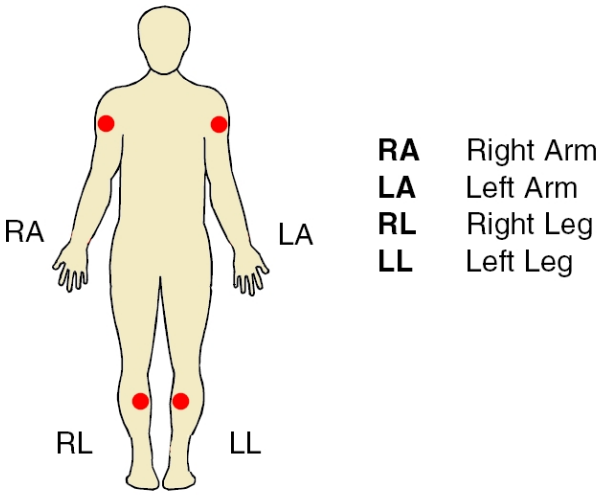


Figure 5.1-A Limb Lead Electrode Placement for 12-lead ECG

CONTINUED ON NEXT PAGE

5. Place the precordial leads (a.k.a. chest or V leads) in accordance with manufacturer's recommendations. Precordial leads are typically placed as shown in Figure 5.1-B. Proper placement is important for accurate diagnosis. Leads locations are identified as V_1 through V_6.

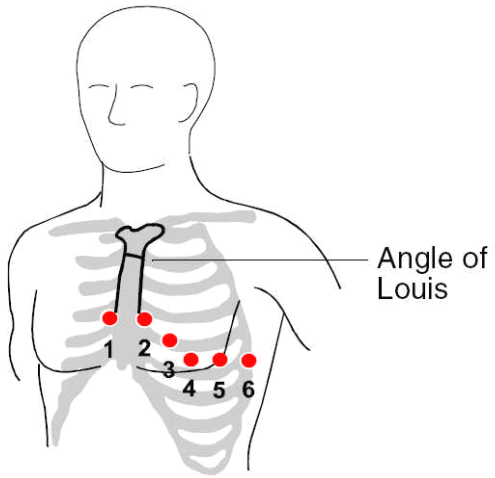


Figure 5.1-B Precordial Lead Electrode Placement

Lead	Lead Location
V_1	Fourth intercostal space to the right of the sternum
V_2	Fourth intercostal space to the left of the sternum
V_3	Directly between leads V2 and V4
V_4	Fifth intercostal space at midclavicular line
V_5	Level with V4 at left anterior auxiliary line
V_6	Level with V5 at left midaxillary line

a. Locating the V_1 position (fourth intercostal space) is critically important because it is the reference point for locating the placement of the remaining V leads. To locate the V_1 position:
   i. Place your finger at the notch in the top of the sternum.
   ii. Move your finger slowly downward about 1.5 inches (3.8 centimeters) until you feel a slight horizontal ridge or elevation. This is the Angle of Louis where the manubrium joins the body of the sternum.
   iii. Locate the second intercostal space on the patient's right side, lateral to and just below the Angle of Louis.
   iv. Move your finger down two more intercostal spaces to the fourth intercostal space, which is the V_1 position.
   v. Place V_1 by attaching the positive electrode to the identified location.
b. Place V_2 by attaching the positive electrode to the left of the sternum at the further intercostal space.
c. Place V_4 by attaching the positive electrode at the midclavicular line at the fifth intercostal space (Note: V_4 must be placed prior to V_3).
d. Place V_3 by attaching the positive electrode in the line midway between lead V_2 and V_4.
e. Place V_5 by attaching the positive electrode at the anterior axillary line as the same level as V_4.
f. Place V_6 by attaching the positive electrode to the midaxillary line at the same level as V_4.

CAUTION: When placing electrodes on female patients, always place leads V_3-V_6 under the breast rather than on the breast.
CAUTION: Never use the nipples as reference points for locating the electrodes for male or female patients, because nipple locations may vary widely.

CONTINUED ON NEXT PAGE

6. Ensure that all leads are attached.
7. Turn on the machine.
8. Record the tracing by following the machine specific acquisition procedure and function.
9. Document on the tracing the patient's name and the date and time the tracing was obtained.
10. Refer to the **ST–ELEVATION MYOCARDIAL INFARCTION (STEMI) TRIAGE**.
11. Provide copies of all 12-Lead ECGs acquired to the receiving hospital.

CONSIDERATIONS

1. Perform the 12-Lead ECG as soon as possible.
2. For a patient with 12-Lead indicated myocardial infarction, follow the **ST–ELEVATION MYOCARDIAL INFARCTION (STEMI) TRIAGE**.
3. Acquire an additional 12-Lead ECG every 15 minutes or if the patient's clinical condition changes.
4. Each agency should have a procedure to ensure the time on each ECG machine is synchronized. It is recommended the time be synchronized at least once each week. Atomic clocks or wireless telephones are recommended sources for the correct time.
5. Consider performing a right-sided ECG when an Inferior Wall myocardial infarction is suspected. (See Figure 5.1-C).

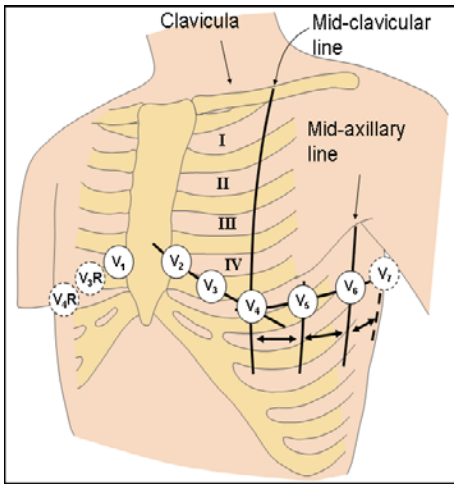


Figure 5.1-C Right Sided Precordial Lead Electrode Placement

Regional Chest Pain Council Criteria

Note: First Medical Contact (FMC) to ECG <10 minutes, ECG to Decision <10 minutes, Scene Time <10 minutes to provide early identification and prehospital arrival notification for suspected myocardial infarction or STEMI. Ideally, 12-Lead ECG acquisition and treatment of the patient (i.e., administration of Oxygen, Aspirin, etc.) should occur concurrently.

Note: Emergency Medical Technicians and Advanced Emergency Medical Technicians should obtain 12-Lead ECGs for suspected cardiac events; they are not allowed to interpret the printout. Once an Intermediate and/or Paramedic level provider interprets the 12-Lead ECG, they are now responsible for the patient and must serve as the Attendant-In-Charge for transport to a medical facility unless **[Medical Control]** approves downgrading the patient to the EMT and/or AEMT level for transport.

CONTACTING MEDICAL CONTROL — Protocol 5.2

Scope	EMR	EMT	AEMT	INT	PM

When the need arises to contact Medical Control, be it for advice, permission, or just a question in general, it is important to be able to phrase your questions in a way that communicates your need in a clear and concise manner. Medical Control can be provided by your Agency's EMS Physician or a Physician (MD / DO) at an Emergency Department. Advanced Practice Providers (Physician Assistants and Nurse Practitioners) may also provide Medical Control ***only*** when under the supervision of a Physician.

PROCEDURE:

1. Identify the need to contact Medical Control and be sure to contact Medical Control via your Agency's EMS Physician or at the facility your patient would be transported to if transport is applicable.
2. **If asking for advice:**
    a. Perform a thorough assessment and obtain as much appropriate patient information as you can in order to facilitate the conversation with Medical Control.
    b. State your agency, certification level, and location. Communicate with the Medical Control provider the situation you are facing. If you are not sure of the situation you are facing, be sure to communicate that.
    c. Medical Control may provide advice, direction, or instruction for care of your patient. Keep in mind your provider level and do not practice outside of the approved scope of practice.
    d. Repeat the directions you have received back to Medical Control ***verbatim*** to ensure understanding.
    e. If the advice you do receive is within your scope of practice, you may perform it if the medications, materials, or tools are available for use.
    f. Be sure to properly document what was performed, the name and credentialing of the Medical Control provider authorizing the care advised, and the patient's response.
    g. Do not act on the advice of Medical Control if:
        i. Not adequately trained and proficient to perform the procedure;
        ii. The procedure is not fully understood; or
        iii. The procedure is judged not to be in the best interests of the patient.
3. **In the event of an immediate threat to loss of life or limb, Medical Control may authorize an EMS provider with specific training to provide care not authorized under existing protocol. The circumstances must be documented on the Patient Care Report.**
4. **If requesting Cease Resuscitation orders:**
    a. Ensure all efforts have been made to resuscitate per the appropriate protocol. Call for cease resuscitation orders if at least one of the following criteria are met:
        i. Extended resuscitation time, typically greater than 20 minutes.
        ii. Unknown down-time patients with consistent asystole for 15 minutes.
        iii. **TRAUMATIC CARDIAC ARREST** with no changes at the end of the algorithm.
        iv. Provider judgement.
    b. Inform Medical Control of all interventions performed, estimated downtime, current cardiac rhythm, and any additional information requested.
    c. Document the name and credentials of the Medical Control provider.

Additionally, there are times during which having a specialty physician on the phone would be warranted, (i.e., Board-Certified EMS Physicians or Trauma Surgeons), may be ideal for emergencies involving entrapment or a significantly elongated scene time. If these resources are needed, consider them in Point 1 as well as consider requesting rendezvous on location if capable.

CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) — Protocol 5.3

Scope	EMR	EMT	AEMT	INT	PM

INDICATION

Conscious patient in severe respiratory distress.

CONTRAINDICATIONS

1. Altered mental status, inability to follow commands.
2. Hypoventilation requiring ventilatory assistance.
3. Upper airway / facial trauma or abnormalities that prevent mask from sealing.
4. Open stoma or tracheostomy.
5. Severe cardio-respiratory instability.
6. Pulmonary edema from any etiology other than CHF.
7. SBP less than 90 mm Hg.

PROCEDURE

1. Assess patient and initiate high flow oxygen as indicated.
2. Monitor pulse oximetry and quantitative waveform capnography, if available.
3. Follow manufacturer recommendations for device set up.
4. Place the device into the face mask.
5. Determine the required level of CPAP and select the desired flow rate.
6. Titrate increases in positive airway pressure until improvement in patient pulse oximetry and symptoms.
7. Reassess the patient.
8. Follow the appropriate treatment protocol.
9. Transport as soon as feasible.

CONSIDERATIONS

1. Pulse oximetry and quantitative waveform capnography should be monitored continuously during use of CPAP.
2. Advise the receiving emergency department of CPAP use as soon as possible.
3. Be prepared to discontinue CPAP and initiate more definitive airway measures in decompensating patients.

CRICOTHYROTOMY, SURGICAL — Protocol 5.4

Scope	EMR	EMT	AEMT	INT	PM

INDICATION

To establish emergency airway access when endotracheal intubation cannot be performed due to an airway obstruction.

CONTRAINDICATIONS

1. Patient under 12 years of age and/or 50 kg in weight.
2. Ability to intubate the trachea.
3. Ability to maintain the airway by other means.
4. Inability to identify the cricothyroid membrane.

PRECAUTIONS

1. Suspected laryngeal fractures
2. Bleeding disorders

PROCEDURE

1. Hyperextend the patient's neck (unless cervical spine injury is suspected). This position brings the larynx and cricothyroid membrane into the extreme anterior position.
2. Use standard isolation precautions.
3. Locate the cricothyroid membrane between the cricoid and thyroid cartilages by palpating the depression caudally (towards the feet) to the midline thyroid cartilage.
4. Cleanse the area well with Povidone-Iodine solution or alcohol.
5. Stabilize the thyroid cartilage with the non-dominant hand.
6. Make a 1 to 2 cm vertical incision over the cricothyroid membrane and then puncture the cricothyroid membrane (cut through the skin, subcutaneous tissue, and cricothyroid membrane). Make a horizontal incision 1 cm in each direction from the midline incision. The incision may be extended if the tube cannot be inserted. The incision should not exceed 2 cm (¾ inch).

   NOTE: Brisk bleeding may occur. Do not waste time attempting to control bleeding.
7. Insert a trach hook and/or forceps into the incision to capture the cricoid ring and with traction applied anteriorly, the structures of the airway are pulled closer to the surface of the skin.
8. Use an Endotracheal Tube Introducer (gum bougie) to canulate trachea and pass an endotracheal tube over the introducer, using the introducer as a guide to enter the trachea.
9. Deliver several breaths with the bag-valve-mask and confirm proper tube placement as follows:
   a. Auscultate over the epigastrium.
   b. Auscultate the chest bilaterally at the apices and the bases for the presence of equal, bilateral lung sounds.
   c. Observe for symmetrical chest rise and fall with each breath.
   d. Confirm proper tube placement with **END-TIDAL CO_2 DETECTION / MONITORING, CAPNOGRAPHY**
   e. Look for moisture condensation in the tube with an exhaled breath, if applicable.
   f. Observe patient for clinical improvement (i.e., pulse oximetry, skin condition).
10. Secure the tube with adhesive or umbilical cord tape.
11. Suction as needed according to **SUCTIONING, TRACHEOBRONCHIAL** protocol.
12. Document the procedure and patient response.

DEFIBRILLATION, MANUAL — Protocol 5.5

Scope	EMR	EMT	AEMT	INT	PM

INDICATIONS

Ventricular fibrillation (VF) and pulseless ventricular tachycardia (VT).

PROCEDURE

1. Turn on monitor / defibrillator (models have either one power switch controlling ON-OFF for both monitor and defibrillator or separate POWER controls for monitor and defibrillator).
2. Set “lead select” switch and select energy level.
    a. **Adults**: Set energy level to manufacturer recommended setting for defibrillation. If manufacturer recommended setting is unknown, use monitor’s highest setting for defibrillation.
    b. **Pediatrics**: Set energy level to manufacturer recommended setting for defibrillation. If manufacturer recommended setting is unknown, start at 2 J/kg. For refractory VF, increase the dose to 4 J/kg. Subsequent energy levels should be at least 4 J/kg, and higher energy levels may be considered, not to exceed 10 J/kg or the adult maximum dose
3. Position conductor pads on the patient’s chest.
4. Position remote defibrillation pad on the patient (sternum-apex) or for small pediatric patients (anterior-posterior).
5. Visually check the monitor display and assess the rhythm. (Subsequent steps assume VF / VT is present).
6. Press CHARGE on defibrillator controls. CPR should be provided while the defibrillator charges (when possible), until it is time to “clear” the victim for shock delivery.
7. When the defibrillator is charged, give the shock as quickly as possible. Begin the final clearing chant. State firmly in a forceful voice the following chant before each shock:
    a. ***“I’m going to shock on three. One, I’m clear.”*** Check to make sure you are clear of contact with the patient, stretcher, and equipment.
    b. ***“Two, you’re clear.”*** Make a visual check to ensure that no one continues to touch the patient or stretcher. In particular, don't forget about the person providing ventilations. That person's hands should not be touching the ventilatory adjuncts, including the tracheal tube. Turn off the oxygen supply or divert the flow away from the patient's chest.
    c. ***“Three, everybody’s clear.”*** Check yourself one more time before pressing the SHOCK button.
8. Press the DISCHARGE button.
9. Immediately after shock delivery, resume CPR (beginning with chest compressions) without delay and continue for 5 cycles (or about 2 minutes if an advanced airway is in place), and then check the rhythm.

CONSIDERATIONS

1. Minimize the number of times that chest compressions are interrupted.
2. Rhythm checks should be brief, and pulse checks should generally be performed only if an organized rhythm is observed.
3. For pediatrics, use the self-adhering electrodes that will fit on the chest wall without touching (leave about 3 cm between the electrodes).

INDICATIONS

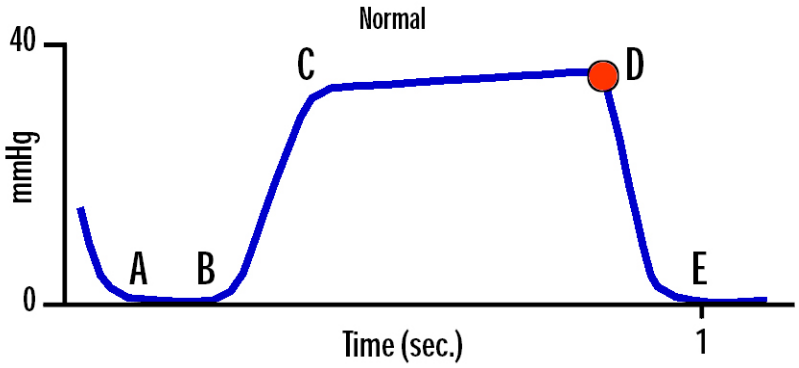
1. Primary confirmation, monitoring, and documentation of endotracheal intubation. **[IF AVAILABLE]**
2. Primary confirmation, monitoring, and documentation of King LT insertion.
3. Assessment, monitoring, and documentation of the respiratory status of the non-intubated patient experiencing respiratory distress including but not limited to asthma and COPD.

PROCEDURE – INTUBATED PATIENTS (Includes Supraglottic Airways)

1. Turn cardiac monitor / defibrillator ON. If CO_2 is not already displayed, select display to monitor the CO_2 waveform.
2. Attach the sampling line to the monitor in accordance with manufacturer recommendations.
3. Attach the sampling line to the patient.
4. Observe the waveform and the $ETCO_2$ values.
5. $ETCO_2$ numerical values and corresponding capnograph should be compared to normal values and morphology (Figure 5.5A).

Normal $ETCO_2$ Values

35 – 45 mm Hg



Waveform Labels	
A	End of inhalation
B	Beginning of exhalation
B–D	Exhalation of alveolar gas
D	End exhalation and point of maximal or highest CO_2 concentration (end-tidal CO_2)
D–E	Inhalation

Figure 5.5A The Normal CO_2 Waveform

PROCEDURE – NON-INTUBATED PATIENTS

1. Patients should be assessed, oxygenated, and ventilated with the appropriate delivery device dependent upon their presenting degree of respiratory distress or obstruction.
2. Interface the end-tidal CO_2 sampling device with the oxygen delivery device being used (i.e., nasal sampling device used under a non-rebreather mask, $ETCO_2$ / O_2 nasal cannula used on a patient requiring less than or equal to 6 LPM).
3. Observe for a waveform and numerical values to appear during exhalation after a total of 6 breaths.
4. $ETCO_2$ numerical values and corresponding capnograph should be compared to normal values and morphology (Figure 5.5A).

   NOTE: $ETCO_2$ monitoring should be discontinued while administering nebulized medications.
5. $ETCO_2$ numerical values and capnographs should be monitored following medication administration to determine the patient's response to the intervention and the need for additional intervention.

CONSIDERATIONS

1. Capnography is only an adjunct to careful patient assessment.
2. Do not use capnography as the sole method of assessing correct tube placement, especially in the pulseless patient.
3. Capnography may not indicate right mainstem bronchus intubation or pyriform placement.

INDICATION

Use of ***Easy Cap II***® and ***Pedi-Cap***® end-tidal CO_2 ($ETCO_2$) detectors is indicated for all patients that have been intubated with an endotracheal tube or King LT airway.

- Adult $ETCO_2$ detector – patient weighing greater than 15 kg.
- Pediatric $ETCO_2$ detector – patient weighing less than or equal to 15 kg.

NOTE: **END-TIDAL CO2 DETECTION / MONITORING or CAPNOGRAPHY** is required for endotracheal intubation and preferred for King Airway confirmation.

PRECAUTIONS

1. False-negative readings may be present during cardiac arrest because blood flow and delivery of CO_2 to the lungs is low.
2. False-negative results have also been reported in association with pulmonary embolus because pulmonary blood flow and Carbon Dioxide delivery to the lungs are reduced.
3. Detector contamination with gastric contents or acidic drugs may cause the detector to display a constant color rather than breath-to-breath color change.
4. Elimination and detection of CO_2 can be drastically reduced following an intravenous bolus of Epinephrine or with severe airway obstruction (e.g., status asthmaticus) and pulmonary edema.

PROCEDURE

1. Confirm tube placement via physical exam as outlined in the **I-GEL SUPRAGLOTTIC AIRWAY**, **KING LT AIRWAY**, or **INTUBATION, ENDOTRACHEAL** protocol.
2. Open the package and inspect detector for purple color and dryness.
3. Attach the detector between the bag-valve-mask and the airway. Keep detector clean and dry.
4. Resume ventilations at the appropriate rate. Do not use continuous hyperventilation.
5. Observe detector for color changes after 6 full breaths. Follow recommended clinical actions as indicated in Table 5.6A and Table 5.6B.

Table 5.6A. Patients with adequate perfusion / spontaneous heartbeat

COLOR RANGE "A" (Purple)	COLOR RANGE "B" (Tan)	COLOR RANGE "C" (Yellow)
0.03 to less than 0.5 % $ETCO_2$ less than 4 mm Hg ↓ Airway **not** properly positioned ↓ Reinsert tube ↓ Recheck with CO_2 detector	0.5 to less than 2 % $ETCO_2$ 4 to less than 15 mm Hg ↓ Retained CO2 in esophagus or low perfusion or hypocarbia ↓ Deliver 6 more breaths ↓ Color remains tan ↓ Airway properly positioned with low perfusion or hypocarbia	2 to 5 % $ETCO_2$ 15 to 38 mm Hg ↓ Airway properly positioned ↓ Secure tube ↓ Continue to observe color change

Table 5.6B. Patients with Poor Perfusion / Cardiac Arrest

COLOR RANGE "A" (Purple)	COLOR RANGE "B" (Tan)	COLOR RANGE "C" (Yellow)
0.03 to less than 0.5 % $ETCO_2$ less than 4 mm Hg ↓ Airway **not** properly positioned or inadequate perfusion (ineffective CPR) ↓ Is ET tube through vocal cords or King ventilating properly? Check ET via direct laryngoscopy **No**: Airway **not** properly positioned ↓ Reinsert tube ↓ Check with CO_2 detector **Yes**: Airway properly positioned with inadequate perfusion ↓ Take appropriate clinical action	0.5 to less than 2 % $ETCO_2$ 4 to less than 15 mm Hg ↓ Retained CO2 in esophagus or low perfusion ↓ Deliver 6 more breaths ↓ Color remains tan ↓ Airway properly positioned with low perfusion	2 to 5 % $ETCO_2$ 15 to 38 mm Hg ↓ Airway properly positioned ↓ Secure tube ↓ Continue to observe color change

CONSIDERATIONS

1. End-tidal CO_2 detectors are only an adjunct to careful patient assessment.
2. Do not use detectors as the sole method of assessing correct tube placement, especially in the pulseless patient.
3. Keep detector clean and dry.
4. If detector is not purple when removed from the package, discard the detector.
5. Adult detectors have a larger dead air space. This larger space may cause rebreathing of CO_2 by patients who weigh less than 15 kg and a potential inaccurate reading.
6. Detectors may be used for up to 2 hours.
7. Quantitative waveform capnography is required, if available, for endotracheal intubation. Colorimetric monitoring may be used temporarily while troubleshooting issues with capnography.

ENDOTRACHEAL TUBE INTRODUCER — Protocol 5.8

Scope	EMR	EMT	AEMT	INT	PM

INDICATIONS

1. To assist in endotracheal tube placement **[ENCOURAGED]**.
2. To assist in establishment of a surgical cricothyrotomy (see **CRICOTHYROTOMY, SURGICAL** for procedure).

CONTRAINDICATIONS

1. Excessive force, passage beyond the carina, or blind introduction may result in soft tissue damage or may cause rupture of the bronchus.
2. The endotracheal tube should not be threaded over the introducer without the laryngoscope in place.
3. Endotracheal tube is too small for the introducer. 15 French introducer can be used with endotracheal tubes greater than or equal to 6.0 ID.

PROCEDURE

1. Prepare for endotracheal intubation as indicated in the **INTUBATION, ENDOTRACHEAL** protocol.
2. Lubricate introducer with a water-soluble lubricant.
3. Perform laryngoscopy. If cords not visible, identify landmarks to aid intubation.
4. Place introducer into the pharynx and direct into larynx. If necessary, bend the introducer to negotiate the corner. Correct placement may be confirmed by detection of tracheal "clicks" and "hold up" of the introducer – no hold up indicates esophageal placement.
5. Leave laryngoscope in place while assistant threads endotracheal tube over introducer into trachea. If the endotracheal tube sticks at the laryngeal inlet, a 90° counterclockwise rotation may help.
6. Hold the endotracheal tube firmly in place and gently withdraw the introducer.
7. Remove laryngoscope and confirm tube placement.

   NOTE: If preferred, the endotracheal tube may be placed over the introducer prior to intubation, instead of using stylet.

CONSIDERATIONS

1. Use of the endotracheal tube introducer is optional for all intubation attempts.
2. Both disposable and reusable introducers are acceptable.
3. Reusable introducers must be cleaned thoroughly with antibacterial soap and water before they can be reused – sterilization is not required.
4. Introducers must be stored in a container that maintains their original shape. If bent or rolled, the introducer may not work as desired.
5. DO NOT use introducers to ventilate patients.

GASTRIC DECOMPRESSION (NASOGASTRIC AND OROGASTRIC) Protocol 5.9

Scope	EMR	EMT	AEMT	INT	PM

INDICATIONS

1. Gastric decompression in the intubated patient.
2. Gastric decompression in patients undergoing positive pressure ventilation, especially infants and young children.

PRECAUTIONS

1. Placement of a gastric tube in a patient with esophageal varices may result in esophageal bleeding. Use extreme caution.
2. Avoid placing a gastric tube in the presence of an esophageal obstruction because of the increased risk of esophageal perforation.

COMPLICATIONS

1. Passage of the gastric tube into the trachea.
2. Coiling of the gastric tube in the posterior pharynx.
3. Trauma and bleeding from poor technique.

PROCEDURE (NASOGASTRIC)

1. Assemble equipment:
    a. Gastric evacuation tube
    b. 60 cc irrigation syringe
    c. Tape
    d. Gloves
    e. Stethoscope
    f. Suction
    g. Water soluble lubricant
2. Use standard isolation precautions.
3. Determine correct gastric tube size.
    a. Adults: 18 French average
    b. Pediatrics: Use length-based resuscitation tape or Pediatric Handtevy (6 to 16 French)
4. Explain the procedure to the patient, if conscious.
5. Measure length of NG tube from the corner of the nose to the earlobe and then to a point midway between xyphoid process and umbilicus. Mark the insertion depth with a piece of tape.
6. Lubricate the tip of the tube with water soluble lubricant.
7. Insert by directing the tube to the back of the naries and then direct tube downward through the nasopharynx.
8. Continue advancing tube until tape mark is at the nose.
9. If tube meets resistance or the patient has respiratory distress, remove the tube. Fogging of the tube accompanied by cough or respiratory distress indicates tracheal intubation.
10. Check the placement by aspirating gastric contents and auscultating gastric sounds while injecting 20 to 30 mL of air into the tube (10 mL of air in children).
11. Tape the tube in place and connect to low suction as needed.
12. Document the procedure, size of tube, tube placement check, and patient response.

GASTRIC DECOMPRESSION (NASOGASTRIC AND OROGASTRIC) Protocol 5.9

Scope	EMR	EMT	AEMT	INT	PM

PROCEDURE (OROGASTRIC)

1. Assemble equipment:
    a. Gastric evacuation tube
    b. 60 cc irrigation syringe
    c. Tape
    d. Gloves
    e. Stethoscope
    f. Suction
    g. Water soluble lubricant
2. Use standard isolation precautions.
3. Determine correct gastric tube size.
    a. Adults: 18 French average
    b. Pediatrics: Use length-based resuscitation tape or Pediatric Handtevy (6 to 16 French)
4. Explain the procedure to the patient, if conscious.
5. Measure length of OG tube from the mouth to the earlobe and then to a point midway between xyphoid process and umbilicus. Mark the insertion depth with a piece of tape.
6. Lubricate the tip of the tube with water soluble lubricant.
7. Insert by directing the tube to the back of the tongue and then direct tube downward through the oropharynx.
8. Continue advancing tube until tape mark is at the lip.
9. If tube meets resistance or the patient has respiratory distress, remove the tube. Fogging of the tube accompanied by cough or respiratory distress indicates tracheal intubation.
10. Check the placement by aspirating gastric contents and auscultating gastric sounds while injecting 20 to 30 mL of air into the tube (10 mL of air in children).
11. Tape the tube in place and connect to low suction as needed.
12. Document the procedure, size of tube, tube placement check, and patient response.

GLUCOMETRY — Protocol 5.10

Scope	EMR	EMT	AEMT	INT	PM

INDICATIONS

1. Patient with altered level of mental status.
2. Seizure patient.
3. Unresponsive patient.
4. Signs and symptoms of hypoglycemia or hyperglycemia.

PRECAUTIONS

1. The glucose reading may be inaccurate if not enough blood has been drawn into the test strip.
2. Inaccurate readings may result if the glucometer has not been properly maintained and tested in accordance with manufacturer recommendations.
3. Inaccurate readings may result if code numbers on the test strips do not match those on the digital reading.
4. Alcohol from swab may alter reading if not allowed to dry.

PROCEDURE

1. Use standard isolation precautions.
2. Wipe finger with an alcohol swab and wait for alcohol to dry.
3. Assemble and prepare the glucometer in accordance with manufacturer directions.
4. Using a Lancet device, pierce patient's finger skin.
5. Acquire the blood sample using the glucometer and wait the required time for the glucose reading.
6. Dispose of the lancet and used test strip in sharps container.

CONSIDERATIONS

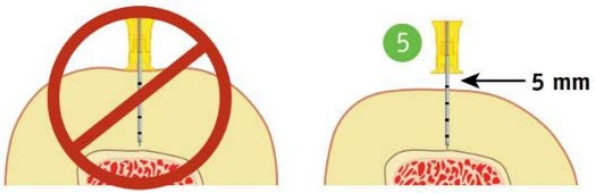
1. Glucometry is considered an invasive procedure requiring the medical practitioner who assumes responsibility for the patient sign the patient care report.

INTRAOSSEOUS INSERTION, EZ–IO — Protocol 5.11

Scope	EMR	EMT	AEMT	INT	PM

INDICATION
The EZ-IO product system is indicated whenever fluid or pharmacological therapy is critical but traditional vascular access techniques are not possible or require too much time to achieve a successful insertion. IO site selection depends on patient age, size, anatomy, presenting condition, ability to locate anatomical landmarks, and clinical judgment and experience. The humerus is a superior site for flow rates, drug delivery, and management of infusion pain in adults and is the preferred site for IO access in adults.

CONTRAINDICATIONS
- Fracture in targeted bone.
- Excessive tissue (figure to the right) or absence of adequate anatomical landmarks.
- Infection at the area of the insertion site.
- Previous, significant orthopedic procedure at site (e.g., prosthetic limb / joint).
- IO access in targeted bone within the past 48 hours.



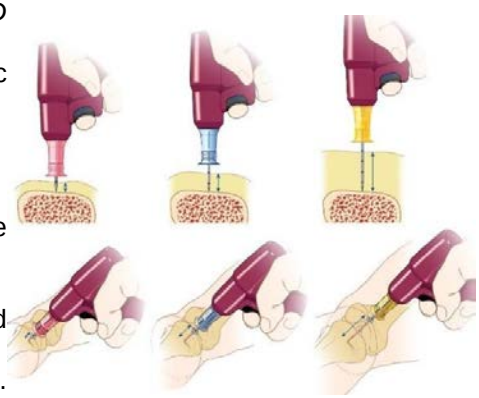
CONSIDERATIONS:
- Due to the anatomy of the IO space, you will note flow rates to be slower than those achieved with IV catheters.
    a. Ensure the administration of a 10 mL rapid bolus (flush) with a syringe.
    b. Use a pressure bag or pump for continuous infusions.
- Insertion of the EZ-IO in conscious patients causes mild to moderate discomfort and is usually no more painful than a large bore IV.
- The EZ-IO is not intended for prophylactic use.

EQUIPMENT
- Alcohol or povidone-iodine swab
- Extension set or EZ-Connect
- EZ-Stabilizer
- EZ-IO driver
- 10 mL syringe
- Normal saline
- Tape or gauze
- Pressure bag
- EZ-IO needle sets

Available needle sets include: EZ-IO® 15mm (3-39 kg, pink), EZ-IO® 25mm (40 kg and greater, blue), and EZ-IO® 45mm (excessive tissue, yellow).

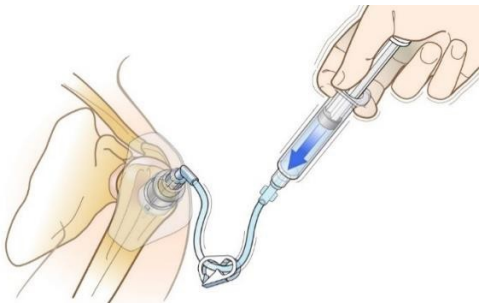
PROCEDURE
If the patient is conscious, advise them of the EMERGENT NEED for this procedure and obtain informed consent.

1. Always observe standard precautions and aseptic techniques when using the EZ-IO.
2. Locate proper site for EZ-IO insertion.
3. Clean the insertion site (use aseptic technique).
4. Prepare supplies.
    a. Prime EZ-Connect®: Unlock the clamp. Prime the set and purge air.
    b. Open EZ-Stabilizer®.
5. Attach the needle set to the EZ-IO® power driver and remove the safety cap from the catheter.
   IMPORTANT: Only handle Needle Set by the plastic hub.



IMPORTANT: Control patient movement prior to and during procedure.

6. Push the needle set through skin until the tip touches bone (reference the image above).
   IMPORTANT: The catheter is marked with a black line 5 mm from the hub. If the needle set is inserted through the soft tissue and does not reach the bone or the 5 mm mark is not visible above the skin with the tip of the needle set touching the bone, the needle set is too short. A longer needle set, or alternate site should be chosen prior to penetration of the bone cortex. Using a needle set that is too short will increase the risk of catheter dislodgement leading to infiltration / extravasation, creating a hole in the bone unnecessarily and rendering the site unusable for future IO access for a minimum of 48 hours.
7. Squeeze trigger and apply moderate steady pressure.
   IMPORTANT: DO NOT USE EXCESSIVE FORCE. Use moderate steady downward pressure and allow Needle Set rotation to penetrate the bone.
   Note: If driver stalls and needle set will not penetrate the bone, the operator may be applying too much downward pressure to penetrate bone.
   Note: In the event of a driver failure, disconnect the power driver, grasp the needle set hub by hand and advance into the medullary space while twisting.
8. Advance needle set and release trigger.
   a. Pediatrics: Release trigger when sudden “give” or “pop” is felt, indicating entry into medullary space.
   b. Adult: Advance needle set approximately 1-2 cm after entry into medullary space; in proximal humerus for most adults, needle set should be advanced 2 cm or until hub is flush or against the skin.
9. Stabilize needle set hub, disconnect driver, and remove stylet.
10. Place Stylet into NeedleVISE® for sharps containment.
    Note: Place the NeedleVISE® on a flat stable surface. Immediately following use of a Needle and while still holding it with one hand away from the sharp end, firmly insert the sharp pointed tip straight down into the opening in the NeedleVISE® until it stops, making sure to KEEP YOUR FREE HAND AWAY FROM THE SHARPS SECURING DEVICE DURING INSERTION. DO NOT HOLD NeedleVISE® WITH FREE HAND WHILE INSERTING NEEDLE. ALWAYS USE ONE-HANDED TECHNIQUE WHEN INSERTING SHARP into NeedleVISE®. Dispose of opened sharp into NeedleVISE® whether or not it has been used.
11. Use of the EZ-Stabilizer is strongly recommended for all EZ-IO® insertions. Place stabilizer over catheter hub.
12. Attach a primed EZ-connect® extension set to the hub, firmly secure by twisting clockwise.
    Note: Do NOT use any instruments to tighten connections.
    Note: To prevent valve damage, Do NOT use needles or blunt cannula to access the swabable valve. Non-standard syringes or connectors can damage the swabable valve.
    Note: Operator may use a sterile alcohol wipe, to swab the surface of the EZ-Connect® valve and let it air dry.
13. Attach EZ-Stabilizer dressing by pulling the tabs to expose the adhesive and adhere to skin.
14. For patients responsive to pain, consider **LIDOCAINE 2%** (preservative free) 20- 40 mg for adults, 0.5 mg/kg up to 40 mg for children. Use extreme dosage precautions to avoid medication error.
15. Flush the EZ-IO® with **NORMAL SALINE** (0.9% Sodium chloride) (5-10 mL for adults; 2-5 mL infant / child).
    a. Prior to flush, aspirate slightly for visual confirmation of bone marrow.
    b. Failure to appropriately flush the EZ-IO® catheter may result in limited or no flow. Repeat flush as needed.



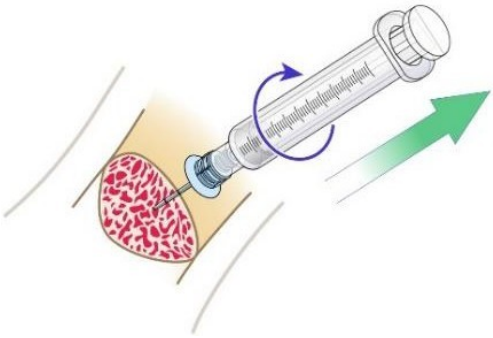
c. Once EZ-IO® catheter has been flushed, administer fluids or medications as indicated.

16. Confirm catheter placement with the following recommended methods:
    - Stability of catheter in the bone.
    - Ability to aspirate after flush.
    - Adequate flow rate.
17. Document date / time of insertion and apply EZ-IO® wristband. Monitor insertion site frequently for extravasation.

REMOVAL

To remove the EZ-IO from patient (figure to the right):

1. Remove EZ-Connect®.
2. Lift and remove EZ-Stabilizer™ adhesive dressing.
3. Attach luer-lock syringe to hub of catheter. Withdraw the Catheter by applying traction while rotating the syringe and catheter clockwise.
4. Maintain axial alignment during removal, do NOT rock or bend the catheter.
5. Once removed, immediately place the syringe / catheter in the appropriate sharp's container.
6. Dress the site.

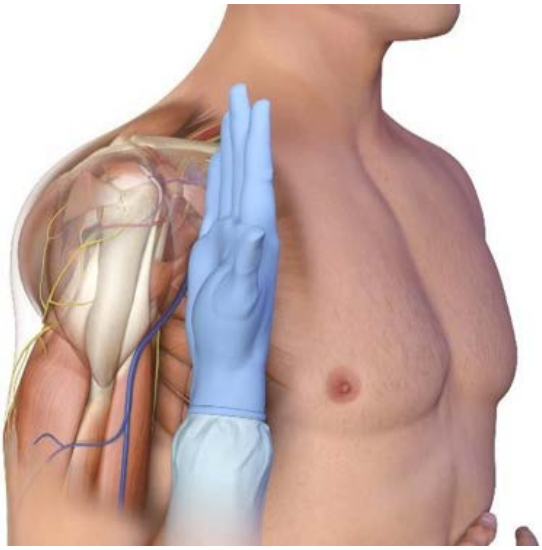


Humeral Insertion (Adult):

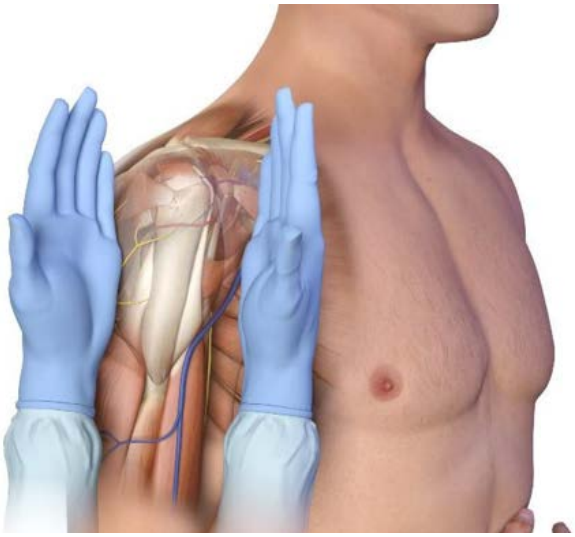
1. Place the patient's hand over the abdomen (elbow adducted and humerus internally rotated).

2. Place your palm on the patient's shoulder anteriorly. The area that feels like a "ball" under your palm is the general target area. You should be able to feel this ball by pushing deeply, even on obese patients.

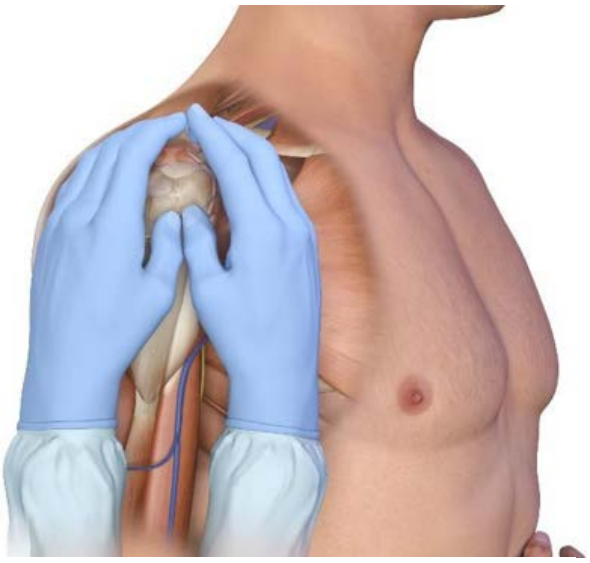
Scope	EMR	EMT	AEMT	INT	PM



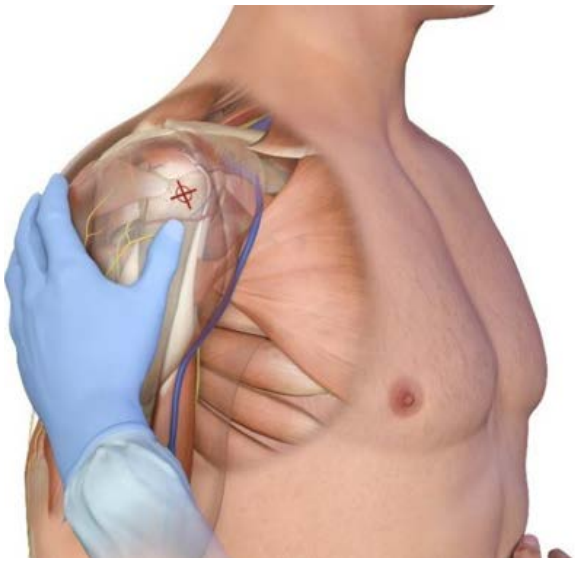
3. Place the ulnar aspect of one hand vertically over the axilla.



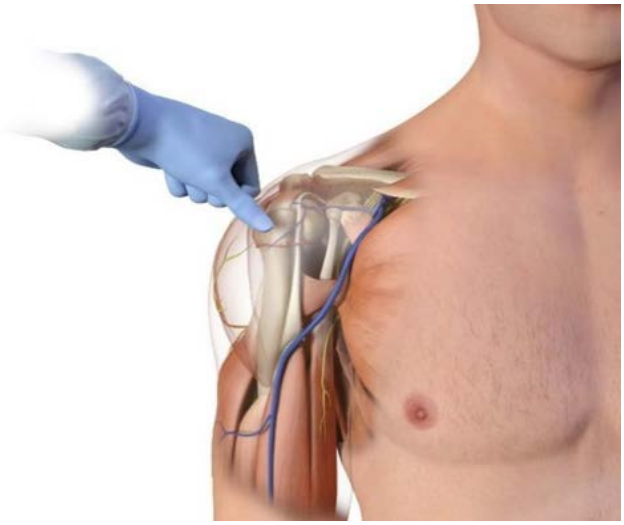
4. Place the ulnar aspect of the opposite hand over the axilla.



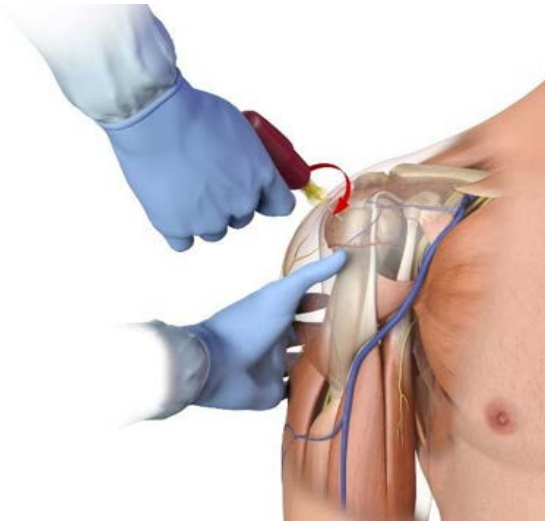
5. Place your thumbs together over the arm. This identifies the vertical line of insertion on the proximal humerus.



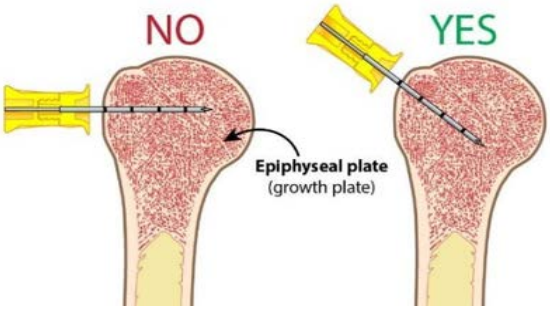
6. Palpate deeply as you climb up the humerus to the surgical neck. It will feel like a golf ball on a tee - the spot where the “ball” meets the tee” is the surgical neck.

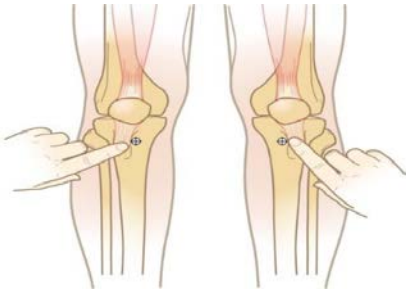


7. The insertion site is on the most prominent aspect of the greater tubercle, 1 to 2 cm above the surgical neck.



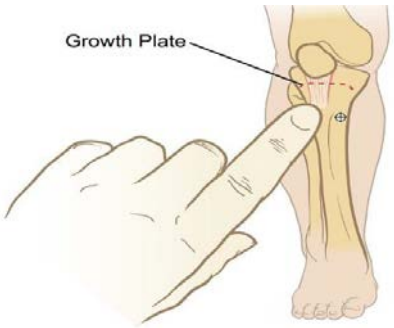
8. Point the needle set tip at a 45° angle to the anterior plane and posteromedial. Push the needle tip through the skin until the tip rests against the bone. Gently drill into the humerus 2 cm or until the hub reaches the skin in an adult. The hub of the needle set should be perpendicular to the skin.





a

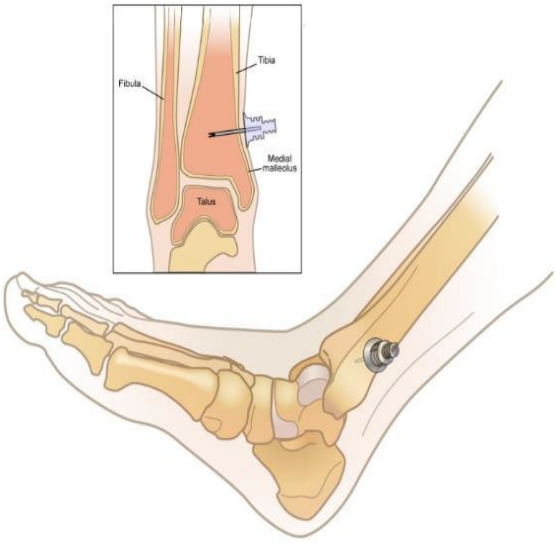
a. **Proximal tibia insertion (adult):** Extend the leg. Insertion site is approximately 2 cm medial to the tibial tuberosity, or approximately 3 cm (two finger widths) below the patella and approximately 2 cm medial, along the flat aspect of the tibia.
b. **Proximal tibia insertion (infants and small children):** Extend the leg. Insertion site is approximately 1 cm medial to the tibial tuberosity, or just below the patella (approximately 1 cm or one finger width) and slightly medial (approximately 1cm or one finger width), along the flat aspect of the tibia. Pinch the tibia between your fingers to identify the center of the medial and lateral borders.
c. **Distal femur insertion (infants and small children):** Extend the leg. Palpate the patella and slide your finger immediately above. The insertion site is approximately 1 cm (1 finger width) superior to and medial of the patella.
d. **Distal tibia insertion (adult):** Insertion site is located approximately 3 cm (2 finger widths) proximal to the most prominent aspect of the medial malleolus. Palpate the anterior and posterior borders of the tibia to assure that your insertion site is on the flat center aspect of the bone.
e. **Distal tibia insertion (infants and small children):** Insertion site is located approximately 1-2 cm (1 finger width) proximal to the most prominent aspect of the medial malleolus. Palpate the anterior and posterior borders of the tibia to assure that your insertion site is on the flat center aspect of the bone.



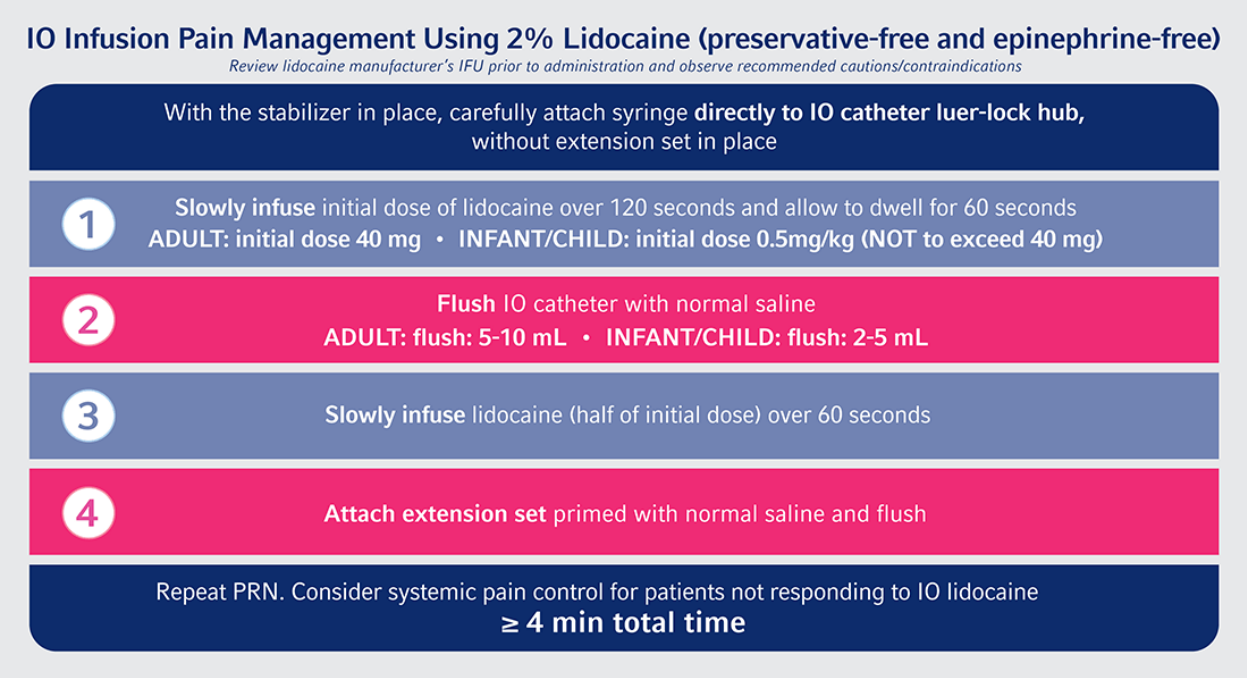
b

c

e



d



Note: Advanced EMT can administer 2% Lidocaine to live patients for pain with fluid administration.

INTRAVENOUS (IV) INFUSION PUMPS (OPTIONAL) Protocol 5.12

Scope	EMR	EMT	AEMT	INT	PM

INDICATIONS

1. Care of a patient requiring specific medication infusions to assure that medication and fluid delivery is at a safe and therapeutic rate.
2. Interfacility transport where an IV Infusion Pump is already in place.

CONTRAINDICATIONS

1. Lack of trained and credentialed personnel.
2. Rapid infusion of IV Fluids exceeding maximum flow rate of infusion pump needed.

CONSIDERATIONS

1. The use / monitoring of an *"IV Programmable Volume Infusion Device"* (AKA IV Infusion Pump) in either the prehospital or interfacility setting is considered an Intermediate / Paramedic level of care and requires one of those providers to be in attendance.
2. The use of an IV Infusion Pump in the prehospital setting is an "Optional Module" and requires additional education and training approved by the EMS Physician.
3. When possible, the Intermediate / Paramedic should use the "drug library" or other "smart pump" functions to reduce the chance of medication error.
4. When possible, the Intermediate / Paramedic should ***"cross check"*** all medication infusions with another EMS Provider, preferably another ALS Provider or the sending facility staff if available, to reduce the chance of medication error.

MEDICATIONS

The use of an IV Infusion Pump is intended for medication maintenance infusions, not for loading dose infusions or bolus doses unless specifically indicated. The following infusions are ***excluded*** from requiring an IV Infusion Pump to administer (but may be used at the Intermediate / Paramedic's discretion or physician order.

- Crystalloid Infusions
- Dextrose solutions (i.e., D10, D10NS) without other medications.
- Magnesium Sulfate loading dose in the setting for the treatment of eclampsia or refractory bronchospasm.
- Blood Products (still requires a filter).
- Anti-histamine infusions in the setting of allergic and anaphylactic reactions.
- Oxytocin in the setting of post-partum hemorrhage.
- Antibiotic Infusions.

Other medication infusions require the use of an IV Infusion Pump.

PROCEDURE

1. Patient shall be placed and maintained on a cardiac monitor, pulse oximetry monitor, and Quantitative Waveform Capnography, during transport.
2. Follow manufacturer's guidelines for the safe us of the IV Infusion Pump.
3. All infusions should be documented in the Patient Care Report (PCR) flow chart and the narrative.
4. If a patient suffers undesired effect(s) as a result of an infusion, consider discontinuation of the infusion, treat per appropriate Protocol(s), and contact **Medical Control** immediately.

5. Interfacility Transport:
    a. When a patient already has an IV Infusion Pump in place, it should be left in place for the transport. If the Intermediate / Paramedic is unfamiliar with the particular brand and/or model of the pump, the staff should be incorporated to familiarize the Intermediate / Paramedic with the pump's basic operation prior to transport.
    b. Note all drips and document any discontinuations / modifications prior to departure.
    c. Verify all drip rates / doses with sending facility staff (i.e., Nursing Staff or Physician) before departure.
    d. Intermediate / Paramedic level providers may not titrate medications not in the Protocols and/or Virginia Office of Emergency Medical Services Formulary (Current Edition) without a direct physician medical order.

INTUBATION, NASOTRACHEAL — Protocol 5.13

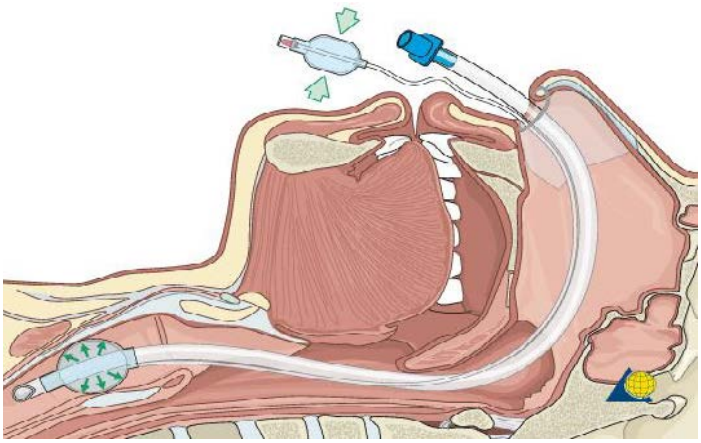
Scope	EMR	EMT	AEMT	INT	PM

INDICATIONS

1. A spontaneously breathing patient in need of intubation (inadequate respiratory effort, evidence of hypoxia or Carbon Dioxide (CO_2) retention, or need for airway protection.
2. Rigidity or clenched teeth prohibiting other airway procedures.
3. Patient must be 12 years of age or older.

PROCEDURE *(MAXIMUM OF 2 ATTEMPTS)*

1. Select the largest and least obstructed nostril and insert a Nasopharyngeal (NP) airway lubricated with jelly to help dilate the nasal passage.
2. Preoxygenate the patient with a bag-valve-mask supplied with 100% oxygen for at least 30 seconds. Lubricate the endotracheal tube.
3. Remove the Nasopharyngeal (NP) airway and gently insert the endotracheal tube, keeping the bevel of the tube toward the septum.
4. Continue to pass the endotracheal tube listening for air movement and looking for vapor condensation in the tube. As the endotracheal tube approaches the larynx, the air movement gets louder.
5. Gently and evenly advance the endotracheal tube through the glottic opening on the inspiration. This facilitates passage of the tube and reduces the incidence of trauma to the vocal cords.
6. Upon entering the trachea, the endotracheal tube may cause the patient to cough, buck, strain, or gag. Do not remove the endotracheal tube! This is normal but be prepared to control the cervical spine and the patient and be alert for vomiting.
7. Auscultate for bilaterally equal breath sounds and absence of sounds over the epigastrium. Observe for symmetrical chest expansion. The 15 mm adapter usually rests close to the nostril with proper positioning.
8. Inflate the cuff with 5-10 mL of air.
9. Confirm endotracheal tube placement using end-tidal CO_2 monitoring and/or Capnography.
10. Secure the endotracheal tube.
11. Reassess airway and breath sounds after transfer to the stretcher and during transport. These endotracheal tubes are easily dislodged and require close monitoring and frequent reassessment.
12. Document the procedure, time, and result (success / failure) on the Patient Care Report (PCR).
13. It is strongly recommended that the airway (if equipment is available) be monitored continuously through Capnography and Pulse Oximetry.



INTUBATION, OROTRACHEAL (DIRECT LARYNGOSCOPY) — Protocol 5.14

Scope	EMR	EMT	AEMT	INT	PM

INDICATIONS

1. Cardiac or respiratory arrest.
2. Unresponsive medical or trauma patients who lack a gag reflex.

CONTRAINDICATIONS

1. Child less than 12 years of age. **(Intermediate Only)**
2. Gag reflex present.
3. Epiglottitis.

PRECAUTIONS

1. Placement of the endotracheal tube must continually be assessed; accidental displacement is a common occurrence.
2. Dextrose or Naloxone to be used.

PROCEDURE *(MAXIMUM OF 2 ATTEMPTS, REGARDLESS OF TECHNIQUE)*

> **NOTE:** Use of an **ENDOTRACHEAL TUBE INTRODUCER** is encouraged for all intubation attempts using standard laryngoscopy.

1. Use standard isolation precautions including eye protection. Use a face mask and gown when splashing is likely prior to initiating airway management procedures.
2. Open the airway and preoxygenate the patient the patient with a bag-valve-mask supplied with 100% oxygen for at least 30 seconds.
3. Auscultate for breath sounds to establish a baseline.
4. Assemble and check the equipment including:
    a. The distal cuff for leaks.
    b. Lubricating the distal end of the endotracheal tube with a water-soluble lubricant.
    c. Inserting a stylet, if desired, in the endotracheal tube, ensuring the stylet is recessing 2 cm from the distal end of the tube.
    d. The laryngoscope bulb to ensure it is bright white and tightly secured in place.
    e. Prepare endotracheal tube introducer.
    f. Prepare quantitative waveform capnography.
5. Turn on the suction unit and attached the appropriate tip.
6. Place the head and neck into a “sniffing position” to align the three axes of the mouth, pharynx, and trachea.

    NOTE: When there is a potential for cervical spine injury, ensure the head is firmly held in a neutral position during intubation.
7. Holding the handle in the left hand, insert the laryngoscope blade into the right side of the patient’s mouth. Using a sweeping motion, displace the tongue to the left.
8. Move the blade slightly toward the midline and advance it until the distal end is positioned at the base of the tongue.
9. Visualize the tip of the epiglottis and then place the laryngoscope blade into the proper position.

a. Curved blade is advanced into the vallecula.
b. Straight blade is inserted under the epiglottis.

10. Lift the laryngoscope slightly upward and forward to displace the mandible and airway structures without allowing the blade to touch the teeth.
11. Keeping the left wrist straight, use the shoulder and arm to continue lifting the mandible and tongue at a 45° angle to the ground until the glottis is exposed. If necessary, have another provider provide cricoid pressure.
12. Intubate the trachea as indicated in the **ENDOTRACHEAL TUBE INTRODUCER** protocol.
13. Insert the endotracheal tube into the glottic opening and advance it until the cuff disappears slightly (1 to 2 cm) past the vocal cords. Observe the tube as it enters the glottic opening.
14. Hold the tube in place with a free hand. Do not release the tube before it is secured in place.
15. Inflate the distal cuff with the prefilled syringe. Use only the minimum amount of air necessary to create an effective seal and prevent air leakage (typically 5 to 10 mL of air). **NOTE:** Ensure the syringe is removed after the distal cuff is inflated.
16. Attach a bag-valve-mask to the tube.
17. Deliver several breaths with the bag-valve-mask and confirm proper tube placement as follows:
    a. Auscultate over the epigastrium.
    b. Auscultate the chest bilaterally at the apices and the bases for the presence of equal, bilateral lung sounds.
    c. Observe for symmetrical chest rise and fall with each breath.
    d. Confirm proper tube placement with **END-TIDAL CO_2 DETECTION / MONITORING or CAPNOGRAPHY**.
    e. Look for moisture condensation in the tube with an exhaled breath.
    f. Observe patient for clinical improvement (i.e., pulse oximetry, skin condition).
18. Note the depth of the endotracheal tube at the teeth. The average depth is 22 cm for adult males and 21 cm for adult females.
19. Ventilate the patient with the bag-valve-mask supplied with 100% oxygen as indicated.
    a. **During CPR:** Deliver 10 breaths per minute (adult) or 20-30 breaths per minute (child). Deliver each breath over about 1 second while chest compressions are delivered at a rate of 100-120 per minute, and do not attempt to synchronize the compressions with the ventilations. Titrate to End-Tidal 35-40 mm Hg.
    b. **Patients with a perfusing rhythm:** Deliver approximately 10 breaths per minute (1 breath every 6 seconds). Deliver these breaths over 1 second.
20. Secure the endotracheal tube in place with a commercial device while continuing ventilatory support.
21. Re-confirm tube placement after the tube is secured, after every patient movement and at regular intervals. Application of a cervical collar and immobilization device will help prevent the patient from moving in such a way as to dislodge the endotracheal tube.

SEDATION

If patient regains consciousness or gag reflex returns ***AND*** the patient's airway needs continued protection ***AND*** the patient is hemodynamically stable,

- Give **MIDAZOLAM** 2.5 mg to 5 mg slow IVP titrated to effect. May repeat dose every 5 minutes if needed. Midazolam may also be administered IM if unable to readily establish IV access. For additional sedation options, contact **[Medical Control]** or refer to your agency's specific sedation protocol.

COMPLICATION: ESOPHAGEAL INTUBATION

1. Deflate the distal cuff.
2. Vigorously suction the oropharynx as needed.
3. Preoxygenate the patient prior to reintubation if an additional attempt is permitted.

COMPLICATION: ENDOBRONCHIAL INTUBATION

1. Loosen the securing device.
2. Deflate the distal cuff.
3. For a right mainstem bronchus intubation, continue ventilating and slowly withdraw the tube while simultaneously auscultating the left side of the chest.
4. Stop withdrawing the tube once breath sounds are heard on the left side.
5. Auscultate both sides of the chest. Breath sounds should be heard equally and bilaterally.
6. Note the tube depth, reinflate the distal cuff, and secure the tube in place.

EXTUBATION

Extubation is indicated if the patient is able to protect and maintain an open airway, the risks for needing to reintubate are significantly reduced and the patient is not sedated. To perform the procedure:

1. Ensure adequate oxygenation.
2. Confirm patient responsiveness.
3. Suction the oropharynx.
4. Deflate the distal cuff.
5. Remove the endotracheal tube on cough or expiration.

Key Points: INTUBATION, OROTRACHEAL

- Keep the ET tube in the protective wrapper until it is time to insert it into the trachea. This helps prevent the tube from becoming contaminated before its placement.
- It is sometimes best to remove dental appliances such as dentures and partials before intubation (unless they fit tightly).
- Do not use the teeth as a fulcrum.
- Male average tube size: 8.0 to 8.5 ID.
- Female average tube size: 7.5 to 8.0 ID.
- Male average tube insertion depth: 22 cm at the teeth.
- Female average tube insertion depth: 21 cm at the teeth.
- Tube size formula for children older than 2 years of age:

  ET tube (in mm) = (16 + age in years) ÷ 4 (one-half size smaller for cuffed ET tubes)

[NOTE] INTUBATION ATTEMPT DEFINITION: An intubation attempt is defined as activities occurring during a single laryngoscopy maneuver, beginning when the laryngoscope is inserted into the patient's mouth, and ending when the laryngoscope is removed, regardless of whether an endotracheal tube is actually inserted into the patient. **[National Emergency Airway Registry]**

INTUBATION, OROTRACHEAL (VIDEO LARYNGOSCOPY) — Protocol 5.15

Scope	EMR	EMT	AEMT	INT	PM

INTRODUCTION
The following protocol may be substituted for PROTOCOL 5.12 - INTUBATION, OROTRACHEAL (DIRECT LARYNGOSCOPY). There are numerous video laryngoscope devices on the market. This protocol divides the devices into "blade" devices where the ET tube is inserted separately and "channel" devices where the ET tube is fixed to the device prior to insertion.

INDICATIONS
- Cardiac or respiratory arrest.
- Unresponsive medical or trauma patients who lack a gag reflex.

CONTRAINDICATIONS
- Child less than 12 years of age. **(Intermediate Only)**
- Gag reflex present.
- Epiglottitis.

PRECAUTIONS
- Placement of the endotracheal tube must continually be assessed; accidental displacement is a common occurrence.
- Dextrose or Naloxone to be used.

PROCEDURE (MAXIMUM OF 2 ATTEMPTS, REGARDLESS OF TECHNIQUE)

Follow the manufacturer's recommendation for device specific procedures.

1. Use standard isolation precautions including eye protection. Use a face mask and gown when splashing is likely prior to initiating airway management procedures.
2. Open the airway and preoxygenate the patient with a bag-valve-mask supplied with 100% oxygen for at least 30 seconds.
3. Auscultate for breath sounds to establish a baseline.
4. Assemble and check the equipment including:
    a. Turn the video laryngoscope "On".
    b. Check the distal cuff for leaks and lubricate the distal end of the endotracheal tube with a water-soluble lubricant.
    c. Prepare mechanical tube holder.
    d. Prepare waveform **CAPNOGRAPHY**.
    e. If using a channel device, load the tube into the channel.
    f. Prepare an Endotracheal Tube Introducer or place the rigid stylet in the tube (blade device only).
5. Turn on the suction unit and attach the appropriate tip.
6. Place the head and neck into a NEUTRAL position.
   NOTE: When there is a potential for cervical spine injury, ensure the head is firmly held in a neutral position during intubation.
7. Insert the video laryngoscope in the mouth with your left hand. Keep your eyes on the patient.

Blade Device	Channel Device
a. Position the blade while viewing the monitor. Visualize the epiglottis. A view that allows visualization of accessory anatomy is ideal. b. Insert the tube into the mouth with your right hand. Keep your eyes on the patient. c. Place either the Endotracheal Tube Introducer or styleted tube through the vocal cords. d. **Stylet:** Carefully remove the stylet while holding the tube. Maintain visualization of the vocal cords. Pull the stylet in the direction of the patient's feet when removing. e. **Bougie:** Place the tube over the bougie. Maintain visualization of the vocal cords.	a. Visualize the epiglottis on the monitor / eyepiece. A view that allows visualization of the accessory anatomy is ideal. b. Advance the tube through the channel and through the vocal cords. c. If tube passage is difficult, it may be necessary to remove the tube partially from the channel to complete passage or to pass an Endotracheal Tube Introducer through the tube. d. Carefully remove the tube from the channel. Maintain visualization of the cords if possible.

8. Hold the tube in place with a free hand. Do not release the tube before it is secured in place.
9. Inflate the distal cuff with the prefilled syringe. Use only the minimum amount of air necessary to create an effective seal and prevent air leakage (typically 5 to 10 cc of air).
   NOTE: Ensure the syringe is removed after the distal cuff is inflated.
10. Attach a bag-valve-mask to the tube.
11. Deliver several breaths with the bag-valve-mask and confirm proper tube placement as follows:
    a. Auscultate over the epigastrium.
    b. Auscultate the chest bilaterally at the apices and the bases for the presence of equal, bilateral lung sounds.
    c. Observe for symmetrical chest rise and fall with each breath.
    d. Confirm proper tube placement with **END-TIDAL CO_2 DETECTION / MONITORING or CAPNOGRAPHY**.
    e. Look for moisture condensation in the tube with an exhaled breath.
    f. Observe the patient for clinical improvement (i.e., pulse oximetry, skin condition).
12. Note the depth of the endotracheal tube at the teeth. The average depth is 22 cm for adult males and 21 cm for adult females.
13. Ventilate the patient with the bag-valve-mask supplied with 100% oxygen as indicated.
    a. **During CPR:** Deliver 10 breaths per minute (adult) or 20-30 breaths per minute (child). Deliver each breath over about 1 second while chest compressions are delivered at a rate of 100-120 per minute, and do not attempt to synchronize the compressions with the ventilations.
    b. **Patients with a perfusing rhythm:** Deliver approximately 10 breaths per minute (1 breath every 6 seconds). Deliver these breaths over 1 second.
14. Secure the endotracheal tube in place with a commercial device while continuing ventilatory support.
15. Re-confirm tube placement after the tube is secured, after every patient movement and at regular intervals. Application of a cervical collar and immobilization device will help prevent the patient from moving in such a way as to dislodge the endotracheal tube.

SEDATION

If patient regains consciousness or gag reflex returns ***AND*** the patient's airway needs continued protection ***AND*** the patient is hemodynamically stable, administer **MIDAZOLAM** 2.5 mg to 5 mg slow IV push titrated to affect. May repeat the dose every 5 minutes if needed. For additional sedation options, contact **[Medical Control]** or refer to your agency's specific sedation protocol.

[NOTE] INTUBATION ATTEMPT DEFINITION: An intubation attempt is defined as activities occurring during a single laryngoscopy maneuver, beginning when the laryngoscope is inserted into the patient's mouth, and ending when the laryngoscope is removed, regardless of whether an endotracheal tube is actually inserted into the patient. **[National Emergency Airway Registry]**

INDICATIONS

The i-Gel Supraglottic Airway is designed for emergency or difficult intubation in the apneic or unresponsive patient without a gag reflex.

CONTRAINDICATIONS

- Trismus, limited mouth opening.
- Patent gag reflex.

PRECAUTIONS

- Dextrose, Naloxone, or Glucagon to be administered to the patient.

WARNINGS

- Do not use excessive force to insert the device.
- i-Gel must be lubricated according to the instructions for use.
- The patient should always be in the 'sniffing' position prior to insertion with the assistant helping to open the patient's mouth.
- The leading edge of the i-Gel's tip must follow the curvature of the patient's hard palate upon insertion.
- Excessive air leak during manual ventilation is primarily due to either sub-optimal depth or over insertion of the i-Gel.
- Do not reuse or attempt to reprocess the i-Gel.

SIZE SELECTION

Select the appropriate size i-Gel by assessing the patient's anatomy. The i-Gel's cuff may look smaller than traditional supraglottic devices with an inflatable cuff of the same numerical size.

i-Gel Size	Patient Size	Patient Ideal Body Weight
1	Neonate	**2-5 kg** (5-11 pounds)
1.5	Infant	**5-12 kg** (11-25 pounds)
2	Small Pediatric	**10-25 kg** (22-55 pounds)
2.5	Large Pediatric	**25-35 kg** (55-77 pounds)
3	Small Adult	**30-60 kg** (65-130 pounds)
4	Medium Adult	**50-90 kg** (110-200 pounds)
5	Large Adult	**90+ kg** (200+ pounds)

PRE-INSERTION PREPARATION

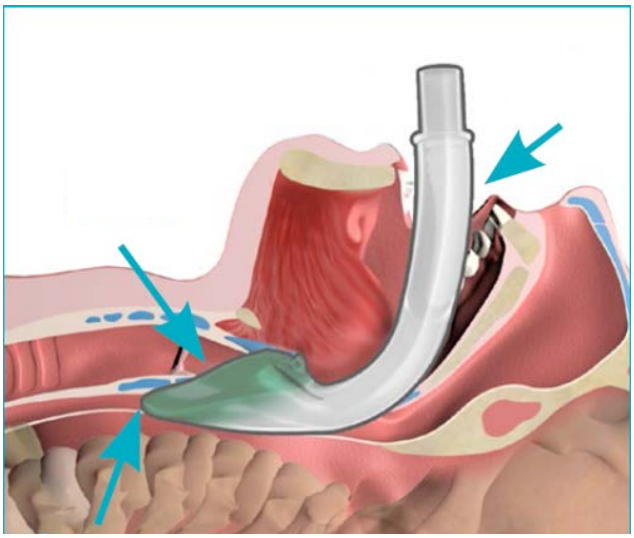
1. Open the i-Gel O_2 package and take out the protective cradle containing the device. Remove the accessory pack containing the sachet of lubricant and airway support strap from the protective cradle and place it to one side.
2. Remove the i-Gel O_2 and transfer it to the palm of the same hand that is holding the protective cradle, supporting the device between the thumb and index finger.

3. Open the sachet of supplied lubricant and place a small bolus onto the middle of the smooth surface of the protective cradle in preparation for lubrication. Do not use silicone-based lubricants.
4. Grasp the i-Gel O_2 with the opposite (free) hand along the integral bite block and lubricate the back, sides, and front of the cuff with a thin layer of lubricant.
5. Place the i-Gel O_2 back into the protective cradle in preparation for insertion.

POSITION PATIENT AND PREOXYGENATE

INSERTION TECHNIQUE (MAXIMUM OF 2 ATTEMPTS)

1. Remove the i-Gel O_2 from the protective cradle. Grasp the lubricated i-Gel O_2 firmly along the integral bite block. Position the device so that the i-Gel O_2 cuff outlet is facing towards the chin of the patient. The patient should be in the 'sniffing' position with head extended and neck flexed. The chin should be gently pressed down before proceeding. Introduce the leading soft tip into the mouth of the patient in a direction towards the hard palate.
2. Glide the device downwards and backwards along the hard palate with a continuous but gentle push until a definitive resistance is felt. The tip of the airway should be located into the upper esophageal opening (a) and the cuff should be located against the laryngeal framework (b). The incisors should be resting on the integral bite-block (c).



3. The strap should be slid under the patient's neck until the wide central band of the strap is located directly under the neck of the patient. One end of the strap should then be lifted over the patient's face and secured to the i-Gel O_2 by placing an appropriate hole on the strap over the lug of the hook ring located at the top of the integral bite block. The other end of the strap should then be lifted over the other side of the patient's face and secured in the same manner, ensuring there is sufficient tension to hold the i-Gel O_2 securely in place, but not an excessive tension that may cause trauma to the patient's neck or face or that may cause unwanted downward pressure of the i-Gel O_2.

RESCUE BREATHING OR TRADITIONAL CPR

1. Deliver several breaths with the bag-valve-mask and confirm proper tube placement as follows:
    a. Auscultate over the epigastrium.
    b. Auscultate the chest bilaterally at the apices and the bases for the presence of equal, bilateral lung sounds.
    c. Observe for symmetrical chest rise and fall with each breath.
    d. Look for moisture condensation in the tube with an exhaled breath.
    e. Observe the patient for clinical improvement (i.e., pulse oximetry, skin condition).
2. Confirm proper tube placement with a CO2 detection device:
    a. **END-TIDAL CO2 DETECTION / MONITORING, CAPNOGRAPHY**
    b. **END-TIDAL CO2 DETECTION, COLORIMETRIC**
3. Ventilate the patient with the bag-valve-mask supplied with 100% oxygen as indicated.
    a. During CPR: Deliver 10 breaths per minute (adult) or 20-30 breaths per minute (child). Deliver each breath over about 1 second while chest compressions are delivered at a rate of 100-120 per minute, and do not attempt to synchronize the compressions with the ventilations.
    b. Patients with a perfusing rhythm: Deliver approximately 10 to 12 breaths per minute (1 breath every 5 to 6 seconds). Deliver these breaths over 1 second.

PROCEDURE – REMOVAL

1. Once it is in the correct position, the i-Gel supraglottic airway is well tolerated until the return of protective reflexes.
2. Ensure suctioning equipment is ready. Turn the patient to the side and remove the airway carefully, suctioning as needed.

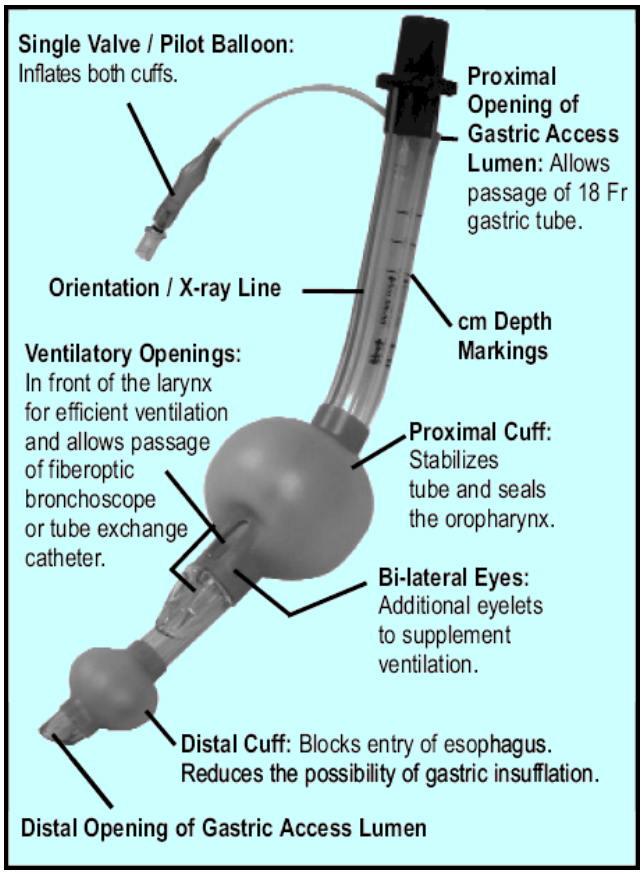
Key Points: i-GEL O_2 SUPRAGLOTTIC AIRWAY

- Sometimes a feel of 'give-way' is felt before the end point resistance is met. This is due to the passage of the bowl of the i-Gel through the faucial pillars. It is important to continue to insert the device until a definitive resistance is felt.
- Once definitive resistance is met and the teeth are located on the integral bite block, do not repeatedly push the i-Gel down or apply excessive force during insertion.
- It is not necessary to insert fingers or thumbs into the patient's mouth during the process of inserting the device.

LT-D and LTS-D models Scope: EMR | EMT | AEMT | INT | PM

INDICATIONS

The King LT Airway is an airway device designed for emergency or difficult intubation in the apneic or unresponsive patient without a gag reflex.



CONTRAINDICATIONS

1. Responsive patients with an intact gag reflex.
2. Patients with known esophageal disease.
3. Patients who have ingested caustic substances.
4. Dextrose, Naloxone, or Glucagon to be administered to the patient (precaution only).

WARNINGS

1. The KING LT airway does not protect the airway from the effects of regurgitation and aspiration.
2. High airway pressures may divert gas either to the stomach or to the atmosphere.
3. Intubation of the trachea cannot be ruled out as a potential complication of the insertion of the KING LT airway.
4. After placement, perform standard checks for breath sounds and utilize an appropriate Carbon Dioxide monitor as required by protocol.
5. Lubricate only the posterior surface of the KING LT airway to avoid blockage of the ventilation apertures or aspiration of the lubricant.
6. The KING LT airway is not intended for re-use.

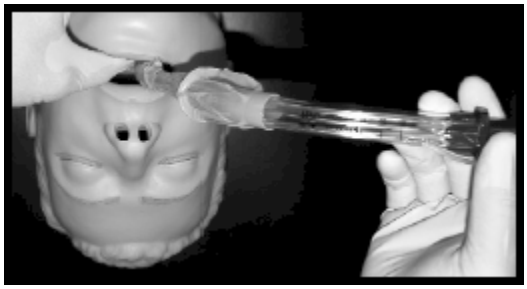
PROCEDURE – INSERTION *(LT-D and LTS-D models) – (MAXIMUM OF 2 ATTEMPTS)*

1. Using the information provided, choose the correct KING LT airway size based on patient height.

Table 5-12: King LT Airway Sizes

Type	Size	Description	Connector Color	OD	ID	Inflation Volume
LT-D	2	35-45 inches 12-25 kg	Green	11 mm	7.5 mm	25-35 mL
LT-D	2.5	41-51 inches 25-35 kg	Orange	11 mm	7.5 mm	30-40 mL
LTS-D	3	4-5 feet (122-155 cm) in height	Yellow	14 mm	10 mm	45-60 mL
LTS-D	4	5-6 feet (155-180 cm) in height	Red	14 mm	10 mm	60-80 mL
LTS-D	5	greater than 6 feet (180 cm) in height	Purple	14 mm	10 mm	70-90 mL

2. Test cuff inflation system by injecting the maximum recommended volume of air into the cuffs (size 3 – 60 mL; size 4 – 80 mL; size 5 – 90 mL). Remove all air from both cuffs prior to insertion.
3. Apply a water-based lubricant to the beveled distal tip and posterior aspect of the tube, taking care to avoid introduction of lubricant in or near the ventilatory openings.
4. Pre-oxygenate.
5. Position the head. The ideal head position for insertion of the KING LT airway is the "sniffing position". However, the angle and shortness of the tube also allows it to be inserted with the head in a neutral position.
6. Hold the KING LT airway at the connector with dominant hand. With non-dominant hand, hold mouth open and apply chin lift.

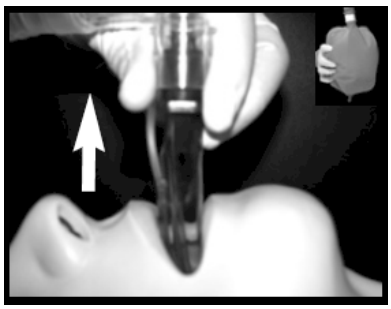


7. With the KING LT airway rotated laterally 45-90º such that the blue orientation line is touching the corner of the mouth, introduce tip into mouth, and advance behind base of tongue. Never force the tube into position.
8. As tube tip passes under tongue, rotate tube back to midline (blue orientation line faces chin).

9. Without exerting excessive force, advance KING LT airway until proximal opening of gastric access lumen ***(LTS-D model)*** or the base of connector ***(LT-D model)*** is aligned with teeth or gums.

10. Inflate cuffs with the minimum volume necessary to seal the airway at the peak ventilatory pressure employed (just seal volume). Typical inflation volumes are as follows:
    a. Size 2 – 25-35 mL
    b. Size 2.5 – 30-40 mL
    c. Size 3 – 45-60 mL
    d. Size 4 – 60-80 mL
    e. Size 5 – 70-90 mL

    If necessary, add additional volume to cuffs to maximize seal of the airway.



11. Attach the bag-valve-mask to the 15 mm connector of the KING LT airway. While gently bagging the patient to assess ventilation, simultaneously withdraw the airway until ventilation is easy and free flowing (large tidal volume with minimal airway pressure).

CONTINUED ON NEXT PAGE

12. Depth markings are provided at the proximal end of the KING LT airway which refer to the distance from the distal ventilatory openings. When properly placed with the distal tip and cuff in the upper esophagus and the ventilatory openings aligned with the opening to the larynx, the depth markings give an indication of the distance, in cm, from the vocal cords to the upper teeth.
13. Deliver several breaths with the bag-valve-mask and confirm proper tube placement as follows:
    a. Auscultate over the epigastrium.
    b. Auscultate the chest bilaterally at the apices and the bases for the presence of equal, bilateral lung sounds.
    c. Observe for symmetrical chest rise and fall with each breath.
    d. Look for moisture condensation in the tube with an exhaled breath.
    e. Observe patient for clinical improvement (i.e., pulse oximetry, skin condition).
14. Confirm proper tube placement with a CO_2 detection device:
    a. **END-TIDAL CO2 DETECTION / MONITORING, CAPNOGRAPHY**
    b. **END-TIDAL CO2 DETECTION, COLORIMETRIC**
15. Ventilate the patient with the bag-valve-mask supplied with 100% oxygen as indicated.
    a. **During CPR:** Deliver 10 breaths per minute. Deliver each breath over about 1 second while chest compressions are delivered at a rate of 100-120 per minute, and do not attempt to synchronize the compressions with the ventilations.
    b. **Patients with a perfusing rhythm:** Deliver approximately 10 breaths per minute (1 breath every 6 seconds). Deliver these breaths over 1 second.
16. Secure the KING LT airway in place with a commercial device while continuing ventilatory support.
17. Re-confirm airway placement after the device is secured, after every patient movement and at regular intervals. Application of a cervical collar and immobilization device will help prevent the patient from moving in such a way as to dislodge the KING LT airway.

KING LTS-D MODEL NOTES

1. DO NOT COVER THE PROXIMAL OPENING OF THE GASTRIC ACCESS LUMEN.
2. The gastric access lumen allows the insertion of up to an 18 French diameter gastric tube into the esophagus and stomach.

PROCEDURE – REMOVAL

1. Once it is in the correct position, the KING LT airway is well tolerated until the return of protective reflexes.
2. Ensure suctioning equipment is ready.
3. Deflate both cuffs completely. Turn the patient onto side.
4. Remove the King LT airway carefully, suctioning as needed.
5. Insert an oropharyngeal or nasopharyngeal airway as needed.
6. Continue ventilations with a BVM and oxygen at 10-15 LPM as needed.

LUCAS / LUCAS 2 / LUCAS 3 MECHANICAL CHEST COMPRESSION DEVICE — Protocol 5.18

Scope	EMR	EMT	AEMT	INT	PM

CLINICAL INDICATIONS

- Adult patients (>16 years of age) in cardiac arrest (non-breathing, pulseless).

CONTRAINDICATIONS

- Patients <16 years of age.
- Patients not in cardiac arrest.
- Too small patient: If you cannot enter the **PAUSE** mode or **ACTIVE** mode when the pressure pad touches the patient's chest and LUCAS alarms with 3 fast signals.
- Too large patient: If you cannot lock the Upper Part of LUCAS to the Back Plate without compressing the patient's chest.

PROCEDURE

1. Arrival at the patient
    a. Confirm cardiac arrest.
    b. Immediately start manual chest compressions.
    c. Minimize interruptions.
2. Unpack LUCAS
    a. Position the bag / case with its top to you.
    b. Put your left hand on the black strap on the left side and pull the red handle so that the bag unfolds or open the case.
    c. Push ON / OFF on the User Control Panel for 1 second to power up LUCAS in the bag / case and start the self-test.
    d. The green LED adjacent to the ADJUST key illuminates when LUCAS is ready for use.
3. Assembly
    a. Remove the LUCAS back plate from the carrying bag / case.
    b. Stop manual chest compressions (CPR).
    c. Make sure that you support the patient's head.
    d. Carefully put the LUCAS Back Plate under the patient, immediately below the arm pits.
    e. Start manual chest compressions (CPR) again.
    f. Hold the handles on the support legs to remove the LUCAS upper part from the bag / case. Pull the release rings once to make sure that the claw locks are open.
    g. Let go of the release rings.
    h. Attach the support leg (that is nearest to you) to the back plate.
    i. Attach the other support leg to the Back Plate, so that the two support legs lock against the Back Plate. Listen for the click.
    j. Pull up once to make sure that the parts are correctly attached.
4. Adjustment and Operation
    a. The compression point should be the same spot as for manual chest compressions (CPR) and according to American Heart Association (AHA) Guidelines.
    b. When the pressure pad in the suction cup is in the correct position, the lower edge of the suction cup is immediately above the end of the sternum.
    c. Use your finger to make sure that the lower edge of the suction cup is immediately above the end of the sternum (xyphoid process).
    d. If necessary, move the device by pulling the support legs to adjust the position.

e. Adjust the height of the suction cup to set the correct position.
f. Make sure that LUCAS is in the **ADJUST** mode.
g. Push the suction cup down with two fingers until the pressure pad touches the patient's chest without compressing the chest.
h. Push **PAUSE** to lock the start position – then remove your fingers from the suction cup.
i. Check for proper position. If not, push **ADJUST**, pull up the suction cup to readjust the central and/or height position for a new start position. Push **PAUSE**.
j. Push **ACTIVE (Continuous)** or **ACTIVE (30:2)** to start chest compressions.

5. Stabilization Strap Application
    a. Delay the application of the LUCAS stabilization strap if this prevents or delays any medical treatment of the patient.
        i. Remove the cushion strap, which is part of the stabilization strap, from the carrying bag / case (the support legs strap should already be attached to the support legs).
        ii. Extend the cushion strap fully at the buckles.
        iii. Carefully lift the patient's head and put the cushion behind the patient's neck. Position the cushion as near the patient's shoulders as possible.
        iv. Connect the buckles on the support leg straps with the buckles on the cushion strap. Make sure that the straps are not twisted.
        v. Hold the LUCAS support legs stable and tighten the cushion strap tightly.
        vi. Make sure that the position of the suction cup is correct on the patient's chest. If it is not, adjust the position.
6. Secure The Patient's Arms
    a. When moving the patient, secure the patient's arms with the patient straps on the LUCAS. This makes it easier to move the patient.
7. Lifting The Patient
    a. Push **PAUSE** to temporarily stop the compressions.
    b. Lift and move the patient to the stretcher or other transportation device (i.e., backboard, Reeve's Stretcher, etc.)
    c. Make sure that the suction cup is in the correct position on the patient's chest.
    d. Push **ACTIVE (Continuous)** or **ACTIVE (30:2)** to start the chest compressions again.
8. Moving The Patient – LUCAS can be active while you move the patient if:
    a. LUCAS and the patient are safely positioned on the transportation device.
    b. LUCAS stays in the correct position and angle on the patient's chest.
    c. If the position of the suction cup changes during operation or during defibrillation, immediately push ADJUST and adjust the position. Always use the LUCAS stabilization strap to help secure the correct position.

LUCAS / LUCAS 2 / LUCAS 3 MECHANICAL CHEST COMPRESSION DEVICE

Protocol 5.18

Scope	EMR	EMT	AEMT	INT	PM

MEAN ARTERIAL PRESSURE (MAP) Protocol 5.19

Scope	EMR	EMT	AEMT	INT	PM

INDICATION

1. Monitor in patients presenting with hypotension associated with shock.
2. Monitor in patients presenting with severe hypertension with an etiology of suspected increased intracranial pressure.
3. Monitor in post-resuscitation patients.
4. Mean Arterial Pressure (MAP) is a decision criteria for treatments and/or pre-hospital alerts in the **TOXICOLOGICAL EMERGENCIES – STIMULANTS** and **SEPSIS / SEPTIC SHOCK** protocols.

PRECAUTIONS

1. Mean Arterial Pressure (MAP) can only be calculated with a known systolic and diastolic blood pressure. MAP cannot be determined for a patient if only the palpated blood pressure is known.
2. Be familiar with cardiac monitor display settings. Some monitors automatically determine, and display MAP based on automated blood pressure measurements. An automated MAP may be useful; however, the EMS Provider must ensure that the monitor display settings are showing the MAP reading and that another value is not errantly used by the EMS Provider.

PROCEDURE

1. Obtain the patient's auscultated blood pressure.
2. Determine the patient's pulse pressure by subtracting the diastolic pressure from the systolic pressure.
3. Calculate one-third (1/3) of the pulse pressure and add that value to the diastolic pressure to yield the patient's MAP.
4. Obtain the patient's MAP at the same frequency as other vital signs and observe for trending.

Key Points: Mean Arterial Pressure (MAP)

- Conceptually, MAP is one-third (1/3) the range between the diastolic pressure and the systolic pressure.
- A MAP < 65 mmHg is associated with severe shock and may present with altered mental status or decreased level of consciousness.
- Use the following formula to calculate the MAP:

MAP = Diastolic + 1/3 Pulse Pressure

- Become familiar with the location that MAP is displayed on the specific cardiac monitor that your EMS Agency uses.

MEDICATION ADMINISTRATION, INTRANASAL — Protocol 5.20

Scope	EMR	EMT	AEMT	INT	PM

INDICATIONS

Patients requiring medication delivery where Intranasal (IN) is the preferred route of administration. Patients requiring medication delivery where the Intravenous (IV) or Intramuscular routes may be difficult or delayed. Intranasal (IN) route may be the preferred administration method for children and seizure patients.

PRECAUTIONS

DO NOT administer more than 1 mL of medication per nostril within a 10-15 minute time period.

CONTRAINDICATIONS

DO NOT administer Intranasal (IN) medications with any nasal / nose trauma or bleeding from the nose. Nasal congestion or discharge and any recognized nasal mucosal abnormality are also contraindications.

EQUIPMENT

- 3 mL syringe with Mucosal Atomization Device (MAD)
- Appropriate medication

PROCEDURE

1. Identify the need for Intranasal (IN) medication delivery.
2. Prepare the delivery device and medication according to the manufacturer's recommendation.
    a. Determine correct medication.
    b. Disconnect Mucosal Atomization Device (MAD) from included syringe.
    c. Fill syringe with desired volume of medication and eliminate remaining air.
    d. Connect the MAD to the syringe.
    e. Place the MAD tip in the nostril.
    f. Compress the syringe plunger to spray ½ of the atomized solution in each nostril.
3. Explain the procedure to the patient.
4. Use a method that fragments the medication into fine particles, so the maximal nasal mucosal surface is covered, and minimal volume runs out of the nose or into the throat.
5. Utilize both nostrils to double the surface area for absorption and halve the volume delivered per nostril.
6. Deliver medication in the nostril, DO NOT exceed more than 1 mL per nostril in any 10-15 minute time period. **Note:** Naloxone (Narcan) can be repeated every 5 minutes.
7. Document time of medication delivery, which nostril(s) used to deliver medication, and response.
8. The Mucosal Atominzation Device (MAD) may be reused on the same patient as needed.
9. The following medications can be given by Intranasal (IN) route in the Region: Diazepam (Valium®), Fentanyl (Sublimaze®), Haloperidol (Haldol®), Ketamine (Ketalar®), Midazolam (Versed®), Naloxone (Narcan®), and Tranexamic Acid (TXA®).

PERSONAL PROTECTIVE EQUIPMENT (PPE) / ISOLATION PRECAUTIONS — Protocol 5.21

Scope	EMR	EMT	AEMT	INT	PM

PURPOSE

To provide guidance to EMS Providers on utilizing the correct level of personal protective equipment (PPE) during patient care. High risk isolation precautions are meant to increase the level of protection of the EMS Provider in contact with a patient with a highly transmissible disease. This reference does not supersede an EMS Agency's Bloodborne Pathogens (BBP), Infection Control Plan (ICP), and/or Occupational Safety and Health Administration (OSHA) plans.

PROCEDURE

1. **Standard Precautions** (to be worn on every patient contact):
    a. Gloves (when indicated for the treatment pathway – be sure to exchange gloves between activities to prevent cross contamination).
    b. Eye Protection (reusable goggles, face mask with a shield, or disposable or reusable face shield).
    c. Surgical mask.
2. **Contact Precautions** (in addition to Standard Precautions):

    Patients who are colonized or infected with pathogens transmitted by the contact route, (e.g., Vancomycin-Resistant Enterococcus (VRE), Methicillin-Resistant Staphylococcus Aureus (MRSA), Respiratory Syncytial Virus (RSV), Clostridium Difficile (C Diff)).

    a. Gloves.
    b. Disposable gown.
3. **Droplet Precautions** (in addition to Contact Precautions):

    Patients known or suspected to be infected with pathogens transmitted by respiratory droplets generated by a patient who is coughing, sneezing, or talking.

    a. Surgical mask or greater respiratory protection.
    b. Face shield in addition to eye protection.
    c. Source control: apply a mask to the patient, if possible.
4. **Airborne Precautions** (in addition to Droplet Precautions):

    Patients known or suspected to be infected with pathogens transmitted by the airborne route (e.g., tuberculosis, measles, chicken pox, disseminated herpes zoster) or when performing an aerosolizing procedure in infectious patients.

    a. N95 respiratory mask or higher level of respiratory protection.
    b. Ensure adequate air exchange / ventilation of the environment (exhaust system on high, HVAC on high and non-recirculating, open doors of the patient compartment while not moving).
    c. Isolate the cab of the ambulance by closing the window or door separating the cab from the patient care compartment.
    d. Limit exposure of EMS Providers by minimizing the number of providers in the vicinity of the patient.

PERSONAL PROTECTIVE EQUIPMENT (PPE) / ISOLATION PRECAUTIONS

Protocol 5.21

Scope	EMR	EMT	AEMT	INT	PM

Key Points: PPE / Isolation Precautions

- Exchanging gloves between activities is imperative to prevent cross contamination of patient care equipment, other EMS Providers, and lay people after the fact (i.e., pharmacy technicians stocking narcotics packs).
- Not only should appropriate PPE be utilized, but proper decontamination after the fact should also be performed as well. That includes ensuring the use of appropriate disinfectants for the suspected pathogen (i.e., alcohol is ineffective against the spores of Clostridium Difficile, aka C Diff).
- Ensuring disposable equipment is used, when possible, helps prevent cross contamination.
- When caring for a patient with Droplet or Airborne Precautions, minimizing the possible areas for contamination is recommended; ensure all cabinets are and remain closed, pre-plan and access the drug box / drug bag a minimum of 6 feet away from the patient, and ensure expected patient care equipment is out and ready for application prior to placing the patient in the ambulance.
- It is important to remember to avoid touching your eyes, nose, or mouth while in contact with any patient, especially those needing increased level of precautions.
- Be sure to wash your hands frequently with soap and water, especially when soiled. While on a call, alcohol-based hand sanitizer is adequate, and it would be advisable to sanitize the patient's hands as well. https://www.cdc.gov/infectioncontrol/basics/transmission-based-precautions.html

SUCTION ASSISTED LARYNGOSCOPY AND AIRWAY DECONTAMINATION (SALAD) — Protocol 5.22

Scope	EMR	EMT	AEMT	INT	PM

PURPOSE

Suction Assisted Laryngoscopy and Airway Decontamination (the SALAD Procedure) is intended for use in all invasive airway attempts in the event of emesis or any other contamination. This technique is intended to prevent aspiration and lung injury.

EQUIPMENT

1. Suction device.
2. Large bore suction catheter.
3. **INTUBATION, OROTRACHEAL (DIRECT LARYNGOSCOPY)** **or** **INTUBATION, OROTRACHEAL (VIDEO LARYNGOSCOPY)** equipment.

PROCEDURE

1. Set up the suction device with large bore suction tubing and the large bore suction catheter.
2. Use airborne level **ISOLATION PRECAUTIONS** prior to initiating airway management procedures.
3. Insert the large bore catheter into the patient's mouth first with suction device activated.
4. Advance the laryngoscope. Ensure that the suction catheter is advanced farther than the tip of the laryngoscope blade to prevent soiling of the light / camera.
5. Maintain constant suction while visualizing the airway anatomy. Be sure to clear any residual contamination from the airway structures.
6. Once the airway is visualized, move the suction catheter from the right side of the laryngoscope to the left side and "park it". Leave the suction running.
7. Intubate the trachea as noted in the **INTUBATION, OROTRACHEAL (DIRECT LARYNGOSCOPY)** **or** **INTUBATION, OROTRACHEAL (VIDEO LARYNGOSCOPY)** procedures.
8. Continue providing suction following securing the airway as needed.

SUCTIONING, ADULT / PEDIATRIC — Protocol 5.23

Scope	EMR	EMT	AEMT	INT	PM

INDICATION

To suction the upper airway of a patient using a tonsil tip (Yankauer) or a whistle tip (flexible) suction catheter.

CONSIDERATIONS

1. For adults, the suction unit should generate 300 mm Hg vacuum.
2. For pediatrics, set the suction force to a maximum of 120 mm Hg.
3. For pediatrics, determine the correct catheter size with a pediatric resuscitation tape. When suctioning the nasopharynx, the suction catheter should be smaller than the nares. An easy formula to determine suction catheter size (Fr) is to double the calculated endotracheal tube size (mm).
4. Do not suction beyond your direct vision to avoid causing gagging, vomiting and possible aspiration.

PROCEDURE

1. Suction device should be inspected on a regular basis *before* it is needed. A battery-operated unit should have a charged battery.
2. Use standard isolation precautions including eye protection. Use a face mask and gown when splashing is likely.
3. Select the appropriate suction device based on clinical condition or type of obstruction and age.
    a. Tonsil tip: Used to remove larger particles and voluminous secretions from the mouth and oropharynx.
    b. Whistle tip: Used for suctioning the nasopharynx and in other situations where a rigid catheter cannot be used.
4. *If possible*, preoxygenate with a bag-valve-mask device supplied with 100% oxygen.
5. Turn on the suction unit.
6. Attach a catheter.
7. Insert the catheter into the oral cavity without suction. Insert only to the base of the tongue.
8. Apply suction. Move the catheter tip side to side.
    a. **Adults** – Suction for no more than 10 to 15 seconds at a time.
    b. **Children** – Suction for no more than 10 to 15 seconds at a time.
    c. **Infants** – Suction for no more than 5 seconds at a time.
    d. If the patient has secretions or emesis that cannot be removed quickly and easily by suctioning, the patient should be log rolled and the oropharynx should be cleared.
    e. If patient produces frothy secretions as rapidly as suctioning can remove, suction for up to 15 seconds, artificially ventilate for 2 minutes, then suction for up to 15 seconds, and continue in that manner.
9. If necessary, rinse the catheter and tubing with water to prevent obstruction of the tubing from dried material.

SUCTIONING, MECONIUM — Protocol 5.24

Scope	EMR	EMT	AEMT	INT	PM

INDICATION

Meconium-stained amniotic fluid occurs in approximately 10 to 15 percent of deliveries, mostly in pre-term or in small-for-gestational-age newborns. Fetal distress and hypoxia can cause the passage of meconium into the amniotic fluid. Endotracheal intubation immediately following birth and suctioning as the endotracheal tube is withdrawn in the infant that is vigorous offers no benefit. A vigorous infant is defined as one who has strong respiratory efforts, good muscle tone, and a heart rate greater than 100 beats per minute (bpm). However, endotracheal suctioning for infants who are not vigorous should be performed immediately after birth.

PROCEDURE

1. Before stimulating the infant to breathe, perform endotracheal intubation with an appropriate size endotracheal tube.
2. Connect the endotracheal tube to a meconium aspirator and to suction.
3. Apply suction at less than or equal to 100 mm Hg.
4. Withdraw the endotracheal tube while applying suction.
5. If the endotracheal tube is filled with meconium, repeat intubation with a new tube and suction again until clear, usually not more than two times.
6. Once the airway is clear and the newborn is able to breathe on its own, ventilate with 100% oxygen.

SUCTIONING, TRACHEOBRONCHIAL — Protocol 5.25

Scope	EMR	EMT	AEMT	INT	PM

INDICATION

Perform tracheobronchial suctioning to remove mucus plugs or secretions causing respiratory compromise in an endotracheally intubated patient.

PRECAUTIONS

1. Because tracheobronchial suctioning can bring about hypoxia, the patient must be oxygenated before and after the procedure.
2. If possible, a sterile technique should be used.
3. If permitted, monitor the cardiac rhythm. If dysrhythmias or bradycardia develop, the suctioning should be stopped and the patient re-oxygenated.
4. Limit suction force to a maximum of 80 to 120 mm Hg in pediatrics.

PROCEDURE

1. Use standard isolation precautions including eye protection. Use a face mask and gown when splashing is likely.
2. Preoxygenate with a bag-valve-mask device supplied with 100% oxygen.
3. Determine the appropriate length of insertion, using the patient's suprasternal notch and the proximal end of the airway adjunct as endpoints.
4. Open the catheter package.
5. Lubricate the catheter tip with a water-soluble gel or dip in saline. This facilitates passage of the catheter through the endotracheal tube.
6. Insert the suction catheter into the opening of the endotracheal tube. Pass the catheter to the predetermined depth.
7. Turn the suction unit on or place the thumb over the suction control opening.
8. Withdraw the catheter rotating it between the fingertips. Limit suctioning to 10 seconds. In infants and children, shorter suction time should be used.
9. Flush out the suction catheter and tubing with saline and evaluate the need for additional suctioning and the patency of the airway.
10. Ventilate the patient with a bag-valve-mask device supplied with 100% oxygen.

SYNCHRONIZED CARDIOVERSION — Protocol 5.26

Scope	EMR	EMT	AEMT	INT	PM

INDICATIONS

All tachycardias (rate greater than 150 bpm) with serious signs and symptoms related to the tachycardia.

- Supraventricular tachycardia (SVT)
- Atrial fibrillation (A-Fib)
- Atrial flutter (A-Flut)
- Ventricular tachycardia (VT)

CONTRAINDICATIONS

1. Ventricular fibrillation and pulseless ventricular tachycardia.
2. Poison or drug-induced tachycardia.

PRECAUTIONS

1. Urgent cardioversion is generally not needed if heart rate is less than or equal to 150 bpm.
2. Ensure monitor remains in “SYNC” mode for subsequent shocks.
3. Prepare to defibrillate immediately if cardioversion causes VF.
4. Synchronized cardioversion cannot be performed unless the patient is connected to monitor leads; lead select switch must be on lead I, II, or III and not on “paddles.”
5. If cardioversion is needed and it is impossible to synchronize a shock (e.g., the patient’s rhythm is irregular), use high-energy unsynchronized shocks.

PROCEDURE

1. Consider sedation with **MIDAZOLAM**.
2. Turn on monitor / defibrillator (models have either one power switch controlling ON-OFF for both monitor and defibrillator or separate POWER controls for monitor and defibrillator).
    - Select lead II on lead select switch. Make sure the lead select switch is not placed in paddles mode.
3. Attach monitor leads to the patient ("white to right, red to ribs, what's left over to the left shoulder"). Make sure the monitor displays the patient's rhythm clearly without artifact.
4. Engage the synchronization mode by pressing the "SYNC" control button. Ensure that the monitor remains in “SYNC” mode for subsequent shocks.
5. Look for markers on R waves indicating sync mode.
6. If necessary, adjust R-wave gain until sync markers occur with each R wave.
7. Select appropriate energy level:

SYNCHRONIZED CARDIOVERSION – INITIAL ENERGY DOSES				
	Atrial Fibrillation	**Atrial Flutter**	**SVT**	**Ventricular Tachycardia**
Biphasic	**120 – 200J**	**50 – 100J**	**50 – 100J**	**100J**
The energy levels listed are monophasic and biphasic initial does energy levels to use if manufacturer recommended settings are unknown for synchronized cardioversion. Providers should use the device-specific energy levels for synchronized cardioversion as recommended by the monitor manufacturer if known. If the initial shock fails, providers should increase the dose in a stepwise fashion.				

8. Position conductor pads on the patient.
9. Announce to team members: ***"Charging defibrillator – stand clear!"***
    - Make one more quick check of the monitor to confirm that tachycardia continues.
10. Press the CHARGE button on the monitor.
11. When the defibrillator is charged, begin the final clearing chant. State firmly in a forceful voice the following chant before each shock:
    a. ***"I'm going to shock on three. One, I'm clear."*** Check to make sure you are clear of contact with the patient, stretcher, and equipment.
    b. ***"Two, you're clear."*** Make a visual check to ensure that no one continues to touch the patient or stretcher. In particular, don't forget about the person providing ventilations. That person's hands should not be touching the ventilatory adjuncts, including the tracheal tube. Turn off the oxygen supply or divert the flow away from the patient's chest.
    c. ***"Three, everybody's clear."*** Check yourself one more time before pressing the SHOCK button.
12. Press the DISCHARGE button(s) and hold down the button(s) until the device discharges. (There can be a delay of several seconds while the device attempts a proper synchronization between the last part of the R wave and the discharge of current.)
13. Check the monitor. If tachycardia persists, increase the dose in a stepwise fashion.
    - Reset the sync mode after each discharge of current because most defibrillators default to unsynchronized mode. This default allows immediate defibrillation if cardioversion produces VF.

Scope	EMR	EMT	AEMT	INT	PM

INDICATION

Patient with a suspected tension pneumothorax.

- Closed or penetrating chest trauma with respiratory distress.
- Absent breath sounds on the side of the injury.
- SBP less than 90 mm Hg in adults or SBP less than 80 mm Hg in children, with signs of shock.

PROCEDURE (MID-CLAVICULAR)

1. Identify the second intercostal space on the side of the pneumothorax:
    a. Place a finger on the clavicle at its midpoint.
    b. Run this finger straight down the chest wall to locate the first palpable rib below the clavicle.
    c. The second intercostal space lies just below this rib, midway between the clavicle and the nipple line.
    d. Cleanse the area with an alcohol or Povidone-Iodine swab.
2. Select a 12 gauge, 3 ¼ inch IV catheter (children: 16 gauge, 1 ¼ inch). Remove the flash chamber cap. Do not use needle safe IV catheters.
3. Attach a syringe filled with sterile water or saline to the needle hub of the catheter.
4. Advance the needle into the second intercostal space. Assure you enter the thoracic cavity by passing the needle just over the top of the rib to avoid interference with the blood vessels and nerves that run along the underside of the rib.
5. As you enter the pleural space, you will feel a pop and note bubbling air through the fluid in the syringe.
6. Advance the catheter into the chest and then withdraw the needle and syringe. Be careful not to kink the catheter.
7. Attach a one-way flutter valve to the catheter:
    a. Asherman Chest Seal, or similar device, over the barrel of the catheter.
    b. Fingertip cut off a latex or similar examination glove (secure to catheter hub prior to performing the thoracentesis).
8. Secure the catheter in place with tape, being careful not to block the port or kink the catheter.
9. Monitor the patient's vital signs and breath sounds for a recurring tension pneumothorax.
10. If signs and symptoms are not relieved by the initial thoracentesis, or signs and symptoms recur, decompress the chest again by placing additional catheters adjacent to the original catheter.

PROCEDURE (ANTERIOR-AXILLARY) – UTILIZED ONLY IF MID-CLAVICULAR POSITION IS INACCESSIBLE!

1. Identify the intersection of the nipple (fourth rib) and anterior axillary line on the side of the pneumothorax:
    a. Place a finger on the fourth rib mid-axillary.
    b. Cleanse the area with an alcohol or Povidone-Iodine swab.
2. Select a 12 gauge, 3 ¼ inch IV catheter (children: 16 gauge, 1 ¼ inch). Remove the flash chamber cap. Do not use needle safe IV catheters.
3. Attach a syringe filled with sterile water or saline to the needle hub of the catheter.

CONTINUED ON NEXT PAGE

4. Advance the needle into the fourth rib space. Assure you enter the thoracic cavity by passing the needle just over the top of the rib to avoid interference with the blood vessels and nerves that run along the underside of the rib.
5. As you enter the pleural space, you will feel a pop and note bubbling air through the fluid in the syringe.
6. Advance the catheter into the chest and then withdraw the needle and syringe. Be careful not to kink the catheter.
7. Attach a one-way flutter valve to the catheter:
    a. Asherman Chest Seal, or similar device, over the barrel of the catheter.
    b. Finger cut off a latex or similar examination glove (secure to catheter hub prior to performing the thoracentesis).
8. Secure the catheter in place with tape, being careful not to block the port or kink the catheter.
9. Monitor the patient's vital signs and breath sounds for a recurring tension pneumothorax.
10. If signs and symptoms are not relieved by the initial thoracentesis, or signs and symptoms recur, decompress the chest again by placing additional catheters adjacent to the original catheter.

CONSIDERATIONS

1. For an open pneumothorax, immediately cover the open area with a gloved hand. Once materials are available, cover the area with an occlusive dressing.
2. An open pneumothorax that has been sealed with an occlusive dressing may result in a tension pneumothorax. In that instance, the increase in pleural pressure may be relieved by briefly removing the dressing. If that air release does not occur or the patient's condition remains unchanged, gently spread the chest wound open with a gloved hand, allowing the trapped air to escape.

TOURNIQUET (COMMERCIAL DEVICE) Protocol 5.28

Scope	EMR	EMT	AEMT	INT	PM

INDICATION

External hemorrhage from an extremity that cannot be controlled by direct pressure.

CONSIDERATIONS

1. Commercial windlass tourniquets are preferred. In the event that the commercial windlass tourniquet is not available or fails, other tourniquets may be utilized based upon approved training programs.
2. Apply the tourniquet above the wound site, not over a joint. A more proximal site (upper thigh or upper arm) is acceptable if the injury cannot be exposed or if the care is being provided in an unsafe tactical environment.
3. Two (2) tourniquets are better than one (1) tourniquet; an additional tourniquet increases the ability to stop blood flow with less pain.
4. Tourniquets must be applied tightly enough to stop the bleeding.
5. Do not use wire, rope, belts, or any other materials that may cut into the underlying tissues.
6. Do not remove or loosen tourniquet once it is applied unless directed by **[Medical Control]**.

PROCEDURE

1. Place a bulky dressing over the exposed injury of the extremity and apply direct pressure initially to attempt to control the bleeding. If that is unsuccessful in controlling the bleeding, apply a tourniquet (commercial device).
2. When using a commercial tourniquet, follow the manufacturer's application guidelines.
3. Ensure that the strap is pulled as tightly as possible prior to turning the windlass.
4. It is paramount that the tourniquet is tightened to the point that the bleeding stops.
5. If the bleeding is still not controlled after the application of a tourniquet (commercial device), apply an additional tourniquet (commercial device), distal (below) the first tourniquet.
6. Notify other emergency personnel who may care for the patient that a tourniquet(s) has been applied.
7. The time of tourniquet application is written on a piece of tape and secured to the tourniquet ("TK 21:45" indicates that the tourniquet was applied at 9:45 PM).
8. The tourniquet should be left uncovered so that the site can be monitored for recurrent hemorrhage.
9. Reference the **PAIN CONTROL** procedure as needed.
10. If the tourniquet is applied for greater than four (4) hours, contact **[Medical Control]** for further instruction.

TRACHEOSTOMY OBSTRUCTION — Protocol 5.29

Scope	EMR	EMT	AEMT	INT	PM

INDICATIONS

The most common problems faced by tracheostomy patients include blockage of the airway by mucus and a dislodged cannula.

PROCEDURE – VENTILATOR PROBLEMS

1. Rapidly determine if the problem is with the ventilator or the airway itself.
2. If the problem is a loose-fitting or disconnected tube, fix it.
3. If the problem is not immediately apparent, do not waste time trying to troubleshoot the machine.
4. Disconnect the ventilator tubing, connect the bag-valve-mask to the tracheostomy tube and ventilate manually.

PROCEDURE – AIRWAY OBSTRUCTION

1. If the patient is on a ventilator, disconnect the ventilator tubing.
2. Attach a bag-valve-mask to the tracheostomy tube and ventilate manually with 100% oxygen.
3. If ventilation is not successful and the tracheostomy tube has an inner cannula, remove the inner cannula and clean with saline or sterile water, then put it back.
4. If the tracheostomy tube does not have an inner cannula, perform suctioning with a whistle tip catheter.
    a. Preoxygenate the patient with 100% oxygen.
    b. Inject 1 to 3 mL of saline into the tube, depending on patient age.
    c. Insert the whistle tip suction catheter into the tube. Do not apply suction during insertion and never force the tube.
    d. Cover the suction port to apply suction while slowly removing the tube. Never suction longer than 10 seconds. In infants and children, shorter suction time should be used.
    e. Re-oxygenate the patient and repeat suctioning as necessary.
5. If suctioning does not clear the obstruction, replace the tracheostomy tube (if trained to do so).
    a. Remove the old tracheostomy tube by deflating the cuff, if applicable, and untying the securing string.
    b. Insert a new tracheostomy tube of the same size by pulling downward traction on stoma, holding the tube in the dominant hand, and gently inserting. If the tube has an obturator, place it inside the tube to aid in placement. DO NOT FORCE tracheostomy tube if resistance is encountered.

       NOTE: If another tracheostomy tube is not available, a similar sized endotracheal tube can be substituted **[ALS ONLY]**.
    c. Once the tube is in place, remove the obturator, inflate the cuff, if applicable, and secure the tube.
    d. Attach a bag-valve-mask to the tracheostomy tube and ventilate manually with 100% oxygen.

       NOTE: Some tracheostomy tubes have an inner cannula that must be placed prior to initiation of ventilation with a bag-valve-mask.
    e. Continue with general procedure for confirming placement, ventilating, and securing the tube as outlined in the **INTUBATION, OROTRACHEAL** procedure.

TRANSCUTANEOUS PACING — Protocol 5.30

Scope	EMR	EMT	AEMT	INT	PM

INDICATIONS

1. Hemodynamically unstable bradycardia.

PRECAUTION

Limit use of the carotid pulse to confirm mechanical capture. Electrical stimulation causes muscular jerking that may mimic a carotid pulse.

PROCEDURE

1. Turn on monitor / defibrillator (models have either one power switch controlling ON-OFF for both monitor and defibrillator or separate POWER controls for monitor and defibrillator).
2. Select lead II on lead select switch. Make sure the lead select switch is not placed in paddles mode.
3. Attach monitor leads to the patient ("white to right, red to ribs, what's left over to the left shoulder"). Make sure the monitor displays the patient's rhythm clearly without artifact.
4. Identify electrode sites. If necessary, shave hair to ensure good skin contact or use alternative pacing electrode positions in patients with excessive body hair. Clip rather than shave excessive hair to avoid tiny nicks in the skin that can increase pain and skin irritation in conscious patients.
5. Place the anterior electrode over the left precordium. The upper edge of the electrode should be below the nipple. Avoid placement over the nipple, the diaphragm, or the bony prominence of the sternum if possible.
6. Place the posterior electrode behind the heart in the intrascapular area. For patient comfort, place the cable connection away from the spine. Do not place the electrode over the bony prominences of the spine or scapula.
7. Ensure the monitor is sensing the R wave. Increase the gain if necessary.
8. Set the rate at 70 bpm (100 bpm for pediatrics) and activate the device.
9. Slowly increase current output from the minimum setting until electrical capture is achieved.

   NOTE: Electrical capture is usually characterized by a widening of the QRS complex (looks like a PVC) and a broad T wave, with the T wave opposite the polarity of the QRS complex. Sometimes only a change in the intrinsic morphology indicates pacing.
10. Assess the hemodynamic response (mechanical capture) to pacing by assessing pulse and blood pressure.

    NOTE: Take pulse at the right femoral or right carotid or artery to avoid confusion between the jerking muscle contractions caused by the pacer.

    NOTE: If mechanical capture is achieved, continue pacing at an output level slightly (10%) higher than the threshold or initial electrical capture.
11. Consider sedation with **MIDAZOLAM**. Sedation should not delay pacing in the severely symptomatic patient. Extreme care should be taken to give the minimum amount for sedation to avoid respiratory compromise / depression or hypotension.

ULTRASOUND – EFAST (OPTIONAL) Protocol 5.31

Scope	EMR	EMT	AEMT	INT	PM

DEFINITION

EFAST – Extended Focused Assessment With Sonography For Trauma has emerged as a sensitive and reliable tool to evaluate patients presenting with acute and sub-acute thoracoabdominal trauma and hypotension.

CLINICAL INDICATIONS

1. Traumatic injuries (blunt trauma, penetrating trauma) with a mechanism of injury creating the suspicion of thoracic or abdominal injury and used in the detection of free fluid in the peritoneal, pericardial, or pleural space.
2. Traumatic injuries to detect pneumothorax.

CONTRAINDICATIONS

1. There are no absolute contraindications for performing an EFAST examination on a patient, male or female, in the emergency setting.

ACOUSTIC WINDOW

1. Right Upper Quadrant View – detect free fluid surrounding the liver and right kidney, focusing on the hepatorenal recess (Morrison's Pouch), to detect free fluid in between the pleural space on the right side.
2. Left Upper Quadrant View – detect free fluid surrounding the spleen and left kidney including the splenorenal recess and detect free fluid in between the pleural space on the left side.
3. Pelvic View – detect free fluid in the rectovesical excavation or the rectouterine excavation.
4. Subxiphoidal View – detect free fluid inside the pericardial sac.
5. Anterior Thoracic View – detect missing pleural sliding on the right and left side of the thorax.

PROCEDURE

1. Place the patient in the supine position.
2. Use the transducer with conductive gel.
3. Scan the five regions as listed above:
    a. Right Upper Quadrant:
        i. Always locate yourself on the patient's right side.
        ii. Probe marker towards the patient's head, transducer at or on the mid-axillary line at the level of the xyphoid, may need to angle posteriorly.
        iii. Try to get between the ribs to see the liver and the kidney. To see the kidney, you may have to move back and angle slightly.
        iv. Morrison's Pouch – the potential space between the right kidney and the liver.
        v. Scan through the entire kidney, moving the transducer to see the entire organ.
        vi. Slide superiorly to view the right lung above the diaphragm. This should look like liver monitoring.
        vii. Looking for an anechoic stripe – black on the ultrasound screen.
    b. Left Upper Quadrant:
        i. Probe towards the head, posterior axillary line, "knuckles on the stretcher".

ii. Looking for the line between the left kidney and the spleen.
iii. View the entire kidney, slide up to the diaphragm identify the space between the spleen and left kidney.

c. Pelvic:
   i. Probe marker to the patient's head and fan through the bladder.
   ii. Repeat with probe marker to the patient's right and fan through the bladder.
   iii. Physiologic free fluid in females can be normal.

d. Subxiphoidal:
   i. Probe marker to the patient's right (abdominal examination type).
   ii. Overhand grip with lots of gel.
   iii. Press the flattened transducer into the abdomen to see under the sternum. Need to identify the pericardium using the liver as the 'window' to the heart.
   iv. Examine the potential space between the visceral and parietal pericardium.

e. Anterior Thoracic:
   i. Hold probe vertically and focus on chest wall that is highest (air rises), looking for pleural sliding.
   ii. Ensure 'B' lines are present.
   iii. Switch to M mode and look for 'waves on a beach' marking.
   iv. Absence of 'B' lines and/or 'Barcode Sign" on 'M' mode are findings consistent with pneumothorax.

FALSE NEGATIVES

1. Obesity severely limits the assessment of the peritoneal cavity.
2. Subcutaneous emphysema.
3. Posterior acoustic enhancement caused by a fluid-filled bladder, can result in free fluid missed.

FALSE POSITIVES

1. Epicardial fat pads, the descending aorta, and a pericardial cyst can be mistakenly identified as effusion.
2. Pre-existing ascites, pleural and pericardial effusions due to medical conditions.
3. Seminal vesicles mistaken for pelvic free fluid in young male patients.

ULTRASOUND – INTRAVENOUS (IV) ACCESS (OPTIONAL) — Protocol 5.31

Scope	EMR	EMT	AEMT	INT	PM

CLINICAL INDICATIONS

1. Need for intravenous (IV) access, unobtainable through traditional methods or inability to establish intraosseous (IO) access.
2. Patient's condition does not justify the need for intraosseous (IO) access.
3. Tool to supplement the chances of an otherwise difficult establishment of an IV.

CONTRAINDICATIONS

1. There are no absolute contraindications as long as the procedure does not unnecessarily delay more crucial medical treatment.

PROCEDURE

1. Place the patient's limb and the Ultrasound screen in the EMS Provider's line of sight.
2. Place the ultrasound probe so you get a cross-sectional view of the limb, over where you suspect venous access to be possible (Image 1).
3. Confirm that the target vessel (indicated by a black circular void) is a vein. This is done by compressing the area with minimal pressure, ensuring the vessel is easily and completely compressible.
4. Rotate the probe 90 degrees (in-line with the limb), to get a clear picture of the long axis of the vein (Image 2).
5. Utilize an aseptic technique as per normal IV guidelines. Keep the probe steady and tilt slightly away from your insertion hand and insert the catheter under the distal end of the probe until you see it enter the vein (Image 3).
6. Secure the IV site and continue as with any normal IV insertion.

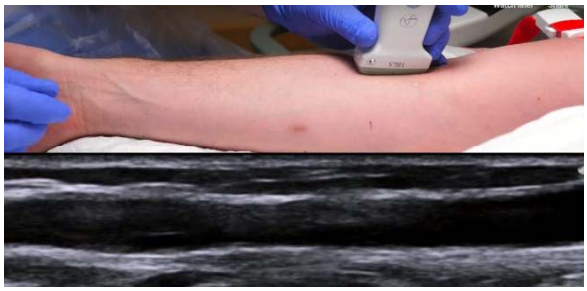


Image 1

Image 2

Image 3

Protocol 5.32

VACCINATION ADMINISTRATION

EMR	EMT	AEMT	INT	PM
		•	•	•
		•	•	•
		•	•	•
		•	•	•
		•	•	•

The Commonwealth of Virginia allows for Intermediates and Paramedics to provide vaccines to patients. Because this is not done on a regular basis, and the actual vaccine may vary based on availability or need, because of this the following guidelines have been established:

1. Agencies must register as a vaccine provider through the Virginia Electronic Registration for Immunization Programs (VERIP).
2. EMS Providers who are administering the vaccine must be approved by the Agency EMS Physician.
3. EMS Providers must participate in training associated with the specific vaccine immediately prior to, and not longer than 12 months prior to, participating as an EMS Provider.
4. All vaccine administrations must be entered into the Virginia Immunization Information System (VIIS).

TRAINING REQUIREMENTS

- Training shall consist of:
    - Indications
    - Contraindications
    - Side Effects
    - Routes of administration
    - Required administration procedure (to include screening)
    - Required documentation of administration

With Agency EMS Physician approval, the training may be developed by the Regional EMS Council, a VIIS Program Coordinator, or local health department.

Note: Licensed EMS Agencies participating in Vaccine Administration must comply with the Virginia Office of Emergency Medical Services (VOEMS), Policy on Vaccination Administration. EMS Physicians should review the Vaccination Program Toolkit from VOEMS prior to initiating a vaccination program.

VEIN CANNULATION, EXTERNAL JUGULAR — Protocol 5.33

Scope	EMR	EMT	AEMT	INT	PM

INDICATION

When peripheral IV access is critically indicated but an upper extremity vein cannot be catheterized.

CONTRAINDICATION

The external jugular vein is not visible.

PROCEDURE

1. Prepare all equipment as for peripheral IV access in an upper extremity.
2. Place the patient in a supine and/or in the Trendelenburg position. This position will increase blood flow to the chest and neck, thus distending the vein and making it easier to see. Additionally, the Trendelenburg position decreases the chance of air entering the circulatory system during cannulation.
3. Turn the patient's head away from the side of the access site. This maneuver makes the site easier to see and reach. Do not perform this maneuver if the patient has traumatic head and/or neck injuries.
4. Identify the external jugular vein. The external jugular can be located between the angle of the jaw and the middle third of the clavicle.
5. Using a circular motion, cleanse the site thoroughly with an alcohol wipe or Povidone-Iodine. Allow the area to dry before penetrating the skin.
6. Occlude venous return by placing a finger on the external jugular just above the clavicle. Never apply a venous constricting band around a patient's neck.
7. Position the venipuncture device parallel with the vein, midway between the angle of the jaw and the clavicle. Point the catheter at the medial third of the clavicle and insert it, bevel up, at a 10 to 30-degree angle. Cannulate the vein in the usual method.
8. Connect an injection port or an extension set and the IV tubing to the catheter hub. Be careful not to contaminate either the hub or connector before insertion.
9. Open the IV flow control valve and run the IV infusion for a brief period of time to ensure that the line is patent. To ensure proper IV flow rates, the IV container must hang 30 to 36 inches above the insertion site.
10. Cover the IV site with Povidone-Iodine ointment or a sterile dressing and bandage.
11. Secure the catheter, administration set tubing, and sterile dressing in place with tape or a commercial device.
12. Adjust the IV to the appropriate flow rate for the patient's condition.

VEIN CANNULATION, PERIPHERAL — Protocol 5.34

Scope	EMR	EMT	AEMT	INT	PM

INDICATIONS

Indications for the establishment of a peripheral intravenous line or an intermittent infusion device (INT) are outlined by protocols in Sections 2 through 4.

PRECAUTIONS

IV therapy is an invasive vascular procedure that carries a number of risks, including bleeding, infiltration, and infection. Because performing venipuncture can be very difficult in some patients, it requires maintenance of ongoing skill proficiency.

CONSIDERATIONS

1. Pre-hospital vein cannulation efforts are to be limited to 2 attempts (per patient) unless otherwise authorized by **[Medical Control]**.
2. Preparations for vein cannulation should be coordinated with rescue efforts so patient transport is not delayed.
3. For IVs started while in transit, transport may be halted only for venipuncture and catheter taping.
4. **[EMT]** EMTs may transport a patient from a health care facility or physician's office with an INT. If a patient presents with an IV, the clinician at the facility must convert the IV to an INT before the patient may be transported by an EMT.

PROCEDURE

1. Explain the need for IV cannulation and describe the procedure to the patient.
2. Select the IV fluid to be used. Check to make sure that it is the proper fluid, clean, without particulate matter, not outdated, and not leaking.
3. Select an appropriately sized catheter:
    a. Adults: 14 to 16 gauge for trauma, volume replacement, or cardiac arrest.
    b. Adults: 18 to 20 gauge for medical conditions.
    c. Children: Based on clinical judgment or tools such as a length-based resuscitation device.
4. Select the proper administration set (e.g., macro-, or micro-drip).
5. Prepare the IV bag and administration set using an aseptic technique to prevent contamination.
6. Prepare other equipment including tape, occlusive dressings, injection port, 2x2, etc.
7. Use standard isolation precautions.
8. Place the patient in a comfortable position with the selected extremity lower than the heart.
9. Apply a tourniquet. Avoid keeping the tourniquet in place for more than 2 minutes.
10. Select a suitable vein by palpation or sight. Avoid areas where a valve is situated.
11. Using a circular motion, cleanse the site thoroughly with an alcohol wipe or Povidone-Iodine. Allow the area to dry before penetrating the skin.
12. Stabilize the vein by anchoring it with the thumb and stretching the skin downward.

CONTINUED ON NEXT PAGE

13. Perform venipuncture without contaminating the equipment or the site.
    a. Hold the end of the venipuncture device between the thumb and the index / middle fingers. Avoid touching any portion of the catheter because a contaminated device is not usable.
    b. Depending on the type of venipuncture device and manufacturer recommendations, hold the needle at a 15-degree, 30-degree, or 45-degree angle to the skin.
    c. Penetrate the skin with the bevel of the needle pointed up. If possible, penetrate the vein at its junction or bifurcation with another vein; it is more stable at this location.
    d. Enter the vein with the needle from either the top or the side. Normally, a slight "pop" or "give" is felt as the needle passes through the wall of the vein. Be careful not to enter too fast or too deeply; the needle can go through the back wall of the vein.
    e. Note when blood fills the flashback chamber of the needle.
    f. Lower the venipuncture device and advance it another 0.5 cm until the tip of the catheter is well within the vein.
    g. While holding the needle stable, advance the catheter into the vein until the hub is against the skin.
    h. Once the catheter is within the vein, apply pressure to the vein beyond the catheter tip.
    i. Release the tourniquet from the patient's arm.
    j. Withdraw the needle.
14. Dispose of the needle in a proper biomedical waste container.
15. Connect an injection port or an extension set and the IV tubing to the catheter hub. Be careful not to contaminate either the hub or connector before insertion.

    NOTE: To establish an INT, insert the distal end of the intermittent device into the hub of the IV catheter. Inject 3 to 5 mL of Normal Saline solution into the lock to confirm patency and prevent occlusion. Cover and secure the site as indicated in steps 17 to 18.
16. Open the IV flow control valve and run the IV infusion for a brief period of time to ensure that the line is patent. To ensure proper IV flow rates, the IV container must hang 30 to 36 inches above the insertion site.
17. Cover the IV site with Povidone-Iodine ointment or a sterile dressing and bandage.
18. Secure the catheter, administration set tubing, and sterile dressing in place with tape or a commercial device. The tubing should be looped and secured with tape above the IV cannulation site.
19. Adjust the IV to the appropriate flow rate for the patient's condition.

Formula to Calculate IV Flow Rate:

$$\textbf{Flow rate (gtts/minute)} = \frac{\textbf{Volume to be infused (mL)} \times \textbf{drop factor (gtts/mL)}}{\textbf{Time of infusion (in minutes)}}$$

VENTILATOR THERAPY (OPTIONAL) Protocol 5.35

Scope	EMR	EMT	AEMT	INT	PM

PURPOSE

To define the indications and management of patients requiring mechanical respiratory support.

RESPIRATORY SUPPORT

1. All patients should be evaluated for evidence of respirator insufficiency and/or respiratory failure either from hypoxia or hypercapnia.
2. Assessment should include evidence of perfusion, skin color, vital signs, level of consciousness, lung sounds, and work of breathing.
3. All patients with respiratory distress must be on continuous vital monitoring including heart rate, blood pressure, pulse oximetry, and end-tidal capnography.

TREATMENT ESCALATION

1. All patients should be evaluated for airway compromise. Those that have airway compromise should receive airway security measures immediately.
2. Patients who have respiratory distress or failure should be treated in a step wise fashion when time and conditions allow.
3. Initial treatment should focus on Oxygen administration via a nasal cannula, non-rebreather mask, or other Oxygen (O_2) delivery device, with the goal to maintain pulse oximetry appropriate for the patient's underlying condition.
4. Patients in shock should be treated with a goal of maintaining SpO_2 as close to 100% as possible.
5. If the patient has refractory hypoxia despite Oxygen administration or has evidence of symptomatic hypercarbia (i.e., decreased level of consciousness or evidence of respiratory fatigue), treatment should escalate to non-invasive ventilation or endotracheal intubation as appropriate.

BILEVEL VENTILATION MANAGEMENT

1. Bilevel ventilation should be considered for patients with respiratory distress or failure despite supplemental Oxygen.
2. Relative contraindications to Bilevel include:
    a. Decreased level of consciousness (LOC) (unless actively pre-oxygenating as part of the Medication Assisted Induction (MAI) procedure.
    b. Inability to maintain airway patency.
    c. Probability of deterioration in transport.
    d. Intubation requirements for other reasons (i.e., patient control, multi-system trauma, burns, etc.).
    e. Hemodynamic instability.
3. When initiating non-invasive positive pressure ventilation, EMS Providers should:
    a. Start with pressure of 10 / 6.
    b. Assure adequate patient coaching through initiation and mask placement.
    c. Confirm the mask is a closed non-vented mask with a good face seal.
    d. Titrate EPAP (or CPAP or PEEP) up to achieve adequate oxygenation.
    e. Titrate IPAP (or Pressure Support) up to as necessary to improve $EtCO_2$.

INVASIVE VENTILATION MANAGEMENT

4. Patients that fail less invasive ventilation or have a contraindication to less invasive ventilation should be managed with invasive mechanical ventilation.
5. Use of mechanical ventilation in patients:
    a. Is indicated for patients with any invasive airway device with a 15 mm connector (e.g., endotracheal (ET) tube, I-Gel Supraglottic Airway Device, King Supraglottic Airway Device).
    b. The decision to use a bag-valve mask device in lieu of mechanical ventilation, requires appropriate rationale and needs to be documented on the Patient Care Report (PCR).
6. Upon arrival at the patient, assessment of the patient's airway and ventilatory status should be completed:
    a. If the patient has an invasive airway device placed, assure the following:
        i. Proper placement (confirmation)
        ii. Proper positioning (i.e., ETT depth)
        iii. The device is properly secured
    b. Check ventilation status
        i. Physiologic signs (heart rate, blood pressure, SpO_2, $EtCO_2$)
        ii. Adequate rise and fall of chest (assess for over-ventilation)
        iii. Adequate lung sounds
    c. Assure adequate sedation and analgesia is addressed per Medication Assisted Induction (MAI) Protocol.

INITIAL VENTILATOR SETUP

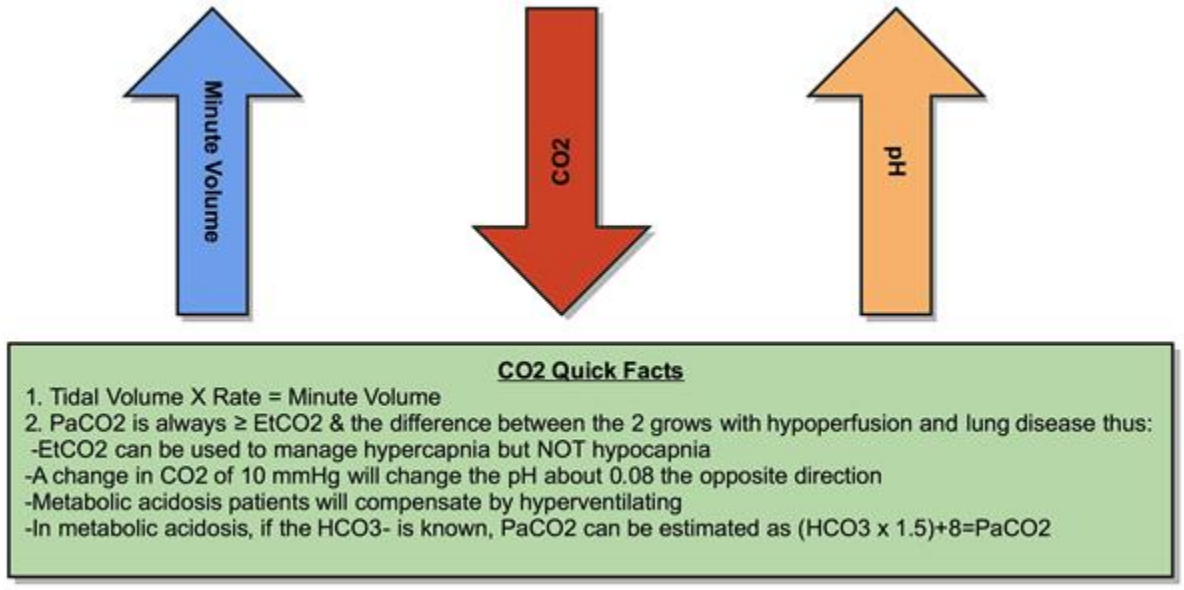
1. Perform circuit check.
2. Assess patient's respiratory status.
3. Select Volume Control.
4. Utilize 4-8 mL/kg to determine Tidal Volume (V_T), recommend starting at 6 mL/kg.
5. Rate appropriate for patient's age and assessed needs.
6. Initial PEEP of 5 mmHg (higher for severely hypoxic patients).
7. Inspiratory Times of:
    a. Newborn – 0.5 seconds
    b. Child – 1.0 second
    c. Adult – 1.5 seconds
8. Set FiO_2 to assessed needs of patient using lowest setting appropriate for the patient.
9. Select mode of choice Synchronized Intermittent Mandatory Ventilation (SIMV) or Assist Control.
10. If SIMV, utilize Pressure Support of 10-20 for spontaneously breathing patient.
11. Attach $EtCO_2$ and SpO_2 monitor.
12. Adjust rate and/or Tidal Volume to achieve $EtCO_2$ of 35-45 mmHg.
13. Acute closed head injury or suspected increased intracranial pressure, adjust rate to achieve $EtCO_2$ of 30 mmHg (not lower than 30 mmHg).
14. Adjust FiO_2 to maintain SpO_2 of about 95%.
15. Re-assess breath sounds and chest rise.

16. If needed, adjust Tidal Volume to achieve appropriate breath sounds and chest rise.
17. Suction when appropriate to maintain patent airway.
18. If Peak Inspiratory Pressures (PIPs) are extremely high, Pressure Control should be utilized:
    a. Select Pressure Control to SIMV or Assist Control.
    b. Start PIPs low to achieve appropriate Tidal Volume calculated.
    c. Start with appropriate Inspiratory Times, might need lower or higher.

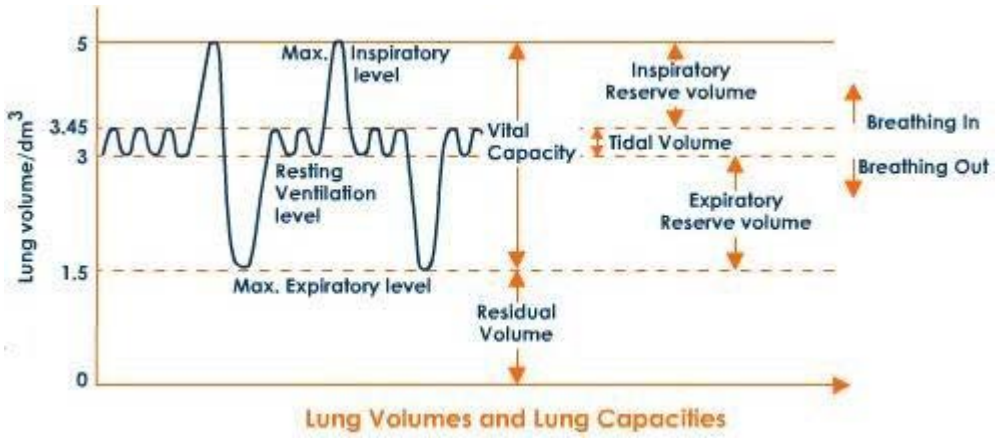
OXYGENATION AND VENTILATION MECHANICS

1. CO_2 reduction is the result of Minute Volume (VE). When Minute Volume is raised, CO_2 falls and conversely when Minute Volume decreases CO_2 rise. Minute Volume (VE) is made of Tidal Volume (VT) multiplied by rate (F or frequency) and can be expressed as: VE = VT X F.
    a. Tidal Volume (VT): The amount of air being placed into the chest each time the ventilator gives a breath. Tidal Volume can be limited with a ventilator in two ways:
        i. In volume ventilation, the ventilator is actually set up to deliver a specified Tidal Volume (i.e., blow in until 500 mL) have been delivered then stop.
        ii. In pressure ventilation, the ventilator is set to blow continuous unspecified volume time (i.e., blow until a PIP of 25 cm H_2O has been delivered for the inspiratory time) then stop.
        iii. When pressure ventilating, the PIP maybe labeled by other names (dependent on the ventilator brand). Examples include Pressure Control (PC), Maximum (Max) Pressure (P_{MAX}) or the pressure limit. In this protocol these will all be generically referred to as the Peak Inspiratory Pressure or PIP.
        iv. The two factors that control Tidal Volume delivered are the flow and the Inspiratory (I) time.
            1. Inspiratory (I) time is the time the ventilator actually opens the circuit to allow gas flow to the patient. Inspiratory (I) time is discussed further below.
            2. Flow is how fast air moves down the circuit to the patient and is measured in liters per minute (lpm).
            3. When Inspiratory (I) time and flow are known, one can calculate the Tidal Volume being delivered. For instance, if the flow is 60 lpm (1 liter per second) and the Inspiratory (I) time is 1 second, then Tidal Volume would be 1 liter.
        v. When Tidal Volume increases, Minute Volume increases and CO_2 decreases.
        vi. When Tidal Volume decreases, Minute Volume decreases and CO_2 increases.
        vii. Tidal Volume should be based on Ideal Body Weight (IBW).
        viii. Ideal Body Weight (IBW) is calculated as follows:
            1. For Adults using the Devine formula:
                a. Males – 50 kg plus 2.3 kg for every inch over 5' in height.
                b. Females – 45.5 kg plus 2.3 kg for every inch over 5' in height.
                (Be sure to start lower if the patient appears to have a small torso.)
                c. Pediatric estimation of weight for 1-10 year olds
                (3 X age in years) + 7 = estimated weight in kg
                d. Infant weight estimation
                (Age in months + 9) / 2 = estimated weight in kg

b. Rate or Frequency: Is the actual number of times in a minute that the ventilator is set to deliver a breath. Dependent on the ventilator mode, the patient may be able to take extra breaths that may be assisted or ignored by the ventilator.
   i. Decreases in rate will decrease Minute Volume and CO_2 will increase.
   ii. Increases in rate will increase Minute Volume and CO_2 will decrease.



2. CO_2 may also climb if a patient has restrictive lung disease and a short expiratory time. The relationship between inspiratory and expiratory time can be expressed two different ways. It may be expressed as the Inhalation (I) time or the Inhalation:Exhalation (I:E) ratio.
   a. **Inhalation (I) Time** is the actual measurement of time the ventilator is given to push a prescribed breath in and is measured in seconds. For instance, an Inhalation (I) time of 1.0 would mean the breath must be delivered over 1 second.
   b. **Inhalation:Exhalation (I:E) Time** is the division of time for inhalation and exhalation. The I:E ratio is the result of the I time and the respiratory rate. For instance, if a patient had an I time of 1 second, and a respiratory rate of 20 (thus 3 seconds for each breath), then the patient would have an I:E ratio of 1:3.



3. Oxygenation is the result of PEEP and FiO_2. For hypoxic patients, increasing Tidal Volume or rate will not improve oxygenation (assuming both parameters are within "typical" ranges). Instead improve oxygenation by increasing FiO_2 or PEEP.
    a. **FiO_2:** The FiO_2 is simply the percentage of ventilator delivered gas that is Oxygen and is expressed as a decimal rather than a percentage (i.e., an FiO_2 of 0.5 means the patient is receiving gas that is 50% Oxygen).
    b. **PEEP:** Positive End Expiratory Pressure (PEEP) can be thought of as the point in exhalation where the ventilator closes the exhalation valve thus trapping all remaining air in the chest and preventing total exhalation. PEEP is measured as a pressure in cm H_2O. Increases in PEEP increase the amount of air that is not allowed to leave the chest during exhalation thus increases in PEEP increase Functional Residual Capacity (FRC) (or the amount of gas that remains in the lungs at the end expiration).
    c. **CPAP:** For the purposes of Critical Care Transport Ventilation and the technology utilized in transport, CPAP and PEEP can be thought of as identical terms.

INVASIVE VENTILATION PATIENT TYPES

1. Essentially all mechanical ventilation patients can be divided into 1 of 2 groups.
    a. Chronic Obstructive Pulmonary Disease (COPD) patients
        i. Patients that have bronchospasm or other pathology that makes it difficult to exhale.
        ii. Examples include: asthma, COPD, etc.
        iii. COPD patients require slow respiratory rates, long expiratory times, and small Tidal Volumes.
        iv. COPD patients often have very high PIP pressures as a result of bronchospasm.
        v. COPD patients are at real risk of death from lung hyperinflation and cardiovascular collapse if they are not allowed to exhale adequately.
        vi. COPD patients often have chronic hypercapnia or hypercapnia that is difficult to manage, thus hypercapnia is often tolerated at reasonable levels (as high as 50 or 60 mmHg).
    b. Lung Protective (LP) patients
        i. Patient with normal lungs.
        ii. Patients with risk for / or evidence of Acute Respiratory Distress Syndrome (ARDS).
        iii. Essentially everyone that is not a COPD patient.
        iv. These patients require small Tidal Volumes, adequate Minute Volume to manage CO_2, and often need PEEP and FiO_2 management to improve oxygenation.
2. Unless directed by a physician, the following ventilator settings below should be used to initiate mechanical ventilation when a patient is being placed on mechanical ventilation by the EMS Provider.
3. These are only starting points and EMS Providers should titrate as necessary to achieve optimum oxygenation and ventilation.

COPD SPECIFIC SETTINGS

1. Inhalation and Exhalation Settings
    a. **Rate:** The ventilator rate should be determined by considering the patient's age and respiratory problems.
        i. Pediatric patients <5 kg through 2-year-old patients should be started on a respiratory rate between 20-25 breaths per minute.

ii. Pediatric patients >2 years old should be started on a respiratory rate of 15-20 breaths per minute.

iii. Adult patients should be started on a respiratory rate of 6-10 breaths per minute.

b. **Tidal Volume (if volume ventilation):** 3-6 mL/kg of ideal body weight

i. Typically, volume ventilation is preferred in children >2 years old and in adults.

ii. Should be titrated to keep the P_{plat} pressure <30 cm H_2O.

c. **I:E Ratio:**

i. Set the I:E Ratio to at least 1:4.

ii. Patients with severe bronchospasm may require I:E Ratios of ≥1:6.

iii. The patient may have increased $EtCO_2$ as a result. (Permissive Hypercapnia)

d. **Peak Inspiratory Pressure (PIP) or Max Pressure (if pressure ventilating):** A typical starting PIP should be about 20 cm H_2O.

i. Should be titrated to obtain an exhaled Tidal Volume of about 3-6 cm H_2O.

ii. Typically, pressure ventilation is preferred in children <2 years old but can be used at any age.

iii. Children <10 kg must be ventilated with pressure ventilation.

e. **Inspiratory Time:** Adjust to I:E goal

i. Typically, an I time is used when pressure ventilating.

ii. For pediatric patients <5 kg to those <2 years old set the I time to at least 0.5-0.6 seconds (set to achieve an I:E Ratio of at least 1:4).

f. **PEEP:** Start most patients on 3-6 cm H_2O.

i. For obstructive lung disease patients, once the patient is stable on the Z Vent ventilator, complete an Expiratory Hold maneuver and not P-EXP value.

ii. Adjust PEEP to approximately 80% of the P-EXP value (i.e., if P-EXP is 10-PEEP should be increased to 8.

LUNG SPECIFIC SETTINGS

1. Inhalation and Exhalation Settings

a. **Rate:** The ventilator rate should be determined by considering the patient's age and respiratory problems.

i. Pediatric patients <5 kg through 2-year-old patients should be started on a respiratory rate between 20-30 breaths per minute.

ii. Pediatric patients >2 years old should be started on a respiratory rate of 20 breaths per minute.

iii. Adult patients should be started on a respiratory rate of 10-12 breaths per minute.

b. **Tidal Volume (if volume ventilation):** 4-8 mL/kg of ideal body weight

i. Typically, volume ventilation is preferred in children >2 years old and in adults.

ii. Should be titrated to keep the P_{plat} pressure <30 cm H_2O.

c. **I:E Ratio:**

i. For pediatric and adult Lung Protective (LP) patients, set the I:E Ratio to at 1:2 to 1:3.

ii. For patients with pulmonary edema, set the I:E Ratios at 1:1 to 1:1.5.

iii. Some interfacility ARDS or severe pulmonary edema patients may be on inverse I:E such as 1.5:1 or 2:1.

d. **Peak Inspiratory Pressure (PIP) or Max Pressure (if pressure ventilating):** A typical starting PIP should be about 20 cm H_2O.

i. Should be titrated to obtain an exhaled Tidal Volume of about 5-8 cm H_2O.

ii. Typically, pressure ventilation is preferred in children <2 years old but can be used at any age.

iii. Children <10 kg must be ventilated with pressure ventilation.

e. **Inspiratory Time:** Adjust to I:E goal

i. Typically, an I time is used when pressure ventilating.

ii. For pediatric patients <2 years old set the I time to at least 0.5 seconds (set to achieve an I:E Ratio of about 1:2 or 1:3).

iii. For Lung Protective (LP) patients >2 years old set the I time as appropriate to achieve and I:E Ratio of 1:2 or 1:3.

Note: The V_T must be increased to 100 mL when choosing "infant" to achieve an I time >0.3 and increased to 150 mL to obtain an I time >0.6.

f. **PEEP:** Start most patients on 5-6 cm H_2O.

i. Once patient is stable on the Z Vent ventilator complete an Inspiratory Hold maneuver.

ii. Note compliance and increase PEEP by 3 cm H_2O. Wait 5 minutes and repeat Inspiratory Hold maneuver. If compliance improved, increase PEEP by 2 and repeat process again, until PEEP increases no longer improve compliance.

iii. If at any time the compliance decreases, reduce PEEP to previous level.

iv. If the patient is hypoxic (SpO_2 <90%) and is on a FiO_2 <0.5 (50%), use the scale below to titrate PEEP and FiO_2 up to achieve an SpO_2 >93%.

FiO_2	0.3	0.4	0.4	0.5	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0
PEEP	5	5	8	8	10	10	12	14	14	14	16	18	20

2. Additional Settings

a. **Mode:** Set the mode to SIMV or Assist Control

i. In Assist Control (A/C), the patient will receive a minimum ventilator rate and Tidal Volume or set pressure. If the patient chooses to take additional breaths, he / she will be able to do so, but will receive a full ventilator breath each time as set.

ii. In Synchronized Intermittent Mandatory Ventilation (SIMV), the patient will receive a minimum ventilator rate and Tidal Volume or pressure. If the patients chooses to take additional breaths, the ventilator will either deliver a full ventilator breath as set, or will provide slight assistance depending on when in the respiratory cycle of the patient decides to take the extra breath.

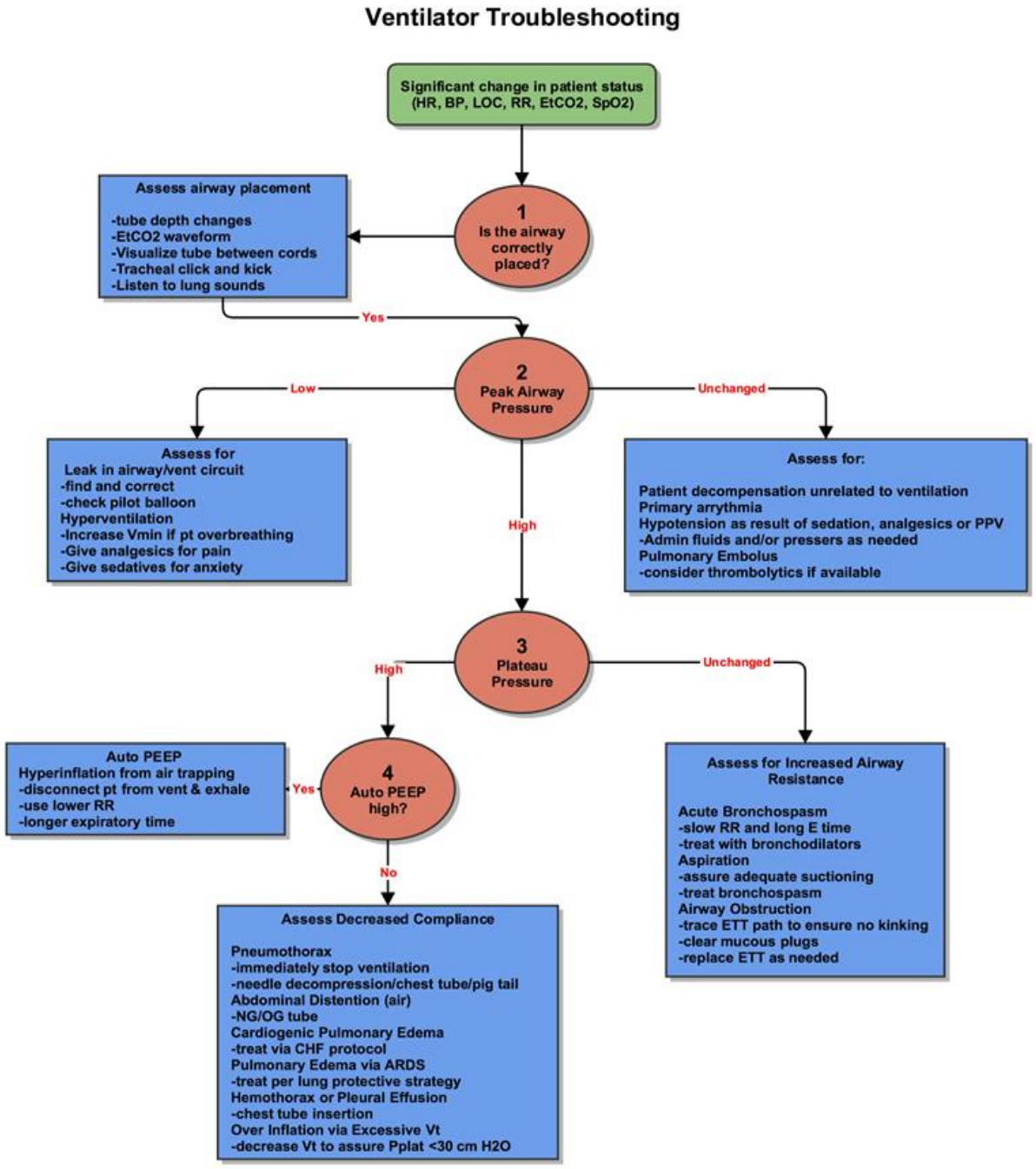
b. **FiO_2:** Start on FiO_2 of 1.0 (100%) and titrate down to 50% or less if the patient has an SpO2 .93% and no evidence of anemia, blood loss, or poor cardiac output.

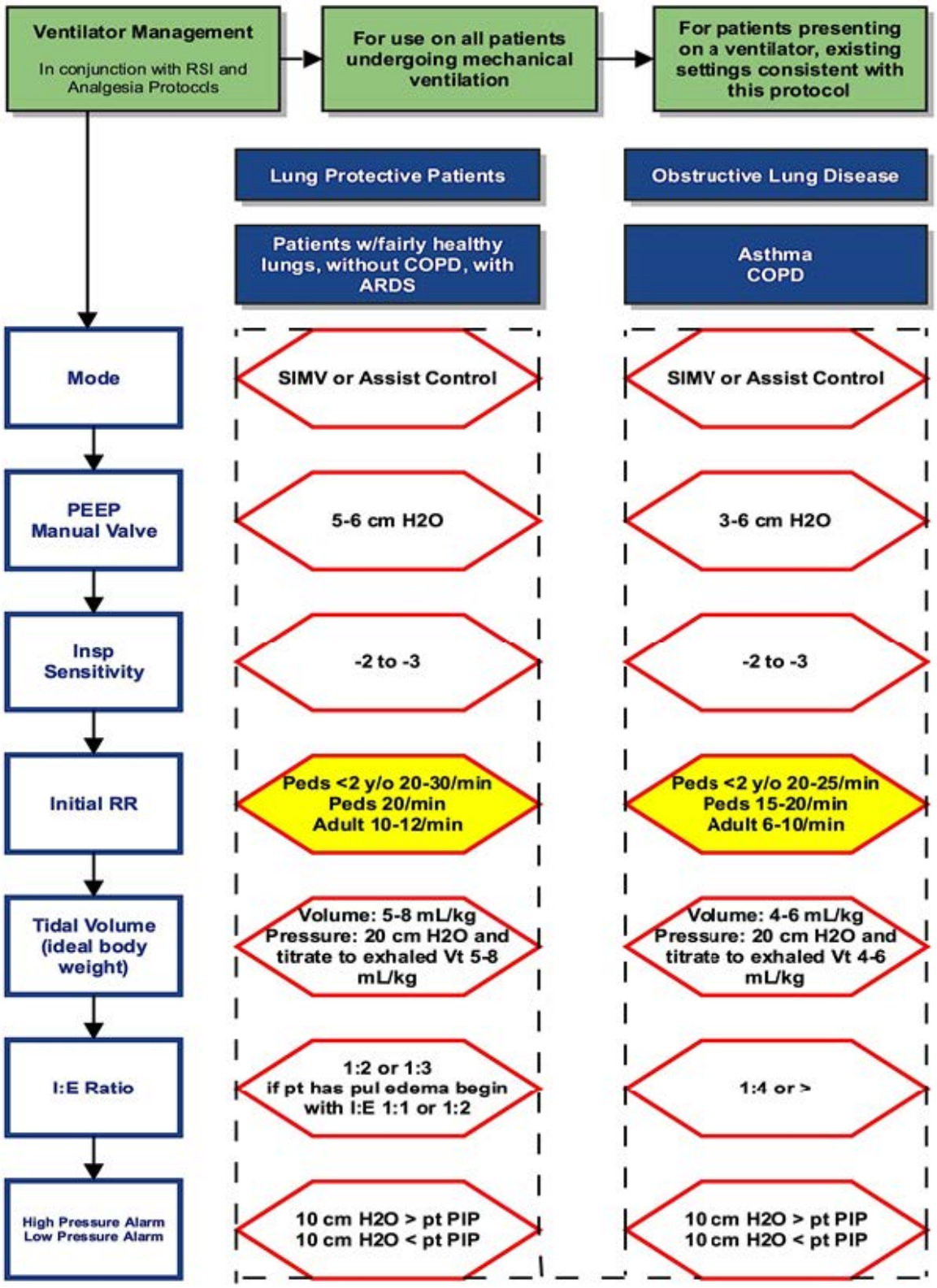
c. **Pressure Support (SIMV and CPAP only):** Start most patients on a pressure support that is 10 cm H_2O above the PEEP.

d. **Inspiratory Sensitivity:** 2

e. If patient has a leak around airway, be sure to set time termination if utilizing pressure control mode or pressure support breaths.

3. Alarm Settings
   a. **High and Low Pressure Alarms:** Should be set 10 cm H2O above / below the assessed peak pressure.
   b. **Low Minute Ventilation:** Should be set to half the patient's current minute ventilation.




Ventilator Management
In conjunction with RSI and Analgesia Protocols
For use on all patients undergoing mechanical ventilation
For patients presenting on a ventilator, existing settings consistent with this protocol
Lung Protective Patients
Patients w/fairly healthy lungs, without COPD, with ARDS
Obstructive Lung Disease
Asthma
COPD
Mode
SIMV or Assist Control
SIMV or Assist Control
PEEP
Manual Valve
5-6 cm H2O
3-6 cm H2O
Insp
Sensitivity
-2 to -3
-2 to -3
Initial RR
Peds <2 y/o 20-30/min
Peds 20/min
Adult 10-12/min
Peds <2 y/o 20-25/min
Peds 15-20/min
Adult 6-10/min
Tidal Volume
(ideal body weight)
Volume: 5-8 mL/kg
Pressure: 20 cm H2O and titrate to exhaled Vt 5-8 mL/kg
Volume: 4-6 mL/kg
Pressure: 20 cm H2O and titrate to exhaled Vt 4-6 mL/kg
I:E Ratio
1:2 or 1:3
if pt has pul edema begin with I:E 1:1 or 1:2
1:4 or >
High Pressure Alarm
Low Pressure Alarm
10 cm H2O > pt PIP
10 cm H2O < pt PIP
10 cm H2O > pt PIP
10 cm H2O < pt PIP

IBW and Ventilator Calculations

MALES									FEMALES								
Height		IBW	Tidal Volume						Height		IBW	Tidal Volume					
Feet	Inches	Kg	4 ml/kg	5 ml/kg	6 ml/kg	7 ml/kg	8 ml/kg		Feet	Inches	Kg	4 ml/kg	5 ml/kg	6 ml/kg	7 ml/kg	8 ml/kg	
4' 10"	58	45.4	182	227	272	318	363		4' 10"	58	40.9	164	205	245	286	327	
4' 11"	59	47.7	191	239	286	334	382		4' 11"	59	43.2	173	216	259	302	346	
5'	60	50	200	250	300	350	400		5'	60	45.5	182	228	273	319	364	
5' 1"	61	52.3	209	262	314	366	418		5' 1"	61	47.8	191	239	287	335	382	
5' 2"	62	54.6	218	273	328	382	437		5' 2"	62	50.1	200	251	301	351	401	
5' 3"	63	56.9	228	285	341	398	455		5' 3"	63	52.4	210	262	314	367	419	
5' 4"	64	59.2	237	296	355	414	474		5' 4"	64	54.7	219	274	328	383	438	
5' 5"	65	61.5	246	308	369	431	492		5' 5"	65	57	228	285	342	399	456	
5' 6"	66	63.8	255	319	383	447	510		5' 6"	66	59.3	237	297	356	415	474	
5' 7"	67	66.1	264	331	397	463	529		5' 7"	67	61.6	246	308	370	431	493	
5' 8"	68	68.4	274	342	410	479	547		5' 8"	68	63.9	256	320	383	447	511	
5' 9"	69	70.7	283	354	424	495	566		5' 9"	69	66.2	265	331	397	463	530	
5' 10"	70	73	292	365	438	511	584		5' 10"	70	68.5	274	343	411	480	548	
5' 11"	71	75.3	301	377	452	527	602		5' 11"	71	70.8	283	354	425	496	566	
6'	72	77.6	310	388	466	543	621		6'	72	73.1	292	366	439	512	585	
6' 1"	73	79.9	320	400	479	559	639		6' 1"	73	75.4	302	377	452	528	603	
6' 2"	74	82.2	329	411	493	575	658		6' 2"	74	77.7	311	389	466	544	622	
6' 3"	75	84.5	338	423	507	592	676		6' 3"	75	80	320	400	480	560	640	
6' 5"	76	86.8	347	434	521	608	694		6' 5"	76	82.3	329	412	494	576	658	
6' 6"	77	89.1	356	446	535	624	713		6' 6"	77	84.6	338	423	508	592	677	
6' 7"	78	91.4	366	457	548	640	731		6' 7"	78	86.9	348	435	521	608	695	
6' 8"	79	93.7	375	469	562	656	750		6' 8"	79	89.2	357	446	535	624	714	
6' 9"	80	96	384	480	576	672	768		6' 9"	80	91.5	366	458	549	641	732	
6' 10"	81	98.3	393	492	590	688	786		6' 10"	81	93.8	375	469	563	657	750	
6' 11"	82	100.6	402	503	604	704	805		6' 11"	82	96.1	384	481	577	673	769	
7"	83	102.9	412	515	617	720	823		7"	83	98.4	394	492	590	689	787	

Ideal Body Weight Calculations

For Adults (Devine Formula)

Males: 50 kg plus 2.3 kg for every inch of height over 5 feet
Females: 45.5 kg plus 2.3 kg for every inch of height over 5 feet
Be sure to start lower if patient appears to have a smaller than normal torso.

Pediatric Estimation Of Weight For 1-10 Year Olds

(3 X Age in years) + 7 = estimated weight in kg

Infant Weight Estimation

(Age in months + 9) / 2 – estimated weight in kg

COPD Specific Settings

	Pediatrics <5 kg – 2 Years Old	Pediatrics >2 Years Old	Adult
Rate	20-25 bpm	15-20 bpm	6-10 bpm
Tidal Volume	N/A, use pressure	4-6 mL/kg	4-6 mL/kg
I:E Ratio	Start at 1:4, may require >1:6		
PEEP	Start at 3-6 cm/H_2O		

Lung Protective Settings

	Pediatrics <5 kg – 2 Years Old	Pediatrics >2 Years Old	Adult
Rate	20-30 bpm	20 bpm	10-12 bpm
Tidal Volume	N/A, use pressure	5-8 mL/kg	5-8 mL/kg
I:E Ratio	1:2 – 1:6		
PEEP	Start at 5-6 cm/H_2O		

Protocol 6.1

MEDICATION ADMINISTRATION

EMR	EMT	AEMT	INT	PM

The medication administration protocol provides EMS providers with verification guidelines to follow prior to administering any medication to a patient during an EMS incident. The protocol is intended to decrease the chance that EMS Providers make a medication administration error during an EMS incident.

EMR	EMT	AEMT	INT	PM
•	•	•	•	•

1. Prior to administering any medication, department personnel will complete a medication Triple Check. This Triple Check is a process that will require the medication label to be checked 3 times. The first check should occur when the drug is removed from the drug box or any other storage device. The second check should occur while the medicine is drawn up (or being prepared for administration if pre-filled syringe or non-intravenous route is supplied). The third and final check should occur immediately prior to the medication being administered to the patient.

EMR	EMT	AEMT	INT	PM
•	•	•	•	•

2. During documentation, the EMS provider will document that the Triple Check was performed prior to any medication administration.

EMR	EMT	AEMT	INT	PM
•	•	•	•	•

3. When there is a second EMS provider available, a verbal verification will be performed prior to drawing up the drug, this fulfills the second check. The EMS provider that is administering the medication will give the second EMS provider the container and verbalize what medication and dose is going to be administered. The verifying EMS provider will read the label to make sure it matches what the first EMS provider verbalized. Any discrepancy should start the process from the beginning. Any level EMS provider can perform the verbal verification.

EMR	EMT	AEMT	INT	PM
•	•	•	•	•

4. Prior to any medication administration, EMS providers should review the Six Rights of Medication Administration:
    a. Right Medication
    b. Right Dose / Concentration
    c. Right Route
    d. Right Patient (Protocol)
    e. Right Time
    f. Right Documentation

LEAN BODY MASS / IDEAL BODY WEIGHT CHART — Protocol 6.2

Scope | EMR | EMT | AEMT | INT | PM |

MALES			FEMALES		
HEIGHT		IBW	HEIGHT		IBW
Feet	Inches	kg	Feet	Inches	kg
4'10"	58	**45**	**4'7"**	55	**34**
4'11"	59	**48**	**4'8"**	56	**36**
5'0"	60	**50**	**4'9"**	57	**39**
5'1"	61	**52**	**4'10"**	58	**41**
5'2"	62	**55**	**4'11"**	59	**43**
5'3"	63	**57**	**5'0"**	60	**46**
5'4"	64	**59**	**5'1"**	61	**48**
5'5"	65	**62**	**5'2"**	62	**50**
5'6"	66	**64**	**5'3"**	63	**53**
5'7"	67	**66**	**5'4"**	64	**55**
5'8"	68	**68**	**5'5"**	65	**57**
5'9"	69	**71**	**5'6"**	66	**59**
5'10"	70	**73**	**5'7"**	67	**62**
5'11"	71	**75**	**5'8"**	68	**64**
6'0"	72	**78**	**5'9"**	69	**66**
6'1"	73	**80**	**5'10"**	70	**69**
6'2"	74	**82**	**5'11"**	71	**71**
6'3"	75	**85**	**6'0"**	72	**73**
6'4"	76	**87**	**6'1"**	73	**75**
6'5"	77	**89**	**6'2"**	74	**78**
6'6"	78	**91**	**6'3"**	75	**80**

- Pediatric patients should be measured utilizing a pediatric medical measuring adjunct, (i.e., a length-based resuscitation tape (Broselow Pediatric Emergency Tape or Handtevy Length-Based Tape).

ACETAMINOPHEN (Tylenol®) Protocol 6.3

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Acetaminophen (uh-see-tuh-mi'-nuh-fin)**
Trade Name:	Tylenol®
Chemical Class:	Prostaglandin inhibitor
Therapeutic Class:	Aniline analgesic and antipyretic
Actions:	Acetaminophen is the most widely used analgesic in the United States. Like Aspirin, it appears to inhibit the enzyme cyclooxygenase. While it has analgesic and antipyretic properties similar to the NSAIDs, it has little anti-inflammatory properties. It does not have platelet aggregation inhibition properties of Aspirin.
Pharmacokinetics:	Onset 15 to 30 minutes. Peak 30 to 120 minutes. Duration 3 to 4 hours. $t_{½}$ = 1 to 3 hours.
Indications:	Treatment of fever.
Contraindications:	1. Hypersensitivity to the drug. 2. It should be avoided in patients with liver disease.
Precautions: ***Pregnancy Cat. C***	Acetaminophen is metabolized by the liver and overdoses can be toxic for the liver. In fact, it is the most common cause of acute liver failure.
Side Effects:	Minimal within recommended dosage range.
Interactions:	Chronic alcohol can increase the hepatotoxicity of Acetaminophen.
Administration:	PO: 325-650 mg every 4-6 hours (up to 1 Gram PO is occasionally used as an antipyretic) in the adult patient. 10-15 mg/kg dose for children.
Supply:	Cup containing 325 mg in 10.15 mL
Notes:	Febrile seizures are more likely in children with a history of febrile seizures and with a rapid elevation in temperature.

Pediatric Tylenol Administration Chart

Pediatric Weight In lbs. (Pounds)

Weight	Dosage
6 – 8 lbs. (3 – 4 kg)	1.25 mL
9 – 11 lbs. (4 – 5 kg)	1.875 mL
12 – 17 lbs. (6 – 8 kg)	2.5 mL
18 – 23 lbs. (9 – 10 kg)	3.75 mL
24 – 35 lbs. (11 – 16 kg)	5 mL
36 – 47 lbs. (17 – 21 kg)	7.5 mL
48 – 59 lbs. (22 – 27 kg)	10 mL
60 – 71 lbs. (28 – 32 kg)	12.5 mL
72 – 99 lbs. (33 – 45 kg)	15 mL

Tylenol administration is 15 mg/mL

Tylenol concentration is 325 mg/10.15 mL

Use a 5 mL syringe to administer the Tylenol PO.

ADENOSINE (Adenocard®) — Protocol 6.4

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Adenosine (ah-den'oh-seen)**
Trade Name:	Adenocard®
Chemical Class:	Endogenous nucleoside
Therapeutic Class:	Antiarrhythmic
Actions:	Adenosine is a naturally occurring substance that is present in all body cells. Adenosine decreases conduction of the electrical impulse through the AV node and interrupts AV reentry pathways in paroxysmal supraventricular tachycardia (PSVT). It can effectively terminate rapid supraventricular tachycardia such as PSVT. Because of its rapid onset and very short half-life, the administration of Adenosine is sometimes referred to as chemical cardioversion. A single bolus of the drug was effective in converting PSVT to a normal sinus rhythm in a significant number (90%) of patients in initial drug studies.
Pharmacokinetics:	Cleared from plasma in less than 30 seconds; $t_{½}$ = 10 seconds
Indications:	1. Unstable narrow QRS tachycardia refractory to vagal maneuvers. 2. Stable, regular, monomorphic wide-complex tachycardia.
Contraindications:	1. Second- or third-degree heart block. 2. Sick sinus syndrome. 3. Hypersensitivity to the drug. 4. Bradycardia. 5. Bronchoconstrictive lung disease (i.e., asthma). 6. Irregular wide-complex tachycardias
Precautions: ***Pregnancy Cat. C***	Adenosine typically causes dysrhythmias at the time of cardioversion. These generally last a few seconds or less and may include PVCs, PACs, sinus bradycardia, sinus tachycardia, and various degrees of AV block. In extreme cases, transient asystole may occur. If this occurs, appropriate therapy should be initiated.
Side Effects:	*CNS:* dizziness, headache *CV:* dysrhythmia outlined under precautions, chest pain, facial flushing, palpitations, diaphoresis *GI:* nausea *RESP:* chest pressure, dyspnea
Administration:	*Adult:* Give 6 mg IV over 1 to 3 seconds. If not effective after 2 minutes, give 12 mg IV over 1 to 3 seconds. *Pediatric:* **[Medical Control]** Give 0.1 mg/kg IV over 1 to 3 seconds (maximum first dose 6 mg). If not effective after 2 minutes, give 0.2 mg/kg IV over 1 to 3 seconds (maximum second dose 12 mg).
Supply:	Vials or prefilled syringes containing 6 mg in 2 mL.
Notes:	1. Give Adenosine rapidly over 1 to 3 seconds, into the medication administration port closest to the patient, through a large (e.g., antecubital) vein followed by a 10 mL Normal Saline flush and elevation of the arm. 2. Higher doses than usual may be needed for patients receiving Theophylline preparations or consuming large quantities of Caffeine. 3. Dipyridamole (Persantine) can potentiate the effects of Adenosine. The dosage of Adenosine may need to be reduced in patients receiving Dipyridamole. 4. Use of Adenosine for irregular wide-complex tachycardias may cause degeneration of the rhythm to VF.

ALBUTEROL (Proventil®) — Protocol 6.5

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Albuterol (al-byoo'ter-ole)**
Trade Name:	Airet®, Proventil®, Repetabs®, Respirol®, Ventolin®, Volmax®; Combivent® (combined with Ipratropium Bromide)
Chemical Class:	Sympathomimetic amine; β_2-adrenergic agonist
Therapeutic Class:	Antiashtmatic; bronchodilator
Actions:	Albuterol is a selective β_2-adrenergic agonist with a minimal number of side effects. It causes prompt bronchodilation and has a duration of action of approximately 5 hours.
Pharmacokinetics:	Onset 5 to 15 minutes. Peak 1 to 1½ hours. Duration 4 to 6 hours. $t_{½}$ = 2½ to 4 hours.
Indications:	1. Bronchial asthma. 2. Reversible bronchospasm associated with chronic bronchitis and emphysema. 3. Anaphylactic respiratory distress. 4. Crush syndrome **[Medical Control]**.
Contraindications:	1. Hypertension (SBP greater than 180 mm Hg). 2. Tachycardia (HR greater than 140 adult, HR greater than 180 child). 3. Severe cardiac disease. 4. Hypersensitivity to the drug.
Precautions: ***Pregnancy Cat. C***	1. Hyperthyroidism. 2. Diabetes mellitus. 3. Convulsive disorders.
Side Effects:	*CNS:* dizziness, headache, stimulation, tremors *CV:* chest pain, dysrhythmias, hypertension, palpitations, tachycardia *GI:* nausea, vomiting
Administration:	Using a small volume nebulizer, adjust the oxygen flowmeter to 6 to 10 L/minute to produce a steady, visible mist. *Adult:* Give 2.5 mg (3 mL of 0.083% solution) with a mouthpiece or facemask. Repeat every 10 minutes, up to 4 additional treatments, if needed. *Pediatric:* Give 2.5 mg (3 mL of 0.083% solution) with a mouthpiece or blow-by. Repeat every 10 minutes, up to 4 additional treatments, if needed.
Supply:	Unit dose vials containing 2.5 mg in 3 mL.
Notes:	1. The possibility of developing unpleasant side effects increases when Albuterol is administered with other sympathetic agonists. 2. β-blockers may blunt the pharmacological effects of Albuterol. 3. Albuterol is also supplied in metered-dose inhalers (MDI) that deliver 90 mcg per inhalation. Be sure to obtain a complete medication history detailing administration times and frequency of use of home inhalation therapy. Overdoses of inhalers cause bronchial constriction and possibly death.

AMIODARONE (Cordarone®) — Protocol 6.6

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Amiodarone (a-mee'oh-da-rone)**
Trade Name:	Cordarone®, Pacerone®
Chemical Class:	Iodinated benzofuran derivative
Therapeutic Class:	Antiarrhythmic
Actions:	Amiodarone prolongs myocardial action potential and effective refractory period and causes noncompetitive α- and β-adrenergic inhibition. Amiodarone suppresses atrial and ventricular ectopy (PSVT, AF, ATach, VT, VF, etc.) and slows conduction through the AV node (ventricular rate control; useful in WPW). Amiodarone also causes vasodilation resulting in reduced cardiac work.
Pharmacokinetics:	$t_{½}$ = 20 to 47 days
Indications:	1. Shock refractory ventricular fibrillation and pulseless ventricular tachycardia. 2. Ventricular tachycardia. 3. Wide-complex tachycardia of unknown type (regular rhythm).
Contraindications:	1. Cardiogenic shock (SBP <90 mm Hg). 2. Marked sinus bradycardia. 3. Second- or third-degree heart block. 4. Hypersensitivity to the drug. 5. Torsades de pointes
Precautions: ***Pregnancy Cat. D***	1. May worsen existing or precipitate new dysrhythmias, including torsades de pointes and VF. 2. Use with beta-blocking agents could increase risk of hypotension and bradycardia. Amiodarone inhibits atrioventricular conduction and decreases myocardial contractility, increasing the risk of AV block with Verapamil or Diltiazem or of hypotension with any calcium channel blocker. 3. Use with caution in pregnancy and with nursing mothers.
Side Effects:	*CNS:* dizziness, headache *CV:* bradycardia, cardiac conduction abnormalities, CHF, dysrhythmias, hypotension, SA node dysfunction, sinus arrest *RESP:* dyspnea, pulmonary inflammation
Administration:	*Adult:* **VF and pulseless VT:** Give 300 mg IV/IO. Give additional 150 mg IV push in 3 to 5 minutes for refractory or recurrent VF/VT. **VT with pulse:** Give a slow infusion of 150 mg over 10 minutes. Mix in 100 mL of D_5W and infuse at 150 gtts/minute (15 drop set). *Pediatric:* **VF and pulseless VT:** Give 5 mg/kg IV/IO. May repeat up to 2 times for refractory VT/pulseless VT. Maximum single dose 300 mg. **VT with pulse:** Give an infusion of 5 mg/kg over 20 minutes. Mix in 100 mL of D_5W and infuse at 75 gtts/minute (15 drop set). Maximum dosage is 300 mg. *Slow Infusion:* 1 mg/minute. Mix 150 mg in 250 mL D_5W and infuse at 100 gtts/minute (60 drop set).
Supply:	Vial containing 150 mg in 3 mL.
Notes:	

ASPIRIN — Protocol 6.7

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Aspirin (as'pir-in)**
Trade Name:	Bayer®, Bufferin®, Ecotrin®
Chemical Class:	Salicylate derivative
Therapeutic Class:	Antiplatelet agent
Actions:	Aspirin blocks the formation of the substance thromboxane A_2, which causes platelets to aggregate and arteries to constrict. This results in an overall reduction in mortality associated with myocardial infarction. It also appears to reduce the rate of nonfatal reinfarction and nonfatal stroke.
Pharmacokinetics:	Onset 15 to 30 minutes. Peak 1 to 2 hours. Duration 4 to 6 hours. $t_{½}$ = 3 hours at low doses.
Indications:	Chest pain suggestive of an acute myocardial infarction.
Contraindications:	1. Hypersensitivity to the drug, NSAIDS, and Tartrazine (FDC yellow dye #5). 2. Bleeding disorders including GI hemorrhage and hemophilia. 3. Hemorrhagic states.
Precautions: ***Pregnancy Cat. C***	Children or teenagers with flu-like symptoms (may be associated with the development of Reye's syndrome).
Side Effects:	*GI:* GI bleeding, heartburn, nausea *HEME:* prolonged bleeding time
Interactions:	When administered together, Aspirin and other anti-inflammatory agents may cause an increased incidence of side effects and increased blood levels of both drugs. Administration of aspirin with antacids may reduce the blood levels of the drug by decreasing absorption.
Administration:	Give four (4) 81 mg chewable tablets (324 mg total dose) PO as soon as possible after the onset of chest pain.
Supply:	81 mg low dose chewable tablets
Notes:	

ATROPINE — Protocol 6.8

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Atropine (a'troe-peen)**
Trade Name:	Atropine Care®, Atropen Autoinjector®, Atropisol®, Atrosulf-1®
Chemical Class:	Belladonna alkaloid
Therapeutic Class:	Anticholinergic
Actions:	Atropine is a potent parasympatholytic that increases cardiac output and heart rate. Atropine acts by blocking acetylcholine receptors, thus inhibiting parasympathetic stimulation. Although it has positive chronotropic properties, it has little or no inotropic effect.
Pharmacokinetics:	Peak 2 to 4 minutes. Duration 4 to 6 hours.
Indications:	1. **[Adult]** Hemodynamically significant bradycardia (HR less than 60): a. Acute altered mental status, ongoing chest pain, hypotension, or other signs of shock. b. Bradycardia associated with "escape" ventricular ectopy (i.e., PVCs attributed to the underlying slow heart rate). 2. **[Pediatric]** Hemodynamically significant bradycardia [HR less than 60 (neonate less than 80/minute)] due to increased vagal tone or primary AV block. 3. Severe organophosphate poisonings (insecticides).
Contraindication:	Hypersensitivity to the drug
Precautions: ***Pregnancy Cat. C***	1. Use Atropine cautiously in the presence of acute coronary ischemia or myocardial infarction; increased heart rate may worsen ischemia or increase the zone of infarction. 2. Avoid relying on Atropine in type II second-degree or third-degree AV block or in patients with third-degree AV block with a new wide-QRS complex. These patients require immediate pacing.
Side Effects:	*CNS:* drowsiness, confusion *CV:* angina, PVCs, tachycardia *EENT:* blurred vision, dilated pupils *GI:* dry mouth
Administration:	*Adult:* **Bradycardia:** Give 1 mg IV. May repeat every 5 minutes to a total dose of 3 mg if needed. **Cholinergic Toxicity:** Give 2 mg IV. Repeat every 5 minutes if needed. *Pediatric:* **Bradycardia:** Give 0.02 mg/kg IV/IO. May repeat once in 3 to 5 minutes if needed. (Minimum dose = 0.1 mg, maximum dose = 1 mg)
Supply:	Prefilled syringe containing 1 mg in 10 mL.
Notes:	

CALCIUM CHLORIDE 10% — Protocol 6.9

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Calcium Chloride (kal'se-um klor-ide)**
Trade Name:	N/A
Chemical Class:	Divalent cation
Therapeutic Class:	Electrolyte
Actions:	Calcium Chloride replaces calcium in cases of hypocalcemia. Calcium Chloride causes a significant increase in the myocardial contractile force and appears to increase ventricular automaticity.
Pharmacokinetics:	Rapid increase in serum levels, with return to pre-drug level within 30 minutes to 2 hours.
Indications:	1. Magnesium sulfate toxicity **[Medical Control]**. 2. Acute hyperkalemia (elevated potassium) **[Medical Control]**. 3. Acute hypocalcemia (decreased calcium) **[Medical Control]**. 4. Calcium channel blocker toxicity (Nifedipine, Verapamil, Diltiazem) **[Medical Control]**. 5. Crush syndrome **[Medical Control]**.
Contraindication:	Patients receiving Digitalis (can result in sudden cardiac death from VF if Digitalis toxicity is present).
Precautions: ***Pregnancy Cat. C***	1. Ensure administration by slow IV push; rapid push can cause VF. 2. Extravasation can cause tissue necrosis at the injection site. 3. Ensure IV line is flushed between administrations of Calcium Chloride and Sodium Bicarbonate to avoid precipitation.
Side Effects:	*CNS:* dizziness *CV:* bradycardia, cardiac arrest, dysrhythmias, heart block, hemorrhage, hypotension, shortened Q-T *GI:* nausea, vomiting
Administration:	Give 8 mg/kg of 10% solution IV over 5 minutes. Repeat dose in 10 minutes if needed. **[Medical Control]**
Supply:	Prefilled syringe containing 1 g in 10 mL (10% solution)
Notes:	

CEFAZOLIN (Ancef®) — Protocol 6.10

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Cefazolin (sef-ah'-soe-lin)**
Trade Name:	Ancef®, Kefzol®
Chemical Class:	First-Generation Cephalosporin
Therapeutic Class:	Antibiotic
Actions:	A bactericidal agent that acts by inhibition of bacterial cell wall synthesis.
Pharmacokinetics:	IV: Onset immediate. Peak immediate. Duration unknown.
Indications:	Open skeletal fracture; a break in the skin over a fracture site. **Note:** Life threats need to be treated prior to administration of Cefazolin.
Contraindications:	1. History of anaphylaxis (not simple rash) to Penicillin. 2. Known allergy to the Cephalosporin group of antibiotics (see notes for list of common Cephalosporin antibiotics). 3. Age less than one (1) year.
Precautions: ***Pregnancy Cat. B***	Be alert for a hypersensitivity reaction. Discontinue the IV infusion if signs and symptoms of an allergic reaction develop.
Side Effects:	*GI:* diarrhea *OTHER:* anaphylaxis, itching, skin rash, rarely pain with intramuscular (IM) injection
Administration:	Give 25 mg/kg up to 2 grams IV bolus over 3-5 minutes. **Directions:** Reconstitute 1 Gram with 10 mL 0.9% Sodium Chloride (Normal Saline) for injection. • Adult patient weighing ≥ 80 kg (176 pounds) administer Cefazolin 2 Grams IV/IO over 3-5 minutes. • Adult patient weighing < 80 kg (176 pounds) administer Cefazolin 25 mg/kg over 3-5 minutes; round dose to nearest 100 mg. • Pediatric patients administer Cefazolin 25 mg/kg over 3-5 minutes; round dose to nearest 100 mg. **Note:** Time of administration is particularly important and **MUST** be documented clearly on the Patient Care Report (PCR) and verbally reported to receiving facility upon transfer of care.
Supply:	Cefazolin must be reconstituted before administration. It is supplied in rubber-stoppered vial containing 1 gram of powder.
Notes:	1. Parenteral drug products should be shaken well when reconstituted and inspected visually for particulate matter prior to administration. If particulate matter is evident in reconstituted fields, the drug solutions should be discarded. 2. Reconstituted solutions may range in color from pale yellow to yellow without a change in potency. **Common Cephalosporin Antibiotics:** Biocef® (Cephalexin), Cedax® (Cefibuten), Cefizox® (Ceftizoxime), Cefobid® (Cefoperazone), Cefotan® (Cefotetan), Ceftin® (Cefuroxime), Cefzil® (Cefprozil), Ceptaz® (Ceftazidime), Claforan® (Cefotaxime), Duricef® (Cefadroxil), Fortaz® (Ceftazidime), Keflex® (Cephalexin), Lorabid® (Loracarbef), Maxipime® (Cefepime), Mefoxin® (Cefoxitin), Omnicef® (Cefdinir), Panixine® (Cephalexin), Raniclor® (Cefaclor), Rocephin® (Ceftriaxone), Spectrecef® (Cefditoren), Suprax® (Cefixime), Tazicef® (Ceftazidime), Vantin® (Cefpodoxime), Velosef® (Cephradine), Zinacef® (Cefuroxime)

DEXTROSE (Glucose®) — Protocol 6.11

Scope | EMR | EMT | AEMT | INT | PM

Generic Name:	**Dextrose (dex'trose)**
Trade Name:	Glucose®, Glutose®, Insta-Glucose®
Chemical Class:	Carbohydrate
Therapeutic Class:	Nutrient, caloric
Actions:	Dextrose supplies supplemental glucose in cases of hypoglycemia and restores blood sugar level to normal (70 to 110 mg/dL).
Pharmacokinetics:	N/A
Indications:	1. Altered mental status of unknown etiology (GCS less than or equal to 12). 2. Hypoglycemia (less than 60 mg/dL) based on rapid glucose determination or clinical judgment. 3. Status epilepticus. 4. Oral hypoglycemic agent overdose. 5. Neonatal resuscitation not responsive to ventilation and chest compressions.
Contraindications:	No contraindications for a patient with suspected hypoglycemia.
Precautions:	1. Use with caution in patients with increased intracranial pressure because the Dextrose load may worsen cerebral edema. 2. Localized venous irritation may occur when smaller veins are used. 3. Infiltration may result in tissue necrosis. 4. Dextrose is only administered via the IV or IO route.
Side Effects:	Tissue necrosis and phlebitis at the injection site.
Administration:	***Patient > 5 years old:*** Give Dextrose 50% 1 g/kg up to 25 g IV. Repeat once in 2 minutes if altered mental status persists. ***Child (1 year old or 10 kg):*** Give Dextrose 25% 1 g/kg up to 25 g IV. Repeat once in 2 minutes if altered mental status persists. ***Neonate (birth to 1 month old):*** Give Dextrose 12.5% 1 g/kg (8 mL/kg).
Supply:	Prefilled syringe containing 25 g in 50 mL (50% solution)
Notes:	1. Establish a free flowing IV of Normal Saline in a large vein. Aspirate blood before and during administration of Dextrose to ensure IV patency. 2. Hypoglycemic states require immediate intervention. Prolonged hypoglycemia can result in permanent brain damage. 3. To make Dextrose 25%, dispel 25 mL of solution from the prefilled syringe and draw 25 mL of Normal Saline back into the syringe. The resultant Dextrose 25% will contain 12.5 g in 50 mL.

DIAZEPAM (Valium®) (Alternate) — Protocol 6.12

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Diazepam (dye-az'e-pam)** — ***DEA Class: Schedule IV***
Trade Name:	Valium®
Chemical Class:	Benzodiazepine
Therapeutic Class:	Anesthesia adjunct, anticonvulsant, sedative / hypnotic, skeletal muscle relaxant
DEA Class:	Schedule IV
Actions:	Diazepam causes central nervous system depression via facilitation of inhibitory GABA[1] at benzodiazepine receptor sites (BZ_1 – associated with sleep; BZ_2 – associated with memory, motor, sensory and cognitive function).
Pharmacokinetics:	*IV:* Onset 1 to 3 minutes. Duration 15 minutes. $t_{½}$ = 20 to 50 hours. *PR:* Onset 5 to 15 minutes. Peak 1.5 hours.
Indications:	1. Seizures not caused by hypoglycemia. 2. Severe agitation, tachycardia, or hallucinations cause by alcohol withdrawal. 3. Sedation for cardioversion and transcutaneous pacing, *secondary to Midazolam*.[2] 4. Sedation for endotracheal intubation only ***after*** the ET tube is inserted, *secondary to Midazolam*.[2] 5. Tachydysrhythmias with HR greater than 120 bpm associated with stimulant (i.e., Cocaine and Methamphetamine) abuse.
Contraindications:	1. Hypersensitivity to the drug. 2. Altered mental status not related to seizures. 3. Respiratory depression.
Precautions: ***Pregnancy Cat. D***	1. Use cautiously with the elderly, the debilitated, hepatic disease, and renal disease. 2. The benefits of giving Diazepam to the pregnant patient for seizures outweigh the associated risks.
Side Effects:	*CNS:* dizziness, drowsiness, headache; *CV:* hypotension; *EENT:* blurred vision; *GI:* nausea, vomiting; *RESP:* respiratory depression
Interactions:	1. Diazepam is incompatible with many medications. Whenever Diazepam is given intravenously in conjunction with other drugs, the IV line should be adequately flushed. 2. The effects of Diazepam can be additive when used in conjunction with other CNS depressants and alcohol.
Administration:	*Adult:* Give 0.25 mg/kg up to 5 mg slow IV push, titrated to effect. Repeat dose in 5 minutes if seizure persists. Diazepam may also be administered 5 mg IM if unable to readily establish IV access. *Pediatric:* *IV:* Give 0.25 mg/kg up to 5 mg slow IV push or IM, titrated to effect. Repeat dose in 5 minutes if seizure persists. *PR:* Give 0.25 mg/kg up to 5 mg PR.
Supply:	Carpuject or vial containing 10 mg in 2 mL.
Notes:	1. GABA – Gammaaminobutyric Acid, the chief inhibitory neurotransmitter in the CNS. GABA hyperpolarizes the membrane of the CNS neurons decreasing their response to stimuli. 2. **[Medical Control]** must authorize administration of Diazepam for sedation secondary to Midazolam. Drug is not routinely stocked in LFEMSC drug bags and/or drug boxes. This drug may be used during drug shortages as an alternate for Midazolam (Versed®).

DILTIAZEM (Cardizem®) — Protocol 6.13

Scope | EMR | EMT | AEMT | INT | PM

Generic Name:	**Diltiazem (duhl-tia-uh-zem)**
Trade Name:	Cardizem®
Chemical Class:	Calcium channel blocker
Therapeutic Class:	Antiarrhythmic
Actions:	Diltiazem causes vascular dilation and slows conduction through the AV node. It slows the rapid ventricular rate associated with atrial fibrillation and atrial flutter. It is also used in the treatment of angina because of its negative inotropic effect and because it dilates the coronary arteries.
Pharmacokinetics:	Onset 3 minutes. Peak effects 7 minutes. Duration 1 to 3 hours. Half-life 2 hours.
Indications:	Diltiazem should be given only to narrow-complex tachycardias, including: 1. Stable, narrow-complex tachycardias if rhythm remains uncontrolled or unconverted by vagal maneuvers or Adenosine, or if SVT is recurrent. 2. Controlling ventricular rate in patients with atrial fibrillation or atrial flutter.
Contraindications:	1. Severe hypotension (SBP under 80 mmHg or Mean Arterial Pressure of 65 mmHg). 2. Congestive heart failure. 3. Cardiogenic shock. 4. Ventricular tachycardia (wide-complex tachycardia) in pre-hospital setting. 5. Patient does not have Wolff-Parkinson- White syndrome.
Precautions: ***Pregnancy Cat. C***	Diltiazem can cause systemic hypotension. It is essential that the blood pressure be constantly monitored following its administration. Calcium Chloride can be used to prevent the hypotensive effects of calcium channel blockers and in the management of calcium channel blocker overdosage.
Side Effects:	*CNS:* dizziness, headache *CV:* bradycardia, heart block, hypotension, and asystole *GI:* nausea, vomiting
Interactions:	1. Diltiazem should not be administered to patients receiving intravenous Beta-blockers because of an increased risk of congestive heart failure, bradycardia, and asystole.
Administration:	*Adult:* Initial Dose - Give 15-20 mg IV bolus (0.25 mg/kg) over 2 minutes. Maximum dose is 20 mg. Repeat Dose – Give 20-25 mg IV bolus (0.35 mg/kg) in 15 minutes after initial dose. Maximum dose is 25 mg.
Supply:	Vial containing 50 mg in 1 mL
Notes:	

DIPHENHYDRAMINE (Benadryl®) Protocol 6.14

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Diphenhydramine (dye-fen-hye'dra-meen)**
Trade Name:	Benadryl®
Chemical Class:	Ethanolamine derivative
Therapeutic Class:	Antihistamine, antianaphylactic (adjunct)
Actions:	Diphenhydramine is an antihistamine with anticholinergic (drying) and sedative side effects. Diphenhydramine decreases the allergic response by blocking Histamine at H_1 receptor sites.
Pharmacokinetics:	N/A
Indications:	3. Anaphylaxis, *as an adjunct to Epinephrine*. 4. Severe vomiting and motion sickness **[Medical Control]**. 5. To treat dystonic reactions and extrapyramidal reactions caused by phenothiazines.
Contraindications:	6. Bronchial asthma. 7. Nursing mothers. 8. Children less than 10 kg. 9. Glaucoma. 10. Hypersensitivity to the drug or other antihistamines.
Precautions: ***Pregnancy Cat. B***	Use with caution in patients with a history of hyperthyroidism, cardiovascular disease, and hypertension.
Side Effects:	*CNS:* dizziness, drowsiness, sedation, sleepiness *CV:* headache, palpitations *GI:* dryness of mouth, nose, and throat *RESP:* thickening of bronchial secretions, wheezing
Interactions:	1. Diphenhydramine has additive effects with alcohol and other CNS depressants (hypnotics, sedatives, tranquilizers, etc.). 2. MAO inhibitors prolong and intensify the anticholinergic (drying) effects of antihistamines.
Administration:	*Adult:* Give 1 mg/kg up to 50 mg IM or slow IV push (25 mg/minute). *Pediatric:* Give 1 mg/kg up to 50 mg IM or slow IV push (25 mg/minute).
Supply:	Vial containing 50 mg in 1 mL
Notes:	The IV route is preferred for the patient in severe shock. If an IV cannot be readily established, give Diphenhydramine via the IM route. Administer deep IM into large muscle mass.

DOPAMINE (Intropin®) (Alternate) — Protocol 6.15

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Dopamine (doe'pa-meen)**
Trade Name:	Intropin®
Chemical Class:	Catecholamine
Therapeutic Class:	Vasopressor, α- and β-adrenergic sympathomimetic
Actions:	Dopamine stimulates both adrenergic and dopaminergic receptors in a dose-dependent manner. Low doses (1-5 mcg/kg/minute) stimulate mainly dopaminergic receptors producing renal and mesenteric vasodilation. Intermediate doses (5-10 mcg/kg/minute) stimulate both dopaminergic and β_1-adrenergic receptors producing cardiac stimulation and renal dilation. Large doses (10-20 mcg/kg/minute) stimulate α-adrenergic receptors producing vasoconstriction and increases in peripheral vascular resistance and blood pressure.
Pharmacokinetics:	Onset 5 minutes. Duration less than 10 minutes. $t_{½}$ = 2 minutes.
Indications:	1. Hemodynamically significant bradycardia that does not respond to Atropine and/or transcutaneous pacing. 2. Hemodynamically significant hypotension associated with cardiogenic shock.
Contraindications:	1. Hypovolemic shock: volume replacement *must* be accomplished prior to using Dopamine. 2. Pheochromocytoma (tumor of the adrenal gland).
Precautions: ***Pregnancy Cat. C***	1. Dopamine increases heart rate and can induce or worsen supraventricular and ventricular dysrhythmias. 2. Dopamine should not be administered in the presence of tachydysrhythmias or ventricular fibrillation.
Side Effects:	*CNS:* headache, nervousness *CV:* anginal pain, ectopic beats, hypertension, palpitation, tachycardia, vasoconstriction *GI:* nausea, vomiting *RESP:* dyspnea
Administration:	IV infusion at 2 to 20 mcg/kg/minute. Titrate to SBP = 90 mm Hg. Piggyback the Dopamine infusion into an already established IV infusion.
Supply:	Premixed Bag containing 800 mg in 250 mL (3,200 mcg/mL).
Notes:	1. To prepare a Dopamine infusion, mix 200 mg Dopamine in a 250 mL bag of D_5W and mix well. Resultant concentration is 800 mcg/mL. Infuse using a 60-drop administration set. Use the formula below to calculate the drip rate. 2. Tissue sloughing may occur with extravasation. Antecubital veins are preferable sites. Monitor closely for leakage and/or infiltration.

Dopamine Infusion Formula

$$\frac{\text{Dose x weight in kg x 60 drops/min}}{\text{Concentration of drug in 1 mL}} = \text{gtts/minute}$$

Drug is not routinely stocked in LFEMSC drug bags and/or drug boxes. This drug may be used during drug shortages as an alternate for Norepinephrine (Levophed®).

EPINEPHRINE 1:1,000 — Protocol 6.16

Scope | EMR | EMT | AEMT | INT | PM

Generic Name:	**Epinephrine 1:1,000 (eh-puh-neh-fruhn)**
Trade Name:	Adrenalin®
Chemical Class:	Catecholamine
Therapeutic Class:	Bronchodilator, vasopressor
Actions:	Epinephrine is a naturally occurring catecholamine. It acts directly on α- and β-adrenergic receptors. Its effect on β-receptors is much more profound that its effect on α-receptors. The effects of Epinephrine on β_1-adrenergic receptors include a positive chronotropic effect (increased heart rate) and a positive inotropic effect (cardiac contractile force). The effects of Epinephrine on α-adrenergic receptor sites include increased systemic vascular resistance. The effects on these receptors sites together cause an increased blood pressure. Epinephrine also causes bronchodilation due to its effects on β_2-adrenergic receptors.
Pharmacokinetics:	*IM:* Onset variable; Peak unknown; Duration 1 to 4 hours *SC:* Onset 5 to 10 minutes; Peak 30 minutes; Duration 1 to 4 hours
Indications:	1. Anaphylaxis. 2. Bronchial asthma. 3. Respiratory distress due to epiglottitis or croup **[Medical Control]**.
Contraindications:	Epinephrine should be avoided in the following patients unless signs and symptoms are severe: 1. Hypertension (SBP greater than 180 mm Hg). 2. Tachycardia (HR greater than 140 adult, HR greater than 180 child). 3. Cardiovascular disease. 4. Elderly (age greater than 55 years). 5. Angle closure glaucoma.
Precautions: ***Pregnancy Cat. C***	1. Hyperthyroidism. 2. Diabetes Mellitus. 3. Give Epinephrine cautiously in geriatric and cardiac patients.
Side Effects:	*CNS:* anxiety, dizziness, restlessness, tremulousness, headache *CV:* anginal pain, dysrhythmias, hypertension, palpitations *GI:* nausea, vomiting *SKIN:* pallor
Interactions:	Cyclic antidepressants and antihistamines may potentiate the effects of Epinephrine.
Administration:	*Adult:* Give 0.3 mg IM. Repeat dose in 10 minutes if needed. *Pediatric:* Give 0.01 mg/kg up to 0.3 mg IM. Repeat dose in 10 minutes if needed. *Infusion:* 0.1 to 0.5 mcg/minute. Mix 1 mg in 100 mL D_5W and titrate to desired effect.
Supply:	Ampule containing 1 mg in 1 mL. Multidose Vial containing 30 mg in 30 mL.
Notes:	The IM route is preferred for the patient in severe shock.

EPINEPHRINE 1:10,000 — Protocol 6.17

Scope | EMR | EMT | AEMT | INT | PM

Generic Name:	**Epinephrine 1:10,000 (eh-puh-neh-fruhn)**
Trade Name:	Adrenalin®
Chemical Class:	Catecholamine
Therapeutic Class:	Bronchodilator, vasopressor
Actions:	Epinephrine is a naturally occurring catecholamine. It acts directly on α- and β-adrenergic receptors. Its effect on β-receptors is much more profound that its effect on α-receptors. The effects of Epinephrine on β_1-adrenergic receptors include a positive chronotropic effect (increased heart rate) and a positive inotropic effect (cardiac contractile force). The effects of Epinephrine on α-adrenergic receptor sites include increased systemic vascular resistance. The effects on these receptors sites together cause an increased blood pressure. Epinephrine also causes bronchodilation due to its effects on β_2-adrenergic receptors.
Pharmacokinetics:	*IV:* Onset immediate; Peak 5 minutes; Duration short
Indications:	1. Cardiac arrest. 2. Pediatric bradycardia unresponsive to ventilation. 3. Neonatal bradycardia unresponsive to ventilation and chest compressions. 4. Anaphylaxis and asthma patients in dire circumstances.
Contraindications:	No contraindications when used for indicated conditions.
Precautions: ***Pregnancy Cat. C***	No precautions when used for indicated conditions.
Side Effects:	*CNS:* anxiety, dizziness, restlessness, tremulousness, headache *CV:* anginal pain, dysrhythmias, hypertension, palpitations *GI:* nausea, vomiting *SKIN:* pallor
Administration:	*Adult:* Give 1 mg (10 mL) IV / IO. Repeat every 3 to 5 minutes if needed. *Pediatric:* Give 0.01 mg/kg (0.1 mL/kg) IV / IO. Repeat every 3 to 5 minutes if needed. *Anaphylaxis:* 0.3 mg to 0.5 mg IV
Supply:	Prefilled syringe containing 1 mg in 10 mL
Notes:	

EPINEPHRINE INFUSION — Protocol 6.18

Scope	EMR	EMT	AEMT	INT	PM

Indications:

1. Symptomatic bradycardia if Atropine and Transcutaneous Pacing fail or if pacing is not available. [INT, PM]
2. Post cardiac arrest (ROSC) severe hypotension (e.g., systolic blood pressure <80 mm Hg) with relative bradycardia, unresponsive to Atropine, pacing, or fluid resuscitation. [INT, PM]
3. Anaphylaxis refractory to initial resuscitation. [PM]

Contraindications: No contraindications when used for indicated conditions.

Precautions: Raising blood pressure and increasing heart rate may cause myocardial ischemia, angina, and increased myocardial oxygen demand.

Pregnancy Cat. C

Side Effects:

CNS: anxiety, dizziness, restlessness, tremulousness, headache

CV: anginal pain, dysrhythmias, hypertension, palpitations

GI: nausea, vomiting

SKIN: pallor

Administration:

Bradycardia:	Give 2 – 10 mcg/minute IV infusion. Titrate to effect. Piggyback the Epinephrine Infusion to an already established IV infusion.
Post-ROSC Hypotension:	Give 0. 1 – 0.5 mcg/kg/minute IV infusion. Titrate to response. Piggyback the Epinephrine Infusion to an already established IV infusion.
Anaphylaxis:	Give 0. 1 – 0.5 mcg/kg/minute IV infusion. Titrate to response. Piggyback the Epinephrine Infusion to an already established IV infusion.

EPINEPHRINE INFUSION REFERENCE	
2–10 mcg/minute dose	
Mix **1 mg** epinephrine 1:1,000 in 250 mL bag of D_5W. **4 mcg/mL concentration** *Use 60 drop administration set.*	
Dose (mcg/min)	**Drops/min 4 mcg/mL conc.**
2	30
3	45
4	60
5	75
6	90
7	105
8	120
9	135
10	150

EPINEPHRINE INFUSION REFERENCE		
0.1 – 0.5 mcg/kg/minute dose		
Mix **2 mg** epinephrine 1:1,000 in 250 mL bag of D_5W. **8 mcg/mL concentration** *Use 60 drop administration set.*	Mix **4 mg** epinephrine 1:1,000 in 250 mL bag of D_5W. **16 mcg/mL concentration** *Use 60 drop administration set.*	
Dose/min (mcg/min)	**Drops/min 8 mcg/mL conc.**	**Drops/min 16 mcg/mL conc.**
2	15	8
4	30	15
6	45	23
8	60	30
10	75	38
15	113	56
20	150	75
25	188	94
30	225	113
35	–	131
40	–	150
45	–	169
50	–	188
60	–	225

DOSE PER MINUTE TABLE
0.1 – 0.5 mcg/kg/minute

Table calculates mcg/minute dose based on dose and weight in kilograms. Example: The dose per minute for a 0.3 mcg/kg/minute Epinephrine infusion for a patient weighing 70 kg would be 21 mcg/minute. Use the "EPINEPHRINE INFUSION REFERENCE" table to convert the dose/minute to drops/minute based on concentration.

	10 kg	**20 kg**	**30 kg**	**40 kg**	**50 kg**	**60 kg**	**70 kg**	**80 kg**	**90 kg**	**100 kg**	**125 kg**
0.1 mcg/kg	1	2	3	4	5	6	7	8	9	10	13
0.2 mcg/kg	2	4	6	8	10	12	14	16	18	20	25
0.3 mcg/kg	3	6	9	12	15	18	21	24	27	30	38
0.4 mcg/kg	4	8	12	16	20	24	28	32	36	40	50
0.5 mcg/kg	5	10	15	20	25	30	35	40	45	50	63

EPINEPHRINE PUSH DOSE — Protocol 6.19

Scope	EMR	EMT	AEMT	INT	PM

Drug Names:	**Epinephrine**
Trade Name:	Adrenalin®
Chemical Class:	Catecholamine
Therapeutic Class:	Bronchodilator, vasopressor
Actions:	Epinephrine is a naturally occurring catecholamine. It acts directly on α- and β-adrenergic receptors. Its effect on β-receptors is much more profound that its effect on α-receptors. The effects of Epinephrine on β_1-adrenergic receptors include a positive chronotropic effect (increased heart rate) and a positive inotropic effect (cardiac contractile force). The effects of Epinephrine on α-adrenergic receptor sites include increased systemic vascular resistance. The effects on these receptors sites together cause an increased blood pressure. Epinephrine also causes bronchodilation due to its effects on β_2-adrenergic receptors.
Overview:	It is becoming more common to use what is referred to as "push dose pressors" in the management of shock when the blood pressure falls to dangerous levels. Push dose pressor therapy is essentially the use of small boluses of a catecholamine (most commonly Phenylephrine or Epinephrine) to raise blood pressure. It has been common practice in the operating room for years and now receiving more use in the emergency setting.
Indications:	Patient exhibiting the assessment findings of a dangerous level of low blood pressure. Hemodynamic collapse begins to occur when the Mean Arterial Pressure (MAP) drops below 45 mmHg. Administration of small boluses of Epinephrine can provide a rapid, yet brief, increase in MAP. Post cardiac arrest (ROSC), severe hypotension (SBP <80 mmHg or MAP <65 mmHg) with relative bradycardia, unresponsive to Atropine, pacing, or fluid resuscitation. Patients with severe hypotension (SBP <80 mmHg or MAP <65 mmHg) not related to trauma that do not respond to initial fluid resuscitation (minimum of 10 mL/kg bolus of 0.9% Sodium Chloride given. Anaphylaxis refractory to initial resuscitation.
Contraindications:	No contraindications when used in a life-threatening situation.
Precautions: ***Pregnancy Cat. C***	Give Epinephrine cautiously in geriatric and cardiac patients.
Side Effects:	Increased pulse rate, tremors, nervousness.
Administration:	1. Take a 10 mL syringe and fill with 9 mL 0.9% Sodium Chloride (Normal Saline) and draw up 1 mL of Epinephrine 1:10,000. a. 1:10,000 Epinephrine contains 1 mg of Epinephrine in 10 mL of solvent. 2. Shake well. Mix for 15-20 seconds to ensure that medication is properly mixed. 3. The syringe now contains 10 mL of Epinephrine at 10 mcg/mL (1:100,000). 4. The push pressor dosing is 0.5-2.0 mL (5-20 mcg) every 3-5 minutes.
Supply:	1. Prefilled syringe containing 1 mg in 10 mL
Notes:	Label syringe "EPI 10 mcg/mL with orange drug label. If more than 2 doses of Push Dose Epinephrine are required, an Epinephrine or Norepinephrine drip should be initiated for the appropriate dose range listed.

EPINEPHRINE AUTO-INJECTOR (EPIPEN®, EPIPEN JR. ®) Protocol 6.20

Scope EMR | EMT | AEMT | INT | PM

Drug Names:	**Epinephrine** (EpiPen®, EpiPen Jr.®)
Overview:	Epinephrine auto-injector (EpiPen®, EpiPen Jr.®) is a life-saving self-administered medication that is prescribed by a physician to a specific patient. Epinephrine dilates the bronchioles and constricts blood vessels to treat anaphylactic shock.
Indications:	Patient exhibiting the assessment findings of an allergic reaction (shock and/or respiratory distress).
Contraindications:	No contraindications when used in a life-threatening situation.
Precautions:	Give Epinephrine cautiously in geriatric and cardiac patients.
Side Effects:	Increased pulse rate, tremors, nervousness.
Administration:	1. Assure right medication, right patient, right route, and right dose. 2. Ensure medication is not discolored (liquid may not be visible inside all types of devices). 3. Remove safety cap from the auto-injector. 4. Place tip of auto-injector against the thigh and press firmly until the injector activates. 5. Hold injector firmly against thigh for a *minimum of 10 seconds* to allow for full dose delivery. 6. Record activity and time. 7. Dispose of injector in biohazard container. 8. If patient condition continues to worsen: a. Decreasing mental status, increasing breathing difficulty, decreasing blood pressure. b. Give an additional dose of Epinephrine using a second EpiPen®.
Supply:	1. Adult Auto-Injector (EpiPen®) contains 0.3 mg of Epinephrine 2. Child Auto-Injector (EpiPen Jr.®) contains 0.15 mg of Epinephrine
Notes:	

FENTANYL (Sublimaze®) — Protocol 6.21

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Fentanyl (fen'-ta-nil)**	***DEA Class: Schedule II***
Trade Name:	Sublimaze®, Duragesic®, Fentora®	
Chemical Class:	Opiate derivative	
Therapeutic Class:	Narcotic analgesic	
Actions:	Fentanyl is a powerful synthetic opiate with mechanism of action similar to Morphine. It is considered both faster acting and of shorter duration than Morphine. Interacts with opiate receptors decreasing pain impulse transmission.	
Pharmacokinetics:	*IV:* Onset immediate. Peak effect several minutes. Duration of action 30 to 60 minutes. *IM:* Onset of action 7 – 8 minutes. Duration of action 1 – 2 hours.	
Indication:	Moderate to severe pain.	
Contraindications:	1. Known hypersensitivity 2. Respiratory depression	
Precautions: ***Pregnancy Cat. C***	1. Use with caution with suspected traumatic brain injury. 2. Use with caution in patients with COPD. 3. Use with caution in patients with cardiac bradyarrhythmia's.	
Side Effects:	*CNS:* dizziness *CV:* hypotension, hypertension, bradycardia *EENT:* blurred vision *GI:* nausea, vomiting *RESP:* respiratory depression, apnea, laryngospasm *SKIN:* diaphoresis	
Administration:	*Pain* *Adult/Ped:*	1 mcg/kg up to 100 mcg IM or IV over 1 to 2 minutes. Titrate to effect. Repeat every 5 minutes, if needed, at ½ the initial dose. Do not exceed 3 mcg/kg.
	Pain *>65 years:*	0.5 mcg/kg up to 50 mcg IM or IV over 1 to 2 minutes. Titrate to effect. Repeat every 5 minutes, if needed, at ½ the initial dose. Do not exceed 3 mcg/kg.
	Chest Pain: *Intranasal:*	50 mcg IV, repeat every 5 minutes (up to 100 mcg). 25-50 mcg IN with no more than 1 mL in each nostril in a 15-minute period.
Supply:	100 mcg in 2 mL	
Notes:	If a subsequent dose is given prior to the peak effect of the initial dose, there is a risk of dose stacking and potential overdose.	

FUROSEMIDE (Lasix®) — Protocol 6.22

Scope | EMR | EMT | AEMT | INT | PM

Generic Name:	**Furosemide (fyr-ow-suh-mide)**
Trade Name:	Lasix®
Chemical Class:	Diuretic
Therapeutic Class:	Diuretic
Actions:	Furosemide is a loop diuretic that inhibits the reabsorption of both sodium and chloride in the kidneys. It is extremely useful in the treatment of congestive heart failure and pulmonary edema. The effects of Furosemide are twofold. First, following administration of Furosemide causes venous dilation. This effect usually occurs within 5 minutes and causes a reduction in preload, thus decreasing cardiac work. The second effect of Furosemide is the diuretic effect, which begins 5-15 minutes after administration.
Pharmacokinetics:	Onset 5 to 10 minutes. Peak effects 30 minutes (vasodilation), 20 to 60 minutes (diuresis). Duration 2 hours. $t_{½}$ = 30 minutes.
Indications:	1. Congestive heart failure. 2. Pulmonary edema.
Contraindications:	Usage in pregnancy should be limited to life-threatening situations in which the benefits of Furosemide outweigh the risks.
Precautions: ***Pregnancy Cat. C***	Dehydration, electrolyte depletion, and hypotension can result from excessive doses of potent diuretics. Thus, blood pressure should be frequently monitored when Furosemide is administered. Furosemide should be protected from light.
Side Effects:	*CNS:* dizziness, headache *CV:* hypotension, volume depletion, potassium depletion, arrhythmias *GI:* nausea, vomiting, diarrhea
Administration:	*Adult:* 40 mg IV
Supply:	Vial containing 40 mg in 4 mL.
Notes:	1. Administration of Furosemide (Lasix) rapidly can produce ringing in the patient's ears. 2. The administration of Furosemide (Lasix) 40 mg does not matter what dosage of medication that the patient is prescribed or has already taken.

GLUCAGON (GlucaGen®) — Protocol 6.23

Scope: EMR | EMT | AEMT | INT | PM

Generic Name:	**Glucagon (gloo'ka-gon)**
Trade Name:	GlucaGen®
Chemical Class:	Polypeptide hormone
Therapeutic Class:	Antihypoglycemic
Actions:	Glucagon is a protein secreted by the α cells of the pancreas. When released, it causes the breakdown of glycogen, stored in the liver, to glucose. It also inhibits the synthesis of glycogen from glucose. Both actions tend to cause an increase in circulating blood glucose. A return to consciousness following the administration of glucagon usually takes 5 to 20 minutes. Glucagon is only effective if there are sufficient stores of glycogen in the liver.
Pharmacokinetics:	Onset within 15 minutes. $t_{½}$ = 3 to 6 minutes.
Indications:	When unable to obtain IV access and give Dextrose, *and:* 1. Altered mental status of unknown etiology (GCS less than or equal to 12). 2. Hypoglycemia (less than 60 mg/dL) based on rapid glucose determination or clinical judgment. 3. Status epilepticus. 4. Oral hypoglycemic agent overdose.
Contraindications:	Hypersensitivity to the drug.
Precautions: ***Pregnancy Cat. C***	Glucagon is only effective if there are sufficient stores of glycogen with the liver. In an emergency, intravenous Dextrose is the agent of choice.
Side Effects:	*CNS:* dizziness, headache *CV:* hypotension *GI:* nausea, vomiting
Administration:	*Adult:* 1 mg IM *Pediatric:* 1 mg IM
Supply:	Glucagon must be reconstituted before administration. It is supplied in rubber-stoppered vials containing 1 mg of powder and 1 mL of diluting solution.
Notes:	Glucagon may be given to reverse effects of beta-blocker drug overdoses. A significant dose is needed to be effective, usually 3 to 10 mg IV bolus followed by a 2 to 5 mg/hour infusion).

HALOPERIDOL (Haldol®) — Protocol 6.24

Scope | EMR | EMT | AEMT | INT | PM

Generic Name:	**Haloperidol (ha-loe-per'idole)**
Trade Name:	Haldol®
Chemical Class:	Butyrophenone derivative
Therapeutic Class:	Antipsychotic
Actions:	Haloperidol is a major tranquilizer that has provided effective in the management of acute psychotic episodes. Haloperidol appears to block Dopamine receptors in the brain associated with mood and behavior. Haloperidol has weak anticholinergic properties.
Pharmacokinetics:	*IM:* Peak 10-20 minutes, $t_{½}$ = 17 hours; *IV:* N/A
Indications:	Combative patients secondary to acute psychotic episodes.
Contraindications:	1. Severe toxic central nervous system depression or comatose states from any cause. 2. Hypersensitivity to the drug. 3. Patients suffering from Delirium Tremens (DTs) from long-term alcohol abuse as it reduces seizure threshold. 4. Parkinson's disease. 5. Age less than 8 years. **[Medical Control]**
Precautions: ***Pregnancy Cat. C***	1. Haloperidol may impair mental and physical abilities. Occasionally, orthostatic hypotension may be seen in conjunction with Haloperidol use. Caution should be used when administering Haloperidol to patients on anticoagulants. 2. Extrapyramidal reactions have been known to occur following the administration of Haloperidol, especially in children. Diphenhydramine should be available.
Side Effects:	*CNS:* extrapyramidal symptoms, drowsiness, headache, insomnia, restlessness, seizures, vertigo *CV:* hypertension, hypotension, tachycardia *EENT:* blurred vision *GI:* nausea, vomiting, dry mouth, constipation
Administration:	*Adult:* Give 5 mg IM. Contact **[Medical Control]** for repeat dosing. *Pediatric:* Contact **[Medical Control]**.
Supply:	Ampule containing 5 mg in 1 mL.
Note:	Haloperidol may be mixed with Midazolam for injection.

HYDROXOCOBALAMIN (Cyanokit®) Protocol 6.25

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Hydroxocobalamin (hye-drox-oh-koe-bal'-a-min)**
Trade Name:	Cyanokit®
Chemical Class:	Vitamin B complex
Therapeutic Class:	Hematinic; vitamin
Actions:	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 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. The action of Cyanokit® in the treatment of cyanide poisoning is based on its ability to bind cyanide ions to form Cyanocobalamin, which is then secreted in the urine.
Pharmacokinetics:	*N/A*
Indications:	Known or suspected cyanide poisoning.
Contraindications:	Hypersensitivity to Hydroxocobalamin or Cyanocobalamin
Precautions: ***Pregnancy Cat. C***	1. Allergic reactions may include anaphylaxis, chest tightness, edema, urticaria, pruritus, dyspnea, and rash. 2. Hypertension.
Side Effects:	*CNS:* headache *CV:* increased blood pressure *GI:* transient chromaturia (abnormal coloration of the urine), nausea *SKIN:* erythema, rash, injection site reactions
Administration:	*Adult:* Give 5 g IV infused over 15 minutes. If signs and symptoms persist, a repeat dose can be administered **[Medical Control]**. The infusion rate for second dose is usually between 15 minutes and 2 hours. *Pediatric:* Give 70 mg/kg, up to 5 g IV infused over 15 minutes. If signs and symptoms persist, a repeat dose can be administered **[Medical Control]**. The infusion rate for second dose is usually between 15 minutes and 2 hours.
Supply:	Each 5 g vial needs to be reconstituted with 200 mL of Normal Saline. Total volume prior to administration is 200 mL and contains 5 g of drug.
Notes:	• The drug substance is the hydroxylated active form of Vitamin B12. • Cyanide poisoning may result from inhalation, ingestion, or dermal exposure to various cyanide-containing compounds, including smoke from closed-space fires. The presence and extent of Cyanide poisoning are often initially unknown. There is not widely available, rapid, confirmatory cyanide blood test. Treatment decisions must be made on the basis of clinical history and signs and symptoms of cyanide intoxication. If clinical suspicion of Cyanide poisoning is high, Cyanokit® should be administered without delay. • Incompatible with Diazepam, Dobutamine, Dopamine, Fentanyl, Nitroglycerin, Norepinephrine, Pentobarbital, Propofol, Thiopental, blood products, Sodium Thiosulfate, Sodium Nitrite, and ascorbic acid. Use separate IV lines. • The standard administration drip set that comes with the Cyanokit is 20 drops/mL.

IPRATROPIUM (Atrovent®) — Protocol 6.26

Scope | EMR | EMT | AEMT | INT | PM

Generic Name:	**Ipratropium (eye-pra-troep'ee-um) Bromide**
Trade Name:	Atrovent®
Chemical Class:	Quaternary ammonium compound
Therapeutic Class:	Bronchodilator
Actions:	Ipratropium Bromide is an anticholinergic bronchodilator that is chemically related to Atropine. Ipratropium acts by inhibiting the action of acetylcholine at receptor sites on bronchial smooth muscle, thus inhibiting parasympathetic stimulation and causing bronchodilation. Ipratropium has antisecretory properties when applied locally.
Pharmacokinetics:	Onset 5 to 15 minutes. Peak effect 1 to 2 hours. Duration of action 3 to 6 hours.
Indications:	1. Bronchoconstriction in COPD, including chronic bronchitis and emphysema as an adjunct to Albuterol. 2. Bronchial asthma as an adjunct to Albuterol.
Contraindications:	1. Hypersensitivity to the drug, or to Atropine and its derivatives.
Precautions: ***Pregnancy Cat. B***	Ipratropium should be used with caution in patients with narrow-angle glaucoma, prostatic hypertrophy, or bladder-neck obstruction.
Side Effects:	*CNS:* anxiety, dizziness, headache, nervousness *CV:* palpitations *EENT:* blurred vision, dry mouth *GI:* nausea, vomiting *RESP:* bronchospasm, cough
Administration:	Using a small volume nebulizer, adjust the oxygen flowmeter to 6 to 10 L/minute to produce a steady, visible mist. *Adult:* Give 0.5 mg in 2.5 mL with a mouthpiece or facemask. Do not repeat. *Pediatric:* Give 0.5 mg in 2.5 mL with a mouthpiece or blow-by. Do not repeat.
Supply:	Unit dose vials containing 0.5 mg in 2.5 mL.
Notes:	1. Give only one dose of Ipratropium with the initial Albuterol treatment. Ipratropium is not used as a standalone drug. 2. Ipratropium is not used for anaphylactic respiratory distress.

KETAMINE (Ketalar®) — Protocol 6.27

Scope | EMR | EMT | AEMT | INT | PM

Generic Name:	**Ketamine (ket'-a-meen)**
Trade Name:	Ketalar®
Chemical Class:	Analgesic
Therapeutic Class:	General anesthetic
Actions:	Ketamine attaches to NMDA receptors which disassociates the portion of the brain that controls consciousness from the portion of the brain that controls vital bodily functions. The result is, when given in sufficient doses, anesthesia that provides pain control and amnesia while not causing hypotension or prolonged apnea.
Pharmacokinetics:	*IV:* Onset 30-40 seconds. $t_{½}$ = 5 minutes.
Indications:	Pain augmentation as an adjunct to an opiate analgesic. Patients with a psycho-social condition exhibiting extreme anxiety and/or combative / violent behavior. Sedation.
Contraindications:	1. Hypersensitivity to the drug. 2. Patients less than twelve (12) years of age and/or under 50 kg (Intermediate level only).
Precautions: ***Pregnancy Cat. B***	In patients with cardiac diseases / syndromes, Ketamine might worsen such conditions; NOT indicated as sedation prior to cardioversion or transcutaneous pacing.
Side Effects:	*CNS:* confusion, delirium, vivid dreams *CV:* hypertension, tachycardia *GI:* nausea, vomiting, hypersalivation *RESP:* respiratory depression
Administration	*Adult:* *IV:* ***Pain Augmentation (if pain persists after maximum dose of first line analgesic is given)***: Give 0.4 mg/kg IV over 1-2 minutes or a maximum single dose of 60 mg. May repeat as needed every 10 to 15 minutes to a maximum of three doses. Contact **[Medical Control]** for additional dosing. *Adult:* *IM:* ***Behavioral Emergency***: Give 3 mg/kg IM up to 150 mg in a single loading dose. May repeat every 10 minutes. Monitor quantitative waveform capnography. *Pediatric:* *IV / IM:* For pain control for patients under the age of 12 years and/or under 50 kg, consider give 0.1 mg/kg IM. (Paramedics Only).
Supply:	Vial contains 500 mg in 10 mL.
Notes:	1. Ketamine (in lower doses) is much more effective in relieving pain when given following a dose of an opiate analgesic. It is effective in relieving pain when combined with another opioid. 2. The first line analgesic is Fentanyl. Morphine may be substituted when a Fentanyl contraindication exists or when Fentanyl is not available.

KETOROLAC TROMETHAMINE (Toradol®) — Protocol 6.28

Scope | EMR | EMT | AEMT | INT | PM

Generic Name:	**Ketorolac (ket'-oro-lac) Tromethamine**
Trade Name:	Toradol®
Chemical Class:	Acetic acid
Therapeutic Class:	Nonsteroidal anti-inflammatory agent
Actions:	Ketorolac is a nonsteroidal anti-inflammatory medication. It has analgesic, anti-inflammatory, and antipyretic effects. Unlike narcotics, which act on the central nervous system, Ketorolac is considered a peripherally acting analgesic. Consequently, it does not have the sedative properties of the narcotics. Ketorolac reduces hormones that cause inflammation and pain. More recent studies have demonstrated that low-dose Ketorolac (10 mg) has equivalent analgesic effects to higher doses (30 mg – 60 mg) with less side effects and less potential for renal injury.
Pharmacokinetics:	*IV:* Onset 10-30 minutes. Peak Effects = 2-3 hours. Duration = 3-6 hours.
Indications:	Mild to moderate pain. Especially beneficial for back pain and kidney stones.
Contraindications:	1. Hypersensitivity to the drug. 2. Pregnancy. 3. Allergies to Aspirin or NSAIDs. 4. History of stroke. 5. Indications of internal or external bleeding.
Relative Contraindications:	6. Currently on blood thinners or anti-coagulants. 7. Liver or kidney disease. 8. Ulcers or hemophilia. 9. Breast feeding. 10. Do not administer to patients under the age of 17 years.
Precautions: ***Pregnancy Cat. C***	Gastrointestinal irritation and hemorrhage can result from therapy with NSAIDs. Long-term usage increases the incidence of serious gastrointestinal side effects. Do not use in female patients who are pregnant.
Side Effects:	*CNS:* drowsiness, dizziness, blurred vision *CV:* edema, hypertension *GI:* nausea, vomiting, heartburn, constipation, diarrhea *Other:*
Administration	*Adult:* *IV:* Give 15 mg over 15 seconds. *IM:* Give 15 mg.
Supply:	Vial contains 30 mg in 1 mL.
Notes:	

LIDOCAINE (Xylocaine®) — Protocol 6.29

Scope | EMR | EMT | AEMT | INT | PM

Generic Name:	**Lidocaine (lye'doe-kane) Hydrochloride 1% or 2%**
Trade Name:	Xylocaine®
Chemical Class:	Amide derivative
Therapeutic Class:	Antiarrhythmic and Anesthetic, local
Actions:	Lidocaine depresses depolarization and automaticity in the ventricles. It has very little effect on atrial tissues. In therapeutic doses, it does not slow AV conduction and does not depress myocardial contractility. Lidocaine stabilizes the neuronal membrane by inhibiting the ionic fluxes required for the initiation and conduction of nerve impulses, thereby effecting local anesthetic action.
Pharmacokinetics:	Onset of antiarrhythmic: < 3 minutes. Peak Effects = 5-7 minutes. Duration = 10-20 minutes. Onset of anesthesia: 15-30 seconds. Duration 30-60 minutes.
Indication:	Adult and pediatric ventricular fibrillation and pulseless ventricular tachycardia. Adult patient with ventricular tachycardia with a pulse. Pain associated with infusing fluid under pressure via the EZ-IO system.
Contraindications:	1. Hypersensitivity to the drug. 2. Second- or third-degree heart block. 3. Stokes-Adams syndrome. 4. Wolff-Parkinson-White syndrome. 5. Severe degrees of sinoatrial, atrioventricular, or intraventricular block in the absence of an artificial pacemaker.
Precautions: ***Pregnancy Cat. B***	Use cautiously in patients with severe liver or kidney disease, hypovolemia, severe congestive heart failure, and shock. Routine prophylactic Lidocaine therapy in patients with acute myocardial infarction is no longer recommended.
Side Effects:	*CNS:* seizures, tremors, twitching, dizziness, drowsiness, unconsciousness *CV:* bradycardia, edema, heart block, hypotension *EENT:* blurred or diplopia, tinnitus *Other:* respiratory depression, nausea, vomiting
Administration	*Adult:* Antiarrhythmic 1st Dose: 1 – 1.5 mg/kg IV/IO. 2nd Dose: 0.5 – 0.75 mg/kg IV / IO. *Pediatric:* Antiarrhythmic 1st Dose: 1 mg/kg IV / IO. 2nd Dose: 0.5 mg/kg IV / IO. *Adult:* Anesthetic slowly administer 40 mg IO over 120 seconds. Allow Lidocaine to dwell in IO space for 60 seconds. Flush with 10 mL Normal Saline. Slowly administer an additional dose of 20 mg. Consider systemic pain control for patients not responding to IO Lidocaine. *Pediatric:* Anesthetic slowly administer 0.5 mg/kg IO over 120 seconds. Allow Lidocaine to dwell in IO space for 60 seconds. Flush with 10 mL Normal Saline. Slowly administer half the initial dose. Consider systemic pain control for patients not responding to IO Lidocaine.
Supply:	Prefilled syringe containing 100 mg in 5 mL.

MAGNESIUM SULFATE — Protocol 6.30

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Magnesium Sulfate (mag-nee'see-um sul'fate)**
Trade Name:	Magnesium Sulfate Inj. 50%
Chemical Class:	Divalent cation
Therapeutic Class:	Antiarrhythmic, electrolyte
Actions:	Magnesium Sulfate is a salt that dissociates into the Magnesium cation (Mg^{2+}) and the Sulfate anion when administered. Magnesium is an essential element in many of the biochemical processes that occur in the body. It acts as a physiological calcium channel blocker and blocks neuromuscular transmission by decreasing acetylcholine release at the neuromuscular junction. Magnesium slows the rate of SA node impulse formation and prolongs conduction time.
Pharmacokinetics:	Onset immediate. Duration 30 minutes.
Indications:	1. Torsades de pointes. 2. Eclampsia. 3. Tricyclic antidepressant toxicity. 4. Status asthmaticus non-responsive to standard medications.
Contraindications:	Third-degree AV block.
Precautions: ***Pregnancy Cat. B***	1. If reflexes disappear in the eclamptic patient, do not repeat the dose. 2. Magnesium Sulfate should be administered slowly to minimize side effects. 3. Any patient receiving intravenous Magnesium Sulfate should have continuous cardiac monitoring and frequent monitoring of vital signs. 4. Magnesium Sulfate should be given very cautiously in the presence of serious impairment of renal function since it is excreted almost entirely by the kidneys.
Side Effects:	*CNS:* coma, depressed reflexes, lethargy, weakness *CV:* heart block, hypotension, bradycardia *RESP:* respiratory depression *SKIN:* flushing, sweating
Interactions:	Magnesium Sulfate can cause cardiac conduction abnormalities if administered in conjunction with Digitalis.
Administration:	Prior to administration, Magnesium Sulfate should be diluted to make a 20% solution. For a 2 g dose, mix 2 g (4 mL) of Magnesium Sulfate with 100 mL of Normal Saline to make a 20% solution. *Adult:* **Pulseless:** Give 2 g (20% solution) IV over 1 to 2 minutes. **With Pulse:** Give 2 g (20% solution) IV over 5 minutes. Repeat dose if needed. **Seizure (Eclampsia):** 4 g (20% solution) IV over 5 minutes. Repeat dose (if available) in 5 minutes if seizure persists **[Medical Control]**. *Pediatric:* **Pulseless:** Give 25 mg/kg up to 2 g IV / IO, for torsades de pointes.
Supply:	Vial containing 1 g in 2 mL.
Notes:	

METERED DOSE INHALER — Protocol 6.31

Scope	EMR	EMT	AEMT	INT	PM

Drug Names:	1. **Albuterol** (Proventil®, Ventolin®) 2. **Metaproterenol** (Metaprel®, Alupent®) 3. **Isoetharine** (Bronchosol®, Bronkometer®)
Overview:	Bronchodilators are drugs that dilate, or enlarge the air passages, making breathing easier. Bronchodilators begin to work immediately and last for hours. The device administers a specific measured (metered) dose of medication. A spacer can be utilized to help administer the medication.
Indications:	1. Shortness of breath and/or signs and symptoms of difficulty breathing, *and* 2. Patient has the medication, and the medication is prescribed for the patient.
Contraindications:	1. Patient is unable to use the device (i.e., unresponsive). 2. Patient has taken the maximum number of prescribed doses prior to the arrival of EMS. 3. Peanut and/or soy product allergies.
Side Effects:	Increased pulse rate, tremors, nervousness
Administration:	1. Assure right medication, right patient, right route, and patient is alert enough to use inhaler. 2. Check expiration date of the inhaler. 3. Check to see if the patient has already taken any doses. 4. Assure the inhaler is at room temperature or warmer. 5. Shake the inhaler vigorously several times. 6. Remove oxygen adjunct from patient. 7. Have the patient exhale deeply. 8. Have the patient put lips around the opening of the inhaler. 9. Have the patient depress the handheld inhaler as he begins to inhale deeply. 10. Instruct the patient to breathe a few times and repeat second dose per medical direction. 11. If patient has a spacer device for use with his inhaler, it should be used. A spacer device is an attachment between the inhaler and patient that allows for more effective use of medication. 12. Record activity and time.
Supply:	Varies by medication.

METHYLPREDNISOLONE (Solu-Medrol®) — Protocol 6.32

Scope | EMR | EMT | AEMT | INT | PM

Generic Name:	**Methylprednisolone (meth-il-pred-niss'oh-lone)**
Trade Name:	Solu-Medrol®
Chemical Class:	Glucocorticoid, synthetic
Therapeutic Class:	Corticosteroid, systemic
Actions:	Methylprednisolone is an intermediate-acting corticosteroid related to the natural hormones secreted by the adrenal cortex. Methylprednisolone enters target cells and causes many complex reactions that are responsible for its anti-inflammatory and immunosuppressive effects.
Pharmacokinetics:	Peak 2 hours. $t_{½}$ = 3 hours.
Indications:	1. Anaphylaxis. 2. Respiratory distress from asthma or COPD. 3. Respiratory distress due to croup.
Contraindications:	Hypersensitivity to the drug.
Precautions: ***Pregnancy Cat. C***	A single dose of Methylprednisolone is all that should be given in the pre-hospital phase of care. Long-term steroid therapy can cause gastrointestinal bleeding and prolonged wound healing.
Side Effects:	*CNS:* seizures, vertigo *CV:* CHF, hypertension, tachycardia *GI:* abdominal distension, diarrhea, GI hemorrhage, increased appetite, nausea
Interactions:	N/A
Administration:	*Adult:* 2 mg/kg up to 125 mg IV over 1 to 2 minutes or IM. *Pediatric:* 2 mg/kg up to 125 mg IV over 1 to 2 minutes or IM.
Supply:	Methylprednisolone must be reconstituted before administration. It is supplied in an Act-O-Vial® containing 125 mg of powder and 2 mL of diluting solution.
Notes:	To use the Act-O-Vial®: 1. Press down on plastic activator to force diluent into the lower compartment. 2. Gently agitate to effect solution. 3. Remove plastic tab covering the center stopper 4. Withdraw dose as with a normal vial.

METOPROLOL (Lopressor®) (Alternate) — Protocol 6.33

Scope: EMR | EMT | AEMT | INT | PM

Generic Name:	**Metoprolol (me-toe'pro-lole)**
Trade Name:	Lopressor®, Toprol XL®
Chemical Class:	β_1-adrenergic blocker, cardio selective
Therapeutic Class:	Antianginal, antihypertensive
Actions:	Metoprolol is a β-antagonist that blocks both β_1- and β_2-adrenergic receptors but is selective for β_1-adrenergic receptors. Metoprolol produces negative inotropic and chronotropic responses, slows AV nodal conduction, and has antiarrhythmic effects. Metoprolol causes reduction in heart rate, systolic blood pressure, and cardiac output. Because of these effects, Metoprolol is thought to be protective of the heart and is used to reduce potential complications in selected patients who have suffered an acute myocardial infarction. Metoprolol has proved effective in reducing the incidence of ventricular fibrillation and chest pain in these patients.
Pharmacokinetics:	Peak 20 minutes. Duration 5 to 8 hours. $t_{½}$ = 3 to 4 hours.
Indications:	1. Irregular narrow-complex tachycardia [probable atrial fibrillation or possible atrial flutter or MAT (multifocal atrial tachycardia)]. 2. Regular narrow-complex tachycardia that does not covert following administration of Adenosine. 3. Acute myocardial infarction with hypertension. 4. Stable wide-complex tachycardia **[Medical Control]**.
Contraindications:	1. Bradycardia (HR less than 60). 2. Hypotension (SBP less than 90 mm Hg). 3. Bronchial asthma. 4. Cardiogenic shock, congestive heart failure. 5. Second- or third-degree AV block.
Precautions: ***Pregnancy Cat. C***	The blood pressure, pulse rate, ECG, and respiratory status should be continuously monitored during Metoprolol therapy. Be alert for signs and symptoms of congestive heart failure, bradycardia, shock, heart block, and bronchospasm. The presence of any of these signs or symptoms is an indication for discontinuing the medication.
Side Effects:	*CNS:* dizziness, lethargy *CV:* bradycardia, CHF, cold extremities, heart block, hypotension *RESP:* bronchospasm (1%), dyspnea
Interactions:	Administer with caution to patients taking antihypertensive agents or calcium channel blockers.
Administration:	*Adult:* Give 5 mg IV over 2 minutes. Repeat every 5 minutes if needed to a total dose of 15 mg. *Pediatric:* Not indicated.
Supply:	Ampule containing 5 mg in 5 mL.
Notes:	Stop administration of Metoprolol (Lopressor) when the QRS widens greater than 50%, ventricular rate less than 120, or the patient becomes hypotensive. Drug is not routinely stocked in LFEMSC drug bags and/or drug boxes. This drug may be used during drug shortages as an alternate for Diltiazem (Cardizem®).

MIDAZOLAM (Versed®) — Protocol 6.34

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Midazolam (mid-az'zoe-lam)** — ***DEA Class: Schedule IV***
Trade Name:	Versed®
Chemical Class:	Benzodiazepine
Therapeutic Class:	Sedative / hypnotic
Actions:	Midazolam causes central nervous systems depression via facilitation of inhibitory GABA[1] at benzodiazepine receptor sites (BZ_1 – associated with sleep; BZ_2 – associated with memory, motor, sensory, and cognitive function). Midazolam is a short-acting benzodiazepine that is three to four times more potent than Diazepam. Midazolam has important amnestic properties.
Pharmacokinetics:	*IM:* Onset 15 minutes. Peak 30 to 60 minutes. *IV:* Onset 3 to 5 minutes. $t_{½}$ = 1.2 to 12.3 hours.
Indications:	1. Sedation for cardioversion and transcutaneous pacing. 2. Sedation for endotracheal intubation only after the ET tube is inserted. 3. Seizures not caused by hypoglycemia, *secondary to Diazepam*.[2] 4. Severe agitation, tachycardia, or hallucinations caused by alcohol withdrawal, *secondary to Diazepam*.[2]. 5. Behavioral or alcohol related agitation as an adjunct to Haloperidol. 6. Sedation for shivering secondary to induced hypothermia.
Contraindications:	1. Hypersensitivity to the drug. 2. Hypotension (SBP less than 90 mm Hg). 3. Acute angle closure glaucoma.
Precautions: ***Pregnancy Cat. D***	Administer cautiously when alcohol intoxication is suspected. Emergency resuscitative equipment must be available prior to the administration of Midazolam. Vital signs must be continuously monitored during and after drug administration. Midazolam has more potential than the other benzodiazepines to cause respiratory depression and respiratory arrest.
Side Effects:	*CNS:* drowsiness, amnesia, altered mental status *CV:* hypotension, tachycardia, PVCs *RESP:* bronchospasm, coughing, laryngospasm, respiratory depression, and arrest
Interactions:	The effects of Midazolam can be accentuated by CNS depressants such as narcotics and alcohol.
Administration:	*Adult:* Give 2.5 to 5 mg slow IV titrated to effect, based on protocol. May repeat dose every 5 minutes if needed. Midazolam may also be administered 5 mg IM if unable to readily establish IV access. *Pediatric:* Give 0.1 mg/kg slow IV, titrated to effect. May repeat every 5 minutes as needed **[Medical Control]**. Midazolam may also be administered 0.1 mg/kg IM if unable to readily establish IV access **[Medical Control]**. *Intranasal:* 1 mg/1 mL IN in each nostril.
Supply:	Vial containing 5 mg in 5 mL.
Notes:	1. GABA – Gammaaminobutyric Acid, the chief inhibitory neurotransmitter in the CNS. GABA hyperpolarizes the membrane of the CNS neurons decreasing their response to stimuli. 2. **[Medical Control]** must authorize administration of Midazolam for sedation secondary to Diazepam.

MORPHINE (Alternate) — Protocol 6.35

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Morphine (mor'feen) Sulfate** — ***DEA Class: Schedule II***
Trade Name:	Astramorph®, Duramorph®, MS Contin®, Roxanol®
Chemical Class:	Natural opium alkaloid, phenanthrene derivative
Therapeutic Class:	Narcotic analgesic
Actions:	Morphine is a central nervous system depressant that acts on opiate receptors in the brain, providing both analgesia and sedation. It increases peripheral venous capacitance and decreases venous return. Morphine also reduces myocardial oxygen demand due to both the decreased systemic vascular resistance and the sedative effects of the drug.
Pharmacokinetics:	*IM:* Onset 10 to 30 minutes. Peak analgesia 30 to 60 minutes. Duration 4.5 hours. *IV:* Peak analgesia 20 minutes. $t_{½}$ = 2.5 to 3 hours.
Indications:	All indications are for pain refractory to FENTANYL administration or when FENTANYL is contraindicated (i.e., allergy). 1. Pain associated with acute myocardial infarction unresponsive to nitrates. 2. Acute pain, such as isolated extremity trauma. 3. Pain from burns (not involving respiratory tract). 4. Pulmonary edema **[Medical Control]**. 5. Acute abdominal pain **[Medical Control]**.
Contraindications:	1. Hypotension (SBP less than 90 mm Hg adult, SBP less than 80 mm Hg child). 2. Respiratory depression. 3. Hypersensitivity to the drug. 4. Multi-system trauma. 5. Head injury. 6. Altered mental status from any cause.
Precautions: ***Pregnancy Cat. B***	Morphine causes severe respiratory distress in high doses, especially in patients who already have some form of respiratory impairment. Naloxone should be readily available whenever morphine is administered.
Side Effects:	*CNS:* dizziness, drowsiness, headache, sedation *CV:* hypotension *EENT:* blurred vision, constricted pupils, diplopia *GI:* abdominal cramps, constipation, nausea, vomiting *RESP:* respiratory depression
Interactions:	The CNS depression associated with Morphine can be enhanced when administered with antihistamines, antiemetics, sedatives, hypnotics, barbiturates, and alcohol.
Administration:	*Adult:* ***Pain with AMI:*** Give 5 mg IV at 1mg/minute, titrated to effect. If additional dosing is needed, contact **[Medical Control]**. ***Other acute pain:*** 0.1 mg/kg IV at 1 mg/minute, not to exceed 20 mg, titrated to effect. Or, 0.1 mg/kg IM, not to exceed 10 mg (1.0 mL); repeat IM dose in 10 minutes if necessary. ***Pulmonary edema:*** Contact **[Medical Control]**. *Pediatric:* Give 0.1 mg/kg IV / IM at 1 mg/minute, not to exceed 10 mg, titrated to effect. If additional dosing is needed, contact **[Medical Control]**.
Supply:	Vial containing 10 mg in 1 mL.
Notes:	Discontinue the IV injection if the pain is relieved or a contraindication develops. Drug is not routinely stocked in LFEMSC drug bags and/or drug boxes. This drug may be used during drug shortages as an alternate for Fentanyl (Sublimaze®).

NALOXONE (Narcan®) — Protocol 6.36

Scope: EMR | EMT | AEMT | INT | PM

Generic Name:	**Naloxone (nal-oks'one)**
Trade Name:	Narcan®
Chemical Class:	Thebaine derivative
Therapeutic Class:	Antidote, opiate
Actions:	Naloxone is chemically similar to the narcotics. However, it has only antagonistic properties. Naloxone competes for opiate receptors in the brain. It also displaces narcotic molecules from opiate receptors. It can reverse respiratory depression associated with narcotic overdose.
Pharmacokinetics:	*IV:* Onset 2 minutes. $t_{½}$ = 64 minutes.
Indications:	1. Respiratory depression caused by narcotics. 2. Coma unknown etiology.
Contraindications:	Hypersensitivity to the drug.
Precautions: ***Pregnancy Cat. B***	Naloxone should be administered cautiously to patients who are known or suspected to be physically dependent on narcotics. Abrupt and complete reversal by Naloxone can cause withdrawal-type effects (this includes newborns of mothers with known or suspected narcotic dependence).
Side Effects:	*CNS:* seizures, tremulousness *CV:* hypertension, hypotension, tachycardia, ventricular dysrhythmia *GI:* nausea, vomiting
Interactions:	Naloxone may cause narcotic withdrawal in the narcotic-dependent patient. In cases of suspected narcotic dependence, only enough drug to reverse respiratory depression should be administered.
Administration:	*Adult:* *IV:* Give 0.1 mg/kg IV until respiratory effort improves or agitation occurs. *IM:* Give two 0.8 mg injections for a total of 2 mL in each deltoid muscle. *IN:* Give 0.4 mg IN (1 mL in each nostril) up to a total of 2 mg. If no response to multiple doses of Naloxone, contact **[Medical Control]**. *Pediatric:* *IV:* Give 0.1 mg/kg IV until respiratory effort improves or agitation occurs. *IM:* Give two 0.8 mg injections for a total of 2 mL in each deltoid muscle. If no response to multiple doses of Naloxone, contact **[Medical Control]**.
Supply:	Vial containing 4 mg in 10 mL and Single Dose Vial containing 0.4 mg in 1 mL.
Notes:	1. Unless necessary, avoid insertion of an advanced airway prior to administration of Naloxone. 2. Administer Naloxone by a slow IV push (0.4 mg/minute). 3. Reversal of the effects of narcotics may be only temporary. Titrate administration of Naloxone to respiratory rate. 4. Common narcotic agents include Codeine, Darvon®, Demerol®, Dilaudid®, Fentanyl, Heroin, Methadone, Morphine, Nubain®, Paregoric, Percodan®, Stadol® and Talwin®.

NITROGLYCERIN (Nitrostat®) — Protocol 6.37

Scope | EMR | EMT | AEMT | INT | PM

Generic Name:	**Nitroglycerin (nye-troe-gli'ser-in)**
Trade Name:	Nitrolingual®, Nitroquick®, Nitrostat®, Nitr-bid®, Nitrol®
Chemical Class:	Nitrate, organic
Therapeutic Class:	Antianginal, vasodilator
Actions:	Nitroglycerin is a rapid smooth muscle relaxant that causes vasodilation and, to a lesser degree, dilates the coronary arteries. This results in increased coronary blood flow and improved perfusion of the ischemic myocardium. Relief of ischemia causes reduction and alleviation of chest pain. Vasodilation decreases preload and leads to decreased cardiac work that can help reverse the effects of angina pectoris. Additionally, decreased preload results in decreased pulmonary capillary hydrostatic pressure and reduction of fluid passing into the pulmonary interstitium and alveoli in cardiogenic pulmonary edema.
Pharmacokinetics:	*SL:* Onest 1 to 3 minutes. Peak 5 minutes. Duration at least 25 minutes. $t_{½}$ = 2 to 3 minutes. *TOP:* Onset 15 to 60 minutes. Peak 30 to 120 minutes. Duration 2 to 12 hours.
Indications:	1. Chest pain suspected to be cardiac in origin. 2. Cardiogenic pulmonary edema.
Contraindications:	1. Hypotension (SBP less than 90 mm Hg). 2. Bradycardia (HR less than 60). 3. Increased intracranial pressure (i.e., CVA, head injury). 4. Hypersensitivity to the drug. 5. Patients who are using anti-impotence agents (Cialis®, Levitra®, Viagra®).
Precautions: ***Pregnancy Cat. C***	1. Administer nitrates with extreme caution if at all to patients with suspected inferior wall MI with possible right ventricular (RV) involvement because these patients require adequate RV preload. 2. Patients taking the drug routinely may develop a tolerance and require an increased dose. 3. Postural syncope sometimes occurs following the administration of Nitroglycerin; it should be anticipated, and the patient kept supine when possible. 4. Careful clinical or hemodynamic monitoring must be used because of the possibility of hypotension and tachycardia.
Side Effects:	*CNS:* dizziness, headache, weakness *CV:* dysrhythmias, palpitations, postural hypotension, tachycardia *GI:* nausea, vomiting *SKIN:* diaphoresis, flushing, pallor, rash
Interactions:	1. Severe hypotension is possible when administered to patients who have recently ingested alcohol. 2. Orthostatic hypotension is possible when used in conjunction with β-adrenergic antagonists. 3. Administration of Nitroglycerin is contraindicated in patients who are using anti-impotence agents such as Sildenafil (Viagra®) since these agents have been shown to potentiate the hypotensive effects of organic nitrates.

CONTINUED ON NEXT PAGE

Administration:		
Sublingual	*Adult:*	**Chest Pain:** Give 0.4 mg SL. Repeat every 5 minutes, if needed, up to 3 doses. **Pulmonary Edema (SBP 90 mm Hg or higher):** Give 1 tablet, 0.4 mg SL. Repeat 1 tablet every 5 minutes if needed.
	Pediatric:	Not indicated.
	Notes:	1. Alternate the sublingual site (right to left side of tongue) when repeating Nitroglycerin tablets. 2. Nitroglycerin may produce a burning or tingling sensation when administered sublingually; however, the ability to produce a burning or tingling sensation should not be considered a reliable method for determining the potency of the tablets.
Topical	*Adult:*	**Chest Pain:** If pain persists following administration of Nitroglycerin SL, apply 1 inch of Nitroglycerin Paste topically. **Pulmonary Edema (SBP 90 mm Hg or higher):** Apply 1 inch of Nitroglycerin Paste topically.
	Pediatric:	Not indicated.
	Notes:	1. Apply Nitroglycerin Paste to the chest or upper arm. 2. Do not rub the paste into the skin. 3. If contraindications develop when Nitroglycerin Paste is applied, remove the paste. 4. Wear gloves for application and/or removal of Nitroglycerin Paste.
Supply:	*Tablet:* Bottle containing 0.4 mg (1/150 grain) tablets. *Paste:* Packets containing 1 g (1 inch) or tubes containing 30 to 60 grams.	
Notes:	Nitroglycerin should be kept in the original glass container, tightly capped.	

NITROGLYCERIN, ASSISTED (Nitrostat®) — Protocol 6.38

Scope	EMR	EMT	AEMT	INT	PM

Drug Names:	**Nitroglycerin** (Nitrolingual®, Nitroquick®, Nitrostat®)
Overview:	Nitroglycerin (nitro) is a potent vasodilator which helps to dilate the coronary arteries that supply the heart with blood. Nitroglycerin relieves the chest pain associated with angina. Patients that are prescribed nitroglycerin are instructed to take the medication when they experience chest pain and may have taken it before EMS arrives on scene. Assisting a patient with nitroglycerin may help to reduce myocardial damage. Absorption rate is 1 to 2 minutes with a duration of 30 minutes.
Indications:	1. Patient complains of chest pain, *and* 2. Patient has a history of cardiac problems, *and* 3. Patient's physician has prescribed Nitroglycerin, *and* 4. Patient has the medication, and the medication is prescribed for the patient.
Contraindications:	1. Hypotension (SBP less than 90 mm Hg). 2. Bradycardia (HR less than 60). 3. Increased intracranial pressure (i.e., CVA, head injury). 4. Hypersensitivity to the drug. 5. Patients who are using anti-impotence agents (Cialis®, Levitra®, Viagra®). 6. Infants and children. 7. Patient has already met maximum prescribed dose prior to EMS arrival.
Side Effects:	1. Hypotension. 2. Headache. 3. Pulse rate changes.
Administration:	1. Assure right medication, right patient, right route, and patient is alert. 2. Check expiration date of Nitroglycerin. 3. Question patient on last dose administration, effects, and assure understanding of route of administration. 4. Ensure patient has not taken any anti-impotence agents (i.e., Viagra) within the past 24 hours. 5. Ask patient to lift tongue and place the tablet under the tongue (while wearing gloves) or have patient place tablet under the tongue. 6. Have patient keep mouth closed with the tablet under the tongue (without swallowing) until dissolved and absorbed. 7. Recheck blood pressure within 2 minutes. 8. Record activity and time.
Supply:	Bottle containing 0.4 mg (1/150 grain) tablets

NOREPINEPHRINE (Levophed®) — Protocol 6.39

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Norepinephrine (naw-reh-puh-neh-fruhn)**
Trade Name:	Levophed®
Chemical Class:	Sympathomimetic amine (Catecholamine)
Therapeutic Class:	Vasopressor. Acts on both α- and β-adrenergic receptors
Actions:	Because of its action on α-adrenergic receptors, Norepinephrine is a potent peripheral vasoconstrictor. This vasoconstriction serves to increase blood pressure in cardiogenic shock and other hypotensive emergencies. Because of its action on β-adrenergic receptors results in inotropic stimulation and coronary artery vasodilation activity.
Pharmacokinetics:	Onset immediate. Peak effects 1 minute. Duration 1-2 minutes. $t_{½}$ = 3 minutes.
Indications:	1. First line vasopressor in hypotension secondary to **SEPTIC SHOCK**. 2. First line vasopressor in hypotension secondary to **CARDIOGENIC SHOCK**. 3. Hypotension when an Epinephrine Infusion is not available or the best choice.
Contraindications:	1. Hypotension due to blood volume deficit.
Precautions: ***Pregnancy Cat. C***	1. Because of the powerful effects of Norepinephrine, it is essential to measure the blood pressure every 5-10 minutes to prevent dangerously high blood pressures. 2. Fluid replacement should be initiated prior to administration of Norepinephrine. 3. Norepinephrine should be given through the largest vein readily available because it may cause local tissue necrosis if it extravasates. 4. Norepinephrine can increase myocardial oxygen demand. 5. Should be used with caution in persons with cardiac ischemia. 6. Norepinephrine typically induces renal and mesenteric vasoconstriction. 7. In septic patients, Norepinephrine improves renal blood flow and urine output.
Side Effects:	*CNS:* anxiety, headache, dizziness, nervousness, tremulousness, *CV:* bradycardia response to increased vasoconstriction *GI:* nausea, vomiting, urinary retention
Administration:	IV infusion at 0.1 to 0.5 mcg/kg/minute (maximum of 16 mcg/minute). Titrate to SBP = 90 mm Hg. Because of its potency, Norepinephrine is given only in extremely diluted IV infusions. It should be piggybacked into an already established IV line.
Supply:	Vial containing 4 mg in 4 mL.
Notes:	1. Mix 4 mg into 250 mL of D_5W to make a concentration of 16 mcg/mL 2. Ensure patent and free-flowing proximal vascular access. 3. Administer starting at 5 mcg/minute. Titrate to minimum necessary to maintain a systolic blood pressure of 90 mmHg (Mean Arterial Pressure of 65 mmHg) to a maximum of 16 mcg/minute. 4. Monitor IV access and blood pressure to ensure a positive clinical effect. 5. Infusion rate should start at 5 mcg/minute IV/IO. If no response, increase every 5 minutes at either 2 mcg/minute or 4 mcg/minute. The goal is to achieve the systolic blood pressure listed above. 6. Infusion rates can exceed 16 mcg/minute in healthcare settings for critically ill and/or injured patients.

NOREPINEPHRINE INFUSION REFERENCE	
5-15 mcg/minute dose	
Mix 4 mg of Norepinephrine into a 250 mL bag of D_5W. **16 mcg/mL concentration** *Use a 60-drop administration set*	
mcg/minute	**drops/minute**
5	19
6	23
7	27
8	30
9	34
10	38
11	42
12	45
13	49
14	53
15	57
16	60

ONDANSETRON (Zofran®) — Protocol 6.40

Scope | EMR | EMT | AEMT | INT | PM

Generic Name:	**Ondansetron (on-dan-she'tron)**
Trade Name:	Zofran®
Chemical Class:	Carbazole derivative
Therapeutic Class:	Antiemetic
Actions:	Ondansetron is a selective 5-HT_3 antagonist which is an effective anti-nausea and anti-emetic medication with minimal reported significant side effects. Nausea and vomiting are strongly associated with serotonin receptors of the 5-HT_3 type, present both peripherally on vagal nerve terminals and centrally in the chemoreceptor trigger zone of the area postrema.
Pharmacokinetics:	*IV:* Peak immediate. *IM:* N/A
Indications:	1. Severe vomiting or nausea. 2. Vertigo.
Contraindications:	1. Hypersensitivity to the drug. 2. Pregnancy (all trimesters).
Precautions: ***Pregnancy Cat. B***	Rarely, transient ECG changes including QT interval prolongation have been reported.
Side Effects:	*CNS:* headache, lightheadedness, seizures *CV:* angina, bradycardia, syncope, tachycardia *EENT:* blurred vision *GI:* constipation, diarrhea *RESP:* bronchospasm *SKIN:* rash
Interactions:	N/A
Administration:	*IV:* Give 4 mg over 2 to 5 minutes. May repeat once in 10 minutes if needed. *IM:* Give 4 mg IM. Do not repeat. *ODT/SL:* Give 4 mg. Place tablet on patient's tongue. The tablet dissolves quickly and can be swallowed with saliva. May repeat once in 10 minutes if needed.
Supply:	Vial containing 4 mg in 2 mL
Notes:	EMTs are only allowed to administer Ondansetron (Zofran®) through the sublingual (SL) or post oral (PO) routes.

ORAL GLUCOSE (Insta-Glucose®) Protocol 6.41

Scope	EMR	EMT	AEMT	INT	PM

Drug Names:	**Dextrose** (Glutose®, Insta-Glucose®)
Overview:	Oral glucose is used to treat patients with a history of diabetes exhibiting an altered mental status and the ability to swallow. Oral glucose is a form of glucose that can reverse a diabetic's hypoglycemic condition. Time of administration can make a critical difference. The preparation comes in a tube.
Indications:	Patient with altered mental status and a known history of diabetes controlled by medication.
Contraindications:	1. Unresponsive. 2. Unable to swallow.
Side Effects:	None when given properly. May be aspirated by the patient without a gag reflex.
Administration:	1. Assure signs and symptoms of altered mental status with a known history of diabetes. 2. Assure patient is conscious and can swallow and protect the airway. 3. Administer glucose: a. Between cheek and gum. b. Place on tongue depressor between cheek and gum.
Supply:	Tube contains – varies per manufacturer (Examples: 10 g, 12.5 g, 15 g, 25 g, 30 g, or 60 g).

OXYGEN — Protocol 6.42

Scope	EMR	EMT	AEMT	INT	PM

Chemical Class:	**Molecular Oxygen** (O_2)
Actions:	Oxygen attaches to hemoglobin molecules in the blood to be transported throughout the body to be utilized in aerobic cellular respiration.
Indications:	1. Difficulty breathing. 2. Signs of shock. 3. Clinical signs and symptoms of hypoxia. 4. Carbon Monoxide or other toxic gas exposure. 5. Patients who have experienced significant blood loss. 6. Patients experiencing an increased state of Oxygen consumption (i.e., pregnant patients in medical distress, pediatric patients in medical distress, etc.).
Contraindications:	None when used as indicated.
Precautions: ***Pregnancy Cat. B***	1. When administering Oxygen to patients with a cardiac complaint or a stroke, titrate flow to the minimum necessary to achieve an SpO_2 between 94% and 99%, using an appropriate delivery method for patient presentation. 2. Be cautious when administering Oxygen via non-rebreather mask (NRB). Patients in respiratory distress can have minute volumes well in excess of 15 liters per minute; NRB masks can restrict air flow causing increased respiratory distress in patients.
Side Effects:	*CNS:* dizziness, headache *SKIN:* skin irritation (from the Oxygen delivery device), drying out of mucous membranes.
Administration:	Variable flow rate in liters per minute (LPM) depending on Oxygen delivery device.
Notes:	1. Administering Oxygen to patients with COPD does **not** pose a risk of causing the patient's "hypoxic drive" to decrease respiratory drive. 2. Administering Oxygen with humidification is preferred, especially when administering over long periods of time (all levels except for EMR).

PROMETHAZINE (PHENERGAN®) (Alternate) — Protocol 6.43

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Promethazine (proe-meth'a-zeen)**
Trade Name:	Phenergan®
Chemical Class:	Ethylamine Phenothiazine derivative
Therapeutic Class:	Antiemetic; antihistamine; antitussive; antivertigo agent; sedative
Actions:	Promethazine possesses sedative, antihistamine, antiemetic, anti-motion sickness, and anticholinergic properties. As an antihistamine, it acts by competitive antagonism but does not block the release of histamine. It antagonizes in varying degrees most but not all the pharmacological effects of histamine.
Pharmacokinetics:	Onset 5 minutes (IV), 20 minutes (IM). Peak effects are variable. Duration 4 to 6 hours. Half-Life 10 to 14 hours.
Indications:	1. Nausea and severe vomiting. 2. Vertigo (motion sickness). 3. To potentiate the effects of analgesics.
Contraindications:	1. Children less than 2 years of age. 2. Altered mental status 3. Hypersensitivity or prior reaction to the drug.
Precautions: ***Pregnancy Cat. C***	Lactating mothers, glaucoma, elderly patients, and chronically ill persons of any age. Promethazine may impair mental and physical abilities. Care must be taken to avoid accidental intra-arterial injection, as gangrene can result. It should never be administered subcutaneously (SQ). Extrapyramidal Symptoms (EPS) have been reported following Promethazine use. Diphenhydramine (Benadryl) should be available.
Side Effects:	*CNS:* anxiety, dizziness, drowsiness, dystonia (odd movements of the neck and body), sedation *CV:* bradycardia, tachycardia, hypotension *EENT:* blurred vision *GI:* dry mouth
Interactions:	1. The depressant effect on the central nervous system (CNS) of narcotics, sedatives or hypnotics, and alcohol is potentiated by Promethazine. An increased incidence of EPS has been reported when Promethazine is administered to patients taking Monoamine Oxidase Inhibitors (MAOIs).
Administration:	*Adult IV:* Give 12.5 mg IV over 3 minutes. Dilute the IV dose in 10 mL of Normal Saline. *Adult IM:* Give 12.5 mg deep IM. May repeat the IV / IM dose in 15 minutes if well tolerated and nausea or vomiting persists. *Pediatric:* Do not exceed 50% of adult dose.
Supply:	Vial or ampule containing 25 mg in 1 mL.
Notes:	Ensure a free-flowing IV, adequate dilution and slow administration. Promethazine can damage the tissues severely if it infiltrates or gets into the subcutaneous tissues. Promethazine can also cause vein damage and phlebitis if not diluted. Drug is not routinely stocked in LFEMSC drug bags and/or drug boxes. This drug may be used during drug shortages as an alternate for Ondansetron (Zofran®).

SODIUM BICARBONATE — Protocol 6.44

Scope | EMR | EMT | AEMT | INT | PM

Generic Name:	**Sodium Bicarbonate (so'dee-um bye-kar'boe-nate)**
Trade Name:	N/A
Chemical Class:	Monosodium salt of carbonic acid
Therapeutic Class:	Alkalinizing agent; electrolyte supplement
Actions:	Sodium Bicarbonate is an alkalizing agent used to buffer acids present in the body during and after severe hypoxia. Sodium Bicarbonate combines with excess acids (usually lactic acid) present in the body to form a weak, volatile acid. This acid is broken down into CO_2 and H_2O. Sodium Bicarbonate is effective only when administered with adequate ventilation and oxygenation. Sodium Bicarbonate may be administered to alkalinize the urine to speed excretion of tricyclic antidepressants.
Pharmacokinetics:	Onset in seconds. Peak 1 to 2 minutes. Duration 10 minutes.
Indications:	1. Prolonged cardiac arrest. 2. Known metabolic acidosis. 3. Cardiac arrest in a dialysis patient (hyperkalemia). Should be an early treatment consideration. 4. Tricyclic antidepressant (TCA) overdose. 5. Crush syndrome **[Medical Control]**.
Contraindications:	Hypokalemia.
Precautions: ***Pregnancy Cat. C***	Sodium Bicarbonate can cause metabolic alkalosis when administered in large quantities. It is important to calculate the dosage based on patient weight and size.
Side Effects:	1. Metabolic alkalosis. 2. Hypernatremia. 3. Hypokalemia.
Interactions:	1. Most catecholamines and vasopressor (e.g., Dopamine, Norepinephrine, and Epinephrine) can be deactivated by alkaline solutions such as Sodium Bicarbonate; assure these drugs are not administered simultaneously. 2. Sodium Bicarbonate should not be administered in conjunction with Calcium Chloride. A precipitate can form and block the IV line.
Administration:	*Adult:* **Cardiac arrest:** Give 1 mEq/kg IV up to 100 mEq. **TCA overdose:** Give 50 mEq IV over 2 minutes. Repeat in 15 minutes if needed. **Crush Syndrome:** Mix 1 mEq/kg in 1 liter of Normal Saline. **[Medical Control]** *Pediatric:* Contact **[Medical Control]**.
Supply:	Prefilled syringe containing 50 mEq in 50 mL (8.4% solution).
Notes:	

TRANEXAMIC ACID — Protocol 6.45

Scope	EMR	EMT	AEMT	INT	PM

Generic Name:	**Tranexamic Acid (tran-ex-am'-ik as-id)**
Trade Name:	Cyklokapron®
Chemical Class:	Amino acid derivative
Therapeutic Class:	Antifibrinolytic
Actions:	Inhibits plasminogen activation and plasmin activity.
Pharmacokinetics:	*IV:* Onset 5-15 minutes. $t_{½}$ = 2 hours. Duration of action: approximately 3 hours.
Indications:	Any trauma patient, 14 years of age or older, who is at high risk for ongoing internal hemorrhage meeting one or more of the following criteria: 1. Systolic blood pressure less than 90 mm Hg. 2. Patients over 65 years of age with systolic blood pressure less than 110 mm Hg. 3. Tachycardia with heart rate greater than 120 beats per minute with signs of hypoperfusion present (confusion, altered mental status, cool extremities, etc.). 4. Contact **[Medical Control]** as needed if the patient does not meet the above criteria.
Other Indications:	1. Epistaxis (nosebleed) uncontrolled. 2. Head injury presenting with a GCS of ≤ 12.
Contraindications:	1. Injuries greater than 3 hours old. 2. Evidence of disseminated intravascular coagulation (DIC). 3. Hypersensitivity to the drug.
Precautions: ***Pregnancy Cat. B***	1. Excreted in breast milk. 2. Caution in patients with history of deep vein thrombosis (DVT), pulmonary embolus, other blood clots, or severe renal failure. 3. Can cause worsened coagulopathy in some patients.
Side Effects:	*CNS:* anxiety, blurred vision, confusion *CV:* hypotension, chest pain, tachycardia *GI:* nausea, vomiting, diarrhea *RESP:* shortness of breath, cough
Interactions:	Female patients taking or using any form of birth control containing estrogen and progestin are at an increased risk for blood clots and this medication increases that risk significantly.
Administration:	***Loading Dose:*** IV bolus of 1 gram Tranexamic Acid (TXA). Piggyback the TXA infusion into an already established IV infusion. ***Maintenance Dose:*** IV infusion of 1 gram Tranexamic Acid (TXA) infused over 8 hours. Piggyback the TXA infusion into an already established IV infusion.
Supply:	Vial containing 1,000 mg in 10 mL.
Notes:	1. To prepare maintenance infusion, mix 1 gram TXA in 1,000 mL of 0.9% Sodium Chloride. Attach a 60 drop administration set and infuse at 125 drops/minute over 8 hours. 2. Major external bleeding MUST be controlled by direct pressure, hemostatic dressings, and tourniquets; TXA administration does NOT control external hemorrhage. 3. Be sure to CLEARLY document the mechanism of injury, the time of injury / incident, and the time that the TXA bolus was administered (as well as when the maintenance infusion was started, if applicable).

The Lord Fairfax EMS Council maintains the following list of approved medical abbreviations. Providers should limit use of abbreviations to those that appear on this list.

AAA	abdominal aortic aneurysm
AAO x 3	awake, alert, and oriented to person, place, and time
AAO x 4	awake, alert, and oriented to person, place, time, and event
ABC	airway, breathing, circulation
ABD	abdomen (abdominal)
AED	automatic external defibrillator
A-FIB	atrial fibrillation
A-FLUT	atrial flutter
AKA	above the knee amputation
ALS	advanced life support
AMA	against medical advice
AMS	altered mental status
AMT	amount
APPROX	approximately
ASSOC	associated
BG	blood glucose
BID	twice daily
BILAT	bilateral
BKA	below the knee amputation
BLS	basic life support
BM	bowel movement
BP	blood pressure
BPM	beats per minute
BS	breath sounds
BSA	body surface area
BSI	body substance isolation
BVM	bag-valve-mask
C/O	complaint of (complains of)
CA	cancer
CABG	coronary artery bypass graft
CAD	coronary artery disease
CATH	catheter
CC	chief complaint
CEPH	cephalic
CHF	congestive heart failure
cm	Centimeter(s)
CNS	central nervous system
COPD	chronic obstructive pulmonary disease
CP	chest pain

CONTINUED ON NEXT PAGE

CPAP	continuous positive airway pressure
CPR	cardiopulmonary resuscitation
C-SECTION	caesarean section
CSF	cerebrospinal fluid
C-SPINE	cervical spine
CT	cat scan
CV	cardiovascular
CVA	cerebrovascular accident (stroke)
D5W	5% dextrose in water
DDNR	durable do not resuscitate
DKA	diabetic ketoacidosis
DNR	do not resuscitate
DOA	dead on arrival
DT	delirium tremens
Dx	diagnosis
ECG	electrocardiogram
EEG	electroencephalogram
EENT	eye, ear, nose, and throat
EMS	emergency medical services
EMT	emergency medical technician
ET	endotracheal
ETA	estimated time of arrival
ETCO2	end-tidal CO_2
ETOH	ethanol (alcohol)
ETT	endotracheal tube
EXT	external (extension)
F	female
FB	foreign body
FBAO	foreign body airway obstruction
FLEX	flexion
Fx	fracture
g	gram(s)
GI	gastrointestinal
GSW	gunshot wound
gtts	drops
GU	gastrourinary
GYN	gynecology (gynecological)
H/A	headache
HEENT	head, eyes, ears, nose, throat
HEME	hematologic, hematology

CONTINUED ON NEXT PAGE

HR	heart rate (hour)
HHN	hand-held nebulizer
HS	hour of sleep (bedtime), heart sounds
HTN	hypertension
Hx	history
ICP	intracranial pressure
ICU	intensive care unit
IM / IN	intramuscular / intranasal
INT	intermittent infusion device
IO	intraosseous
IV	Intravenous
IVP	intravenous push
J	joules
JVD	jugular vein distension
kg	kilogram
KVO	keep vein open
L	left
L/S-SPINE	lumbar sacral spine
LAT	lateral
lb	pound
LLQ	left lower quadrant
LMP	last menstrual period
LPM	liters per minutes
LR	lactated ringers
L-SPINE	lumbar spine
LUQ	left upper quadrant
M	male
MAST	military anti-shock trousers
MAT	multifocal atrial tachycardia
mcg	microgram(s)
MED	medicine
mg	milligram(s)
mg/dL	milligrams per decaliter
MI	myocardial infarction (heart attack)
min	minimum / minute
mL	milliliters
mm	millimeters
mm Hg	millimeters of Mercury
MS	mental status
MVC	motor vehicle crash
N/V	nausea / vomiting

CONTINUED ON NEXT PAGE

N/V/D	nausea / vomiting / diarrhea
NAD	no apparent distress
NC	nasal cannula
NEB	nebulizer
NKDA	no known drug allergies
NRB	non-rebreather
NS	normal saline
NSR	normal sinus rhythm
OB/GYN	obstetrics / gynecology
ODT	orally disintegrating tablet
PAC	premature atrial contraction
PALP	palpation
PASG	pneumatic anti-shock garment
PE	pulmonary embolus
PEA	pulseless electrical activity
PEARL	pupils equal and reactive to light
PMHx	past medical history
PO	orally
PPE	personal protection equipment
PRN	as needed
PT	patient
PVAD	preexisting vascular access device
PVC	premature ventricular contraction
QID	four times daily
R	right
RLQ	right lower quadrant
RUQ	right upper quadrant
Rx	medicine
RXN	reaction
SBP	systolic blood pressure
SC	subcutaneous
SL	sublingual
SOB	shortness of breath
ST	sinus tachycardia
SVT	supraventricular tachycardia
Sx	symptom
SZ	seizure
T	temperature
TIA	transient ischemic attack
TID	three times a day
TKO	to keep open (refers to IV's – same as KVO)

CONTINUED ON NEXT PAGE

T-SPINE	thoracic spine
Tx	treatment
UOA	upon our arrival
URI	upper respiratory infection
UTI	urinary tract infection
VF	ventricular fibrillation
VS	vital signs
VT	ventricular tachycardia
WAP	wandering atrial pacemaker
WNL	within normal limits
YO (YOA)	years old (years of age)

♂	male
♀	female
+	positive
-	negative
?	questionable
~	approximately
=	equal
↑	upper (increased)
a̅	before
p̅	after
c̅	with
s̅	without
Δ	change
↓	lower (decreased)
1°	primary
2°	secondary

CONTINUED ON NEXT PAGE

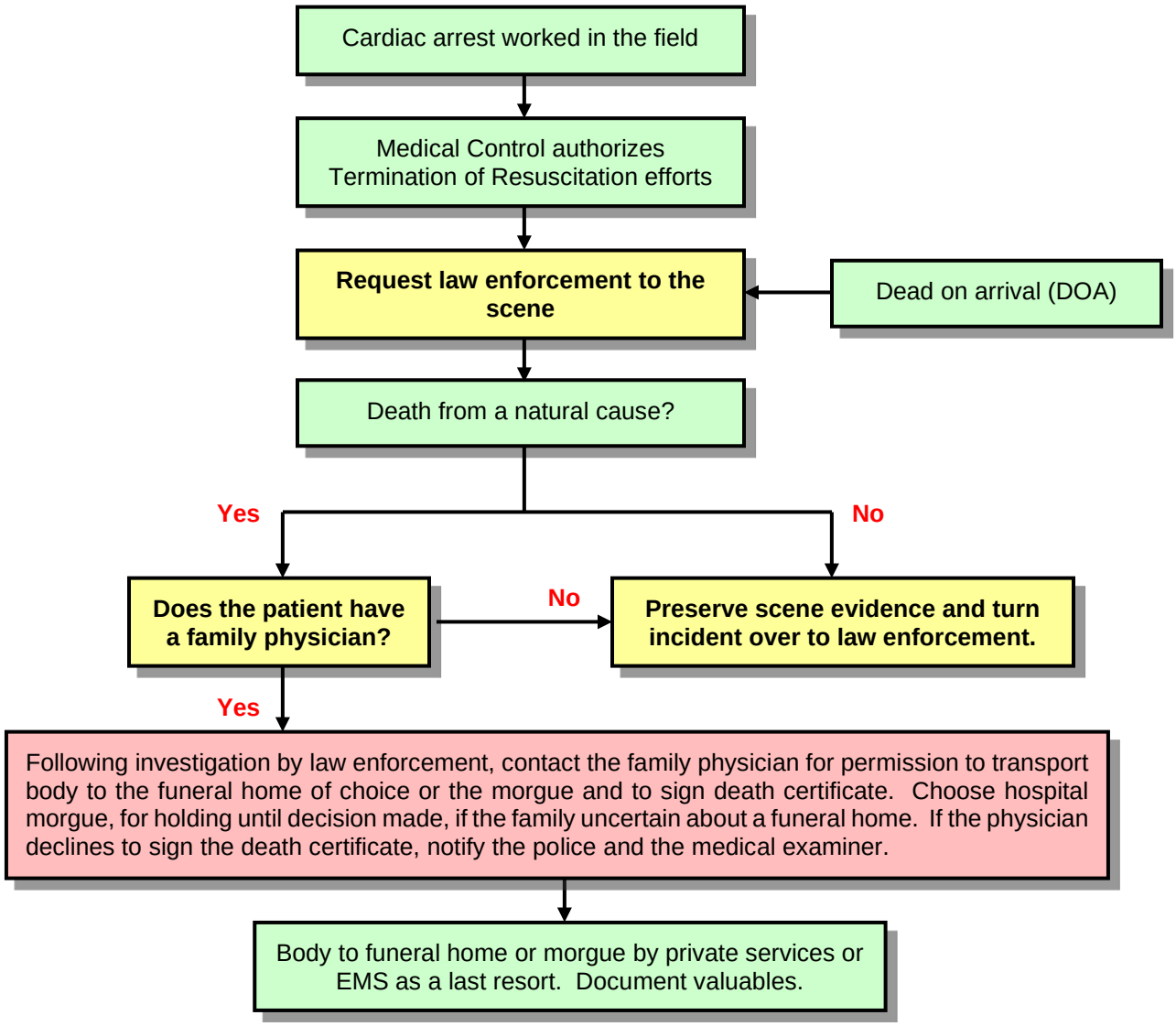
Dangerous abbreviations and dosage designations – *DO NOT USE*

Problem Term	Intended meaning	Reason for Problem(s)	Suggested remedy
/ (a slash mark)	with, and, or per	Read as one	Use "and", "with" or "per"
> and <	"greater than" or "less than"	Not understood or the meaning is reversed	Use "greater than" or "less than"
Apothecary symbols or terms	Units of measure	Not understood or misunderstood	Use the metric system
AU	for each ear	Read as OU (each eye) or not understood	Spell out "each ear"
cc for expressing liquid measurements	millimeter	Read as u (unit)	Write "mL" when expressing liquid measurements (drugs, urine, blood etc.)
D/C	discharge	Interpreted as (orders for discharge medications result in premature discontinue of current medication)	Use "discharge"
Drug name and dosage not separated by a space	Inderal 40 mg	Inderal40 mg misread as Inderal 140 mg	Always leave a space between a drug name, dose, and unit of measure
IU	International unit	Misread as IV (intravenous); The I is read as a one (6 IU is read as 61 units)	Use "units" or spell out "international units", using a lowercase "i"
Lettered abbreviations for drug names such as MS and MS04 for Morphine sulfate or DPH, ASA, APAP, AZT, CPZ and others for protocols		Not understood or misunderstood	Use generic or brand name(s). For protocols, follow the facility's procedures.
μg	microgram	When handwritten, misread as mg	Write "mcg"
Naked decimal point; .5 mL	0.5 mL	Decimal point is not seen; read as 5 mL causing a tenfold overdose	Add a zero; 0.5 mL
OD	once daily	Interpreted as right eye	Write "once daily"
OJ	Orange juice	Read as OS (left eye) or OD (right eye)	Use "orange juice"

CONTINUED ON NEXT PAGE

Dangerous abbreviations and dosage designations – *DO NOT USE* (continued)

Problem Term	Intended meaning	Reason for Problem(s)	Suggested remedy
per os	By mouth; 1/2	Not understood or misunderstood	Use "by mouth", "orally", or "PO"
q hs	once daily at bedtime, each day	Read as every hour	Use "HS" or "at bedtime"
q.n.	every night	Read as every hour	Write "once daily at night"
QD	once daily	Read or interpreted as q.i.d. (four times daily)	Write "once daily"
QOD	every other day	Interpreted as meaning "every once a day" or read as q.i.d. (four times daily)	Write "every other day"
Roman numerals	Numbers	Not understood or misunderstood (iv read as intravenous rather than 4; iii, X, L, and C, are not understood)	Use Arabic numerals (4, 3, 10, 50 100, etc.)
sq or sub q	subcutaneous	The q is read as every	Use "subcut"
ss	sliding scale or 1/2 in the Apothecary system	Read as the number 55	Spell out "sliding scale" or "1/2"
T.I.W.	three times a week	Interpreted as T/W (Tuesday and Wednesday); as twice a week; as TID (three times daily)	write "three times a week"
T/d	one per day	read as t.i.d. (three times daily)	Use "once daily"
Trailing zeros; **1.0 mg**	1 mg	Decimal point is not seen; read as 10 mg causing a tenfold overdose	Omit the zero; write 1 mg
U	unit	When handwritten, read as 0, 4, 6, or cc	Use "unit"



Key Points: DECEASED PATIENT PROTOCOL

- For Medical Examiner cases, leave the body as found and do not disturb the scene.
- Document the time efforts to resuscitate were terminated.
- Indicate the physician and/or medical examiner contacted, the agency providing transport of the deceased patient, and the destination of the deceased in the narrative of your Patient Care Report (PCR).
- For medical examiners cases where resuscitation has been attempted, do not remove advanced airways, IVs, etc., once resuscitation is terminated.
- Some localities policies for dealing with deceased patients differ from this guideline; follow local policies.
- A body should not be moved without authorization by a medical examiner or the family physician unless resuscitation is terminated during transport to the hospital. Under this circumstance, continue non-emergent transport to the hospital.

DRUG DOSAGE BY WEIGHT CHART — Protocol 7.3

DRUG	5 kg 11 lb	10 kg 22 lb	20 kg 44 lb	30 kg 66 lb	40 kg 88 lb	50 kg 110 lb	60 kg 132 lb	70 kg 154 lb	80 kg 176 lb	90 kg 198 lb	100 kg 220 lb
ACETAMINOPHEN (10-15 mg/kg)	1.875 mL	3.75 mL	7.5 mL	12.5 mL	15 mL	20.5 mL	20.5 mL	20.5 mL	20.5 mL	20.5 mL	20.5 mL
ADENOSINE (0.1 mg/kg)	0.5 mg	1 mg	2 mg	3 mg	4 mg	5 mg	6 mg	6 mg	6 mg	6 mg	6 mg
ADENOSINE (0.2 mg/kg)	1 mg	2 mg	4 mg	6 mg	8 mg	10 mg	12 mg	12 mg	12 mg	12 mg	12 mg
ALBUTEROL	2.5 mg	2.5 mg	2.5 mg	2.5 mg	2.5 mg	2.5 mg	2.5 mg	2.5 mg	2.5 mg	2.5 mg	2.5 mg
AMIODARONE (5 mg/kg)	25 mg	50 mg	100 mg	150 mg	200 mg	250 mg	300 mg	300 mg	300 mg	300 mg	300 mg
ASPIRIN	-	-	-	-	-	324 mg	324 mg	324 mg	324 mg	324 mg	324 mg
ATROPINE (0.02 mg/kg)	0.1 mg	0.2 mg	0.4 mg	0.6 mg	0.8 mg	1 mg	1 mg	1 mg	1 mg	1 mg	1 mg
CALCIUM CHLORIDE (8 mg/kg)	40 mg	80 mg	160 mg	240 mg	320 mg	400 mg	480 mg	560 mg	640 mg	720 mg	800 mg
CEFAZOLIN (25 mg/kg)	-	-	1 Gram	1 Gram	1 Gram	1 Gram	1 Gram	1 Gram	1 Gram	1 Gram	1 Gram
DEXTROSE (0.5 g/kg)	2.5 g	5 g	10 g	15 g	20 g	25 g	25 g	25 g	25 g	25 g	25 g
DEXTROSE (1 g/kg)	5 g	10 g	20 g	25 g	25 g	25 g	25 g	25 g	25 g	25 g	25 g
DIAZEPAM (0.25 mg/kg)	1.25 mg	2.5 mg	5 mg	5 mg	5 mg	5 mg	5 mg	5 mg	5 mg	5 mg	5 mg
DILTIAZEM (15-20 mg/kg)	-	-	-	-	-	12.5 mg	15 mg	17.5 mg	20 mg	20 mg	20 mg
DIPHENHYDRAMINE (1 mg/kg)	-	10 mg	20 mg	30 mg	40 mg	50 mg	50 mg	50 mg	50 mg	50 mg	50 mg
DOPAMINE[1] (5 mcg/kg/minute)	0.5	1	2	3	4	5	6	7	8	9	10
DOPAMINE[1] (10 mcg/kg/min)	1	2	4	6	8	10	12	14	15	17	19
DOPAMINE[1] (20 mcg/kg/min)	2	4	8	12	15	19	23	27	30	34	38
EPINEPHRINE 1:1,000 (0.01 mg/kg)	0.05 mg	0.1 mg	0.2 mg	0.3 mg	0.3 mg	0.3 mg	0.3 mg	0.3 mg	0.3 mg	0.3 mg	0.3 mg
EPINEPHRINE 1:10,000	-	-	-	-	-	1 mg	1 mg	1 mg	1 mg	1 mg	1 mg
EPINEPHRINE 1:10,000 (0.01 mg/kg)	0.05 mg	0.1 mg	0.2 mg	0.3 mg	0.4 mg	-	-	-	-	-	-
EPINEPHRINE INFUSION	See charts in Protocol 6.18 – EPINEPHRINE INFUSION										
EPINEPHRINE PUSH DOSE	Dosing is 0.5-2.0 mL (5-20 mcg) every 3-5 minutes.										
FENTANYL (1 mcg/kg)	5 mcg	10 mcg	20 mcg	30 mcg	40 mcg	50 mcg	60 mcg	70 mcg	80 mcg	90 mcg	100 mcg
FENTANYL (0.5 mcg/kg)	2.5 mcg	5 mcg	10 mcg	15 mcg	20 mcg	25 mcg	30 mcg	35 mcg	40 mcg	45 mcg	50 mcg
FUROSEMIDE (40 mg)	-	-	-	-	-	40 mg	40 mg	40 mg	40 mg	40 mg	40 mg
GLUCAGON	1 mg	1 mg	1 mg	1 mg	1 mg	1 mg	1 mg	1 mg	1 mg	1 mg	1 mg
HALOPERIDOL	-	-	-	5 mg	5 mg	5 mg	5 mg	5 mg	5 mg	5 mg	5 mg
IPRATROPIUM	500 mcg	500 mcg	500 mcg	500 mcg	500 mcg	500 mcg	500 mcg	500 mcg	500 mcg	500 mcg	500 mcg
KETAMINE (INTERMEDIATE LEVEL)	-	-	-	-	-	20 mg	24 mg	28 mg	32 mg	36 mg	40 mg
KETAMINE (PARAMEDIC LEVEL)	0.5 mg	1 mg	2 mg	3 mg	4 mg	20 mg	24 mg	28 mg	32 mg	36 mg	40 mg
KETOROLAC TROMETHAMINE	-	-	-	-	-	15 mg	15 mg	15 mg	15 mg	15 mg	15 mg
LIDOCAINE (0.5 mg/kg) (Anesthetic)	2.5 mg	5 mg	10 mg	20 mg	30 mg	40 mg	40 mg	40 mg	40 mg	40 mg	40 mg
LIDOCAINE (1 mg/kg) (Cardiac)	5 mg	10 mg	20 mg	30 mg	40 mg	50 mg	60 mg	70 mg	80 mg	90 mg	100 mg
LIDOCAINE (1.5 mg/kg) (Cardiac)	-	-	-	-	-	75 mg	90 mg	105 mg	120 mg	135 mg	150 mg

DRUG	5 kg 11 lb	10 kg 22 lb	20 kg 44 lb	30 kg 66 lb	40 kg 88 lb	50 kg 110 lb	60 kg 132 lb	70 kg 154 lb	80 kg 176 lb	90 kg 198 lb	100 kg 220 lb
MAGNESIUM SULFATE	125 mg	250 mg	500 mg	750 mg	1 g	2 g	2 g	2 g	2 g	2 g	2 g
METHYLPREDNISOLONE (2 mg/kg)	10 mg	20 mg	40 mg	60 mg	80 mg	125 mg	125 mg	125 mg	125 mg	125 mg	125 mg
METOPROLOL	-	-	-	-	-	5 mg	5 mg	5 mg	5 mg	5 mg	5 mg
MIDAZOLAM (0.1 mg/kg)	0.5 mg	1 mg	2 mg	2.5 mg	2.5 mg	2.5 mg	2.5 mg	2.5 mg	2.5 mg	2.5 mg	2.5 mg
MORPHINE (0.1 mg/kg)	0.5 mg	1 mg	2 mg	3 mg	4 mg	5 mg	6 mg	7 mg	8 mg	9 mg	10 mg
NALOXONE (0.1 mg/kg)	0.5 mg	1.0 mg	2 mg	2 mg	2 mg	2 mg	2 mg	2 mg	2 mg	2 mg	2 mg
NITROGLYCERIN	-	-	-	-	-	0.4 mg	0.4 mg	0.4 mg	0.4 mg	0.4 mg	0.4 mg
NITROPASTE 2% OINTMENT	-	-	-	-	-	1-2”	1-2”	1-2”	1-2”	1-2”	1-2”
NOREPINEPHRINE INFUSION	See chart in Protocol 6.39 – NOREPINEPHRINE INFUSION										
ONDANSETRON (0.1 mg/kg)	0.5 mg	1 mg	2 mg	3 mg	4 mg	4 mg	4 mg	4 mg	4 mg	4 mg	4 mg
PROMETHAZINE	-	-	-	-	-	12.5 mg	12.5 mg	12.5 mg	12.5 mg	12.5 mg	12.5 mg
SODIUM BICARBONATE (1 mEq/kg)	5 mEq	10 mEq	20 mEq	30 mEq	40 mEq	50 mEq	60 mEq	70 mEq	80 mEq	90 mEq	100 mEq
TRANEXAMIC ACID	-	-	-	-	-	1 Gram	1 Gram	1 Gram	1 Gram	1 Gram	1 Gram

[1] Values listed for Dopamine are in drops/minute and assume an 800 mcg/mL concentration.

GLASGOW COMA SCALE (GCS)
Check, Observe, Stimulate, Rate

Eye Opening		Spontaneous	**4**
		To Verbal Stimulation	**3**
		To Painful Stimulation	**2**
		None	**1**
		Closed by local factor	**NT**
Verbal	Over 5 Years	Oriented / Appropriate	**5**
		Confused	**4**
		Inappropriate Words	**3**
		Non-Specific Sounds	**2**
		None	**1**
		Factor interfering with communication	**NT**
	2 to 5 Years	Appropriate Words	**5**
		Inappropriate Words	**4**
		Cries and/or Screams	**3**
		Grunts	**2**
		None	**1**
		Factor interfering with communication	**NT**
	0 to 23 Months	Smiles / Coos / Cries Appropriately	**5**
		Cries / Inconsolable	**4**
		Inappropriate Cry	**3**
		Persistent Cry / Grunting	**2**
		None	**1**
		Factor interfering with communication	**NT**
Motor	Over 5 Years	Obeys Commands	**6**
		Localization of Pain	**5**
		Normal Flexion	**4**
		Abnormal Flexion	**3**
		Extension	**2**
		None	**1**
		Paralyzed or other limiting factor	**NT**
	Up to 5 Years	Spontaneous	**6**
		Localization of Pain	**5**
		Normal Flexion	**4**
		Abnormal Flexion	**3**
		Extension	**2**
		None	**1**
		Paralyzed or other limiting factor	**NT**
TOTAL OF GLASGOW COMA SCALE (NT = NOT TESTED / UNABLE TO TEST)			**3-15**

Reference: https://www.glasgowcomascale.org/downloads/GCS-Assessment-Aid-English.pdf?v=3

mL/hour ⬇	Drip Set		
	10 drops/min	**15** drops/min	**60** drops/min
25	4	6	25
50	8	13	50
100	17	25	100
150	25	38	150
200	33	50	200
250	42	63	250
300	50	75	300
350	58	88	350
400	67	100	400
450	75	113	450
500	83	125	500
600	100	150	600
700	117	175	700
800	133	200	800
900	150	225	900
1000	167	250	1,000

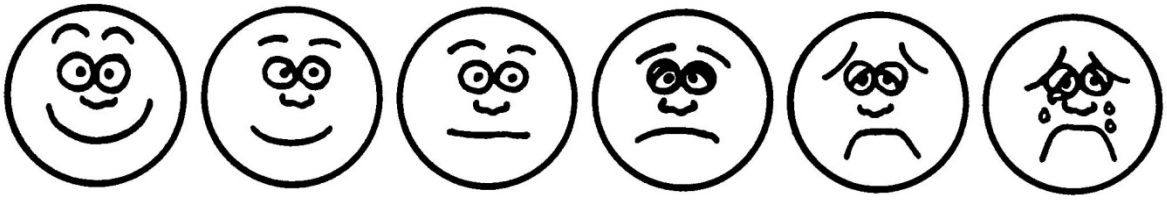
Table 7.5.1 Pediatric Vital Signs

Age	Heart Rate	Respiratory Rate	Minimum Systolic BP
Infant (less than 1 year)	100 – 160	30 – 60	greater than 60
Toddler (1 to 2 years)	90 – 150	24 – 40	greater than 70
Preschooler (3 to 5 years)	80 – 140	22 – 34	greater than 75
School-aged child (6 to 10 years)	70 – 120	18 – 30	greater than 80
Adolescent (11 to 18 years)	60 – 100	12 – 16	greater than 90

Table 7.5.2 Pediatric Airway Management Supplies

Weight (kg)	Laryngoscope Blade	ET Tube	ET Tube Length	Stylet	Suction Catheter
Newborn **3-5 kg**	0-1 straight	3.0-3.5 uncuffed	10-10.5	6 Fr	6-8 Fr
Infant **6-9 kg**	1 straight	3.5 uncuffed	10-10.5	6 Fr	8 Fr
Toddler **10-11 kg**	1 straight	4.0 uncuffed	11-12	6 Fr	8-10 Fr
Small Child **12-14 kg**	2 straight	4.5 uncuffed	12.5-13.5	6 Fr	10 Fr
Child **15-18 kg**	2 straight or curved	5.0 uncuffed	14-15	6 Fr	10 Fr
Child **19-22 kg**	2 straight or curved	5.5 uncuffed	15.5-16.5	14 Fr	10 Fr
Large Child **24-30 kg**	2-3 straight or curved	6.0 cuffed	17-18	14 Fr	10 Fr
"Adult" **greater than or equal to 32 kg**	3 straight or curved	6.5 cuffed	18.5-19.5	14 Fr	12 Fr

Wong-Baker FACES Pain Rating Scale



0 **1** **2** **3** **4** **5**

Explain to the person that each face is for a person who feels happy because he has no pain (hurt) or sad because he has some or a lot of pain. Face 0 is very happy because he doesn't hurt at all. Face 1 hurts just a little bit. Face 2 hurts a little more. Face 3 hurts even more. Face 4 hurts a whole lot. Face 5 hurts as much as you can imagine, although you don't have to be crying to feel this bad. Ask the person to choose the face that best describes how he is feeling.

Rating scale is recommended for persons age 3 years and older.

Brief word instructions: Point to each face using the words to describe the pain intensity. Ask the child to choose the face that best describes their own pain and record the appropriate number.

lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg
1	0.5	61	27.5	121	55.0	181	82.0	241	109.5	301	136.5
2	1.0	62	28.0	122	55.5	182	82.5	242	110.0	302	137.0
3	1.5	63	28.5	123	56.0	183	83.0	243	110.0	303	137.5
4	2.0	64	29.0	124	56.5	184	83.5	244	110.5	304	138.0
5	2.5	65	29.5	125	56.5	185	84.0	245	111.0	305	138.5
6	2.5	66	30.0	126	57.0	186	84.5	246	111.5	306	139.0
7	3.0	67	30.5	127	57.5	187	85.0	247	112.0	307	139.5
8	3.5	68	31.0	128	58.0	188	85.0	248	112.5	308	139.5
9	4.0	69	31.5	129	58.5	189	85.5	249	113.0	309	140.0
10	4.5	70	32.0	130	59.0	190	86.0	250	113.5	310	140.5
11	5.0	71	32.0	131	59.5	191	86.5	251	114.0	311	141.0
12	5.5	72	32.5	132	60.0	192	87.0	252	114.5	312	141.5
13	6.0	73	33.0	133	60.5	193	87.5	253	115.0	313	142.0
14	6.5	74	33.5	134	61.0	194	88.0	254	115.0	314	142.5
15	7.0	75	34.0	135	61.5	195	88.5	255	115.5	315	143.0
16	7.5	76	34.5	136	61.5	196	89.0	256	116.0	316	143.5
17	7.5	77	35.0	137	62.0	197	89.5	257	116.5	317	144.0
18	8.0	78	35.5	138	62.5	198	90.0	258	117.0	318	144.5
19	8.5	79	36.0	139	63.0	199	90.5	259	117.5	319	144.5
20	9.0	80	36.5	140	63.5	200	90.5	260	118.0	320	145.0
21	9.5	81	36.5	141	64.0	201	91.0	261	118.5	321	145.5
22	10.0	82	37.0	142	64.5	202	91.5	262	119.0	322	146.0
23	10.5	83	37.5	143	65.0	203	92.0	263	119.5	323	146.5
24	11.0	84	38.0	144	65.5	204	92.5	264	120.0	324	147.0
25	11.5	85	38.5	145	66.0	205	93.0	265	120.0	325	147.5
26	12.0	86	39.0	146	66.0	206	93.5	266	120.5	326	148.0
27	12.5	87	39.5	147	66.5	207	94.0	267	121.0	327	148.5
28	12.5	88	40.0	148	67.0	208	94.5	268	121.5	328	149.0
29	13.0	89	40.5	149	67.5	209	95.0	269	122.0	329	149.5
30	13.5	90	41.0	150	68.0	210	95.5	270	122.5	330	149.5
31	14.0	91	41.5	151	68.5	211	95.5	271	123.0	331	150.0
32	14.5	92	41.5	152	69.0	212	96.0	272	123.5	332	150.5
33	15.0	93	42.0	153	69.5	213	96.5	273	124.0	333	151.0
34	15.5	94	42.5	154	70.0	214	97.0	274	124.5	334	151.5
35	16.0	95	43.0	155	70.5	215	97.5	275	125.0	335	152.0
36	16.5	96	43.5	156	71.0	216	98.0	276	125.0	336	152.5
37	17.0	97	44.0	157	71.0	217	98.5	277	125.5	337	153.0
38	17.0	98	44.5	158	71.5	218	99.0	278	126.0	338	153.5
39	17.5	99	45.0	159	72.0	219	99.5	279	126.5	339	154.0
40	18.0	100	45.5	160	72.5	220	100.0	280	127.0	340	154.5
41	18.5	101	46.0	161	73.0	221	100.5	281	127.5	341	154.5
42	19.0	102	46.5	162	73.5	222	100.5	282	128.0	342	155.0
43	19.5	103	46.5	163	74.0	223	101.0	283	128.5	343	155.5
44	20.0	104	47.0	164	74.5	224	101.5	284	129.0	344	156.0
45	20.5	105	47.5	165	75.0	225	102.0	285	129.5	345	156.5
46	21.0	106	48.0	166	75.5	226	102.5	286	130.0	346	157.0
47	21.5	107	48.5	167	76.0	227	103.0	287	130.0	347	157.5
48	22.0	108	49.0	168	76.0	228	103.5	288	130.5	348	158.0
49	22.0	109	49.5	169	76.5	229	104.0	289	131.0	349	158.5
50	22.5	110	50.0	170	77.0	230	104.5	290	131.5	350	159.0
51	23.0	111	50.5	171	77.5	231	105.0	291	132.0	351	159.5
52	23.5	112	51.0	172	78.0	232	105.5	292	132.5	352	160.0
53	24.0	113	51.5	173	78.5	233	105.5	293	133.0	353	160.5
54	24.5	114	51.5	174	79.0	234	106.0	294	133.5	354	161.0
55	25.0	115	52.0	175	79.5	235	106.5	295	134.0	355	161.5
56	25.5	116	52.5	176	80.0	236	107.0	296	134.5	356	162.0
57	26.0	117	53.0	177	80.5	237	107.5	297	134.5	357	162.5
58	26.5	118	53.5	178	80.5	238	108.0	298	135.0	358	163.0
59	27.0	119	54.0	179	81.0	239	108.5	299	135.5	359	163.5
60	27.0	120	54.5	180	81.5	240	109.0	300	136.0	360	164.0

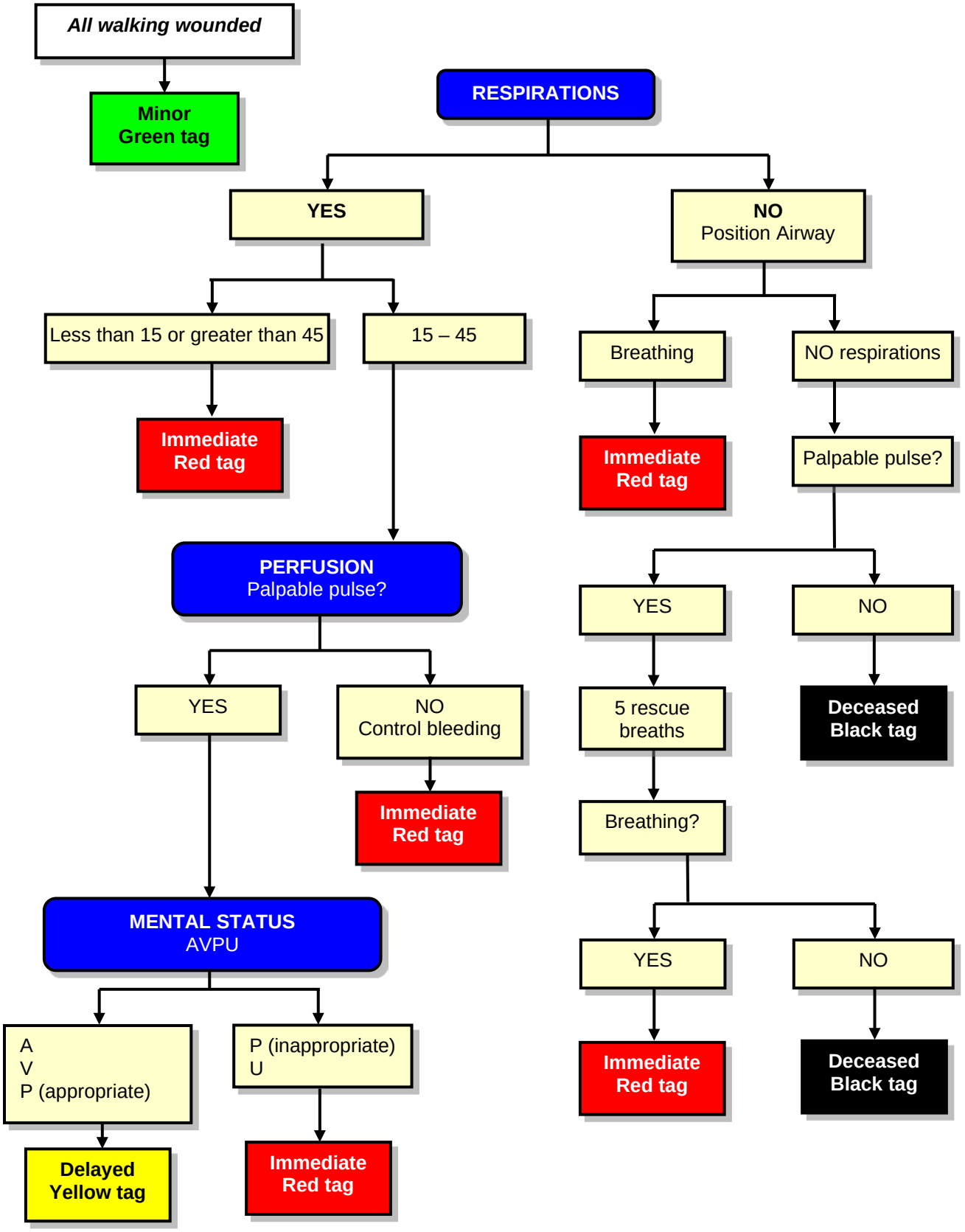
HOSPITALS	Telephone #	Fax #
Berkeley Medical Center – Martinsburg, WV Physical Address – 2500 Hospital Drive	304-264-1357	304-596-6861
Hampshire Memorial Hospital – Romney, WV Physical Address – 363 Sunrise Boulevard	304-822-4927	304-822-4951
INOVA Fairfax Hospital – Fairfax, VA Physical Address – 3300 Gallows Road	703-776-3111	703-776-3400
INOVA Loudoun Hospital (Cornwall) – Leesburg, VA Physical Address – 224 Cornwall Street	703-737-7520	703-737-7527
INOVA Loudoun Hospital (Lansdowne) – Leesburg, VA Physical Address – 44045 Riverside Parkway	703-858-6040	703-858-6049
Jefferson Memorial Hospital – Ranson, WV Physical Address – 300 South Preston Street	304-728-1642	304-728-1644
Page Memorial Hospital – Luray, VA Physical Address – 200 Memorial Drive	540-743-8018	540-843-0850
Sentara-Rockingham Memorial Hospital – Harrisonburg, VA Physical Address – 2010 Health Campus Drive	540-689-9999	540-689-1415
Shenandoah Memorial Hospital – Woodstock, VA Physical Address – 759 South Main Street	540-459-1175	540-459-1153
University of Virginia Medical Center – Charlottesville, VA Physical Address – 1215 Lee Street	434-924-9287	434-971-1137
War Memorial Hospital – Berkeley Springs, WV Physical Address – 1 Healthy Way	304-258-6536	304-258-7422
Warren Memorial Hospital – Front Royal, VA Physical Address – 351 Valley Health Way	540-635-0929	540-636-0247
Washington Hospital Center – Washington, DC Physical Address – 110 Irving Street, Northwest	202-877-8800	202-877-7516
Winchester Medical Center – Winchester, VA Physical Address – 1840 Amherst Street	540-667-0609	540-536-4177

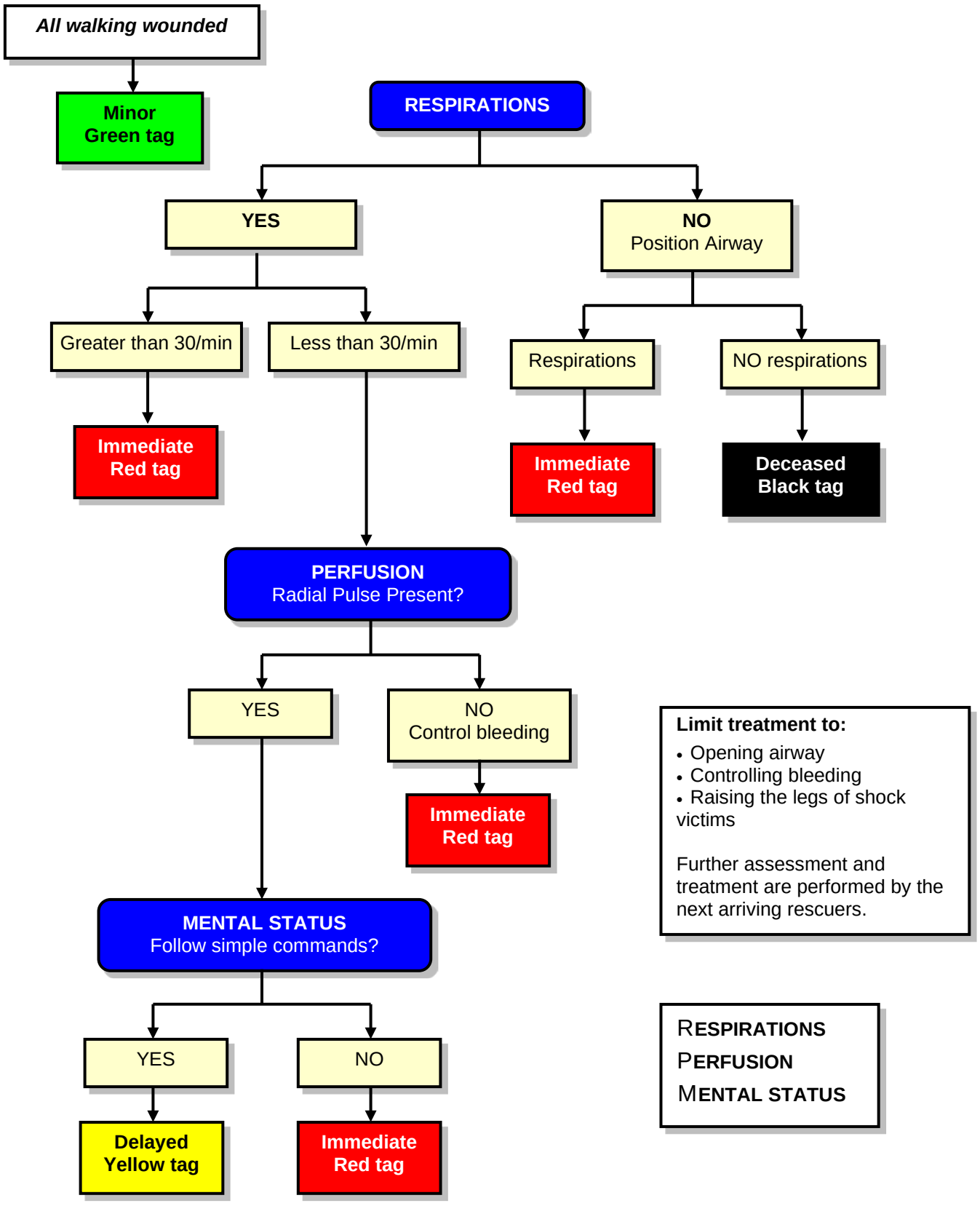
AIR MEDICAL TRANSPORT		Telephone #	Fax #
Carilion Life-Guard 10 – Roanoke, VA		888-377-7628	540-343-3976
Fairfax County Police – Fairfax, VA		703-691-2131	
HealthNet 8 – Martinsburg, WV		304-598-4100	304-598-6188
LifeEvac – Petersburg, VA		877-902-7779	
MedSTAR – Washington, DC		800-824-8614	800-267-5150
Pegasus – Charlottesville, VA		800-882-4354	434-924-9295
PHI AirCare 1 – Manassas, VA	*AirCare Dispatch* 800-258-8181	703-393-7379	703-393-7974
PHI AirCare 2 – Fredericksburg, VA		540-368-9709	540-368-9241
PHI AirCare 3 – Leesburg, VA		703-737-7715	
PHI AirCare 4 – Front Royal, VA		540-635-1344	540-635-1373
PHI AirCare 5 – Weyers Cave, VA		540-453-2000	540-453-2004
PHI AirCare 6 – Culpeper, VA		540-216-0100	

HELICOPTER RESCUE	Telephone #	Fax #
Coast Guard	757-398-6390	757-398-6392
Maryland State Police	410-706-7813	410-706-4209
U. S. Park Police	202-690-0808	202-433-7246

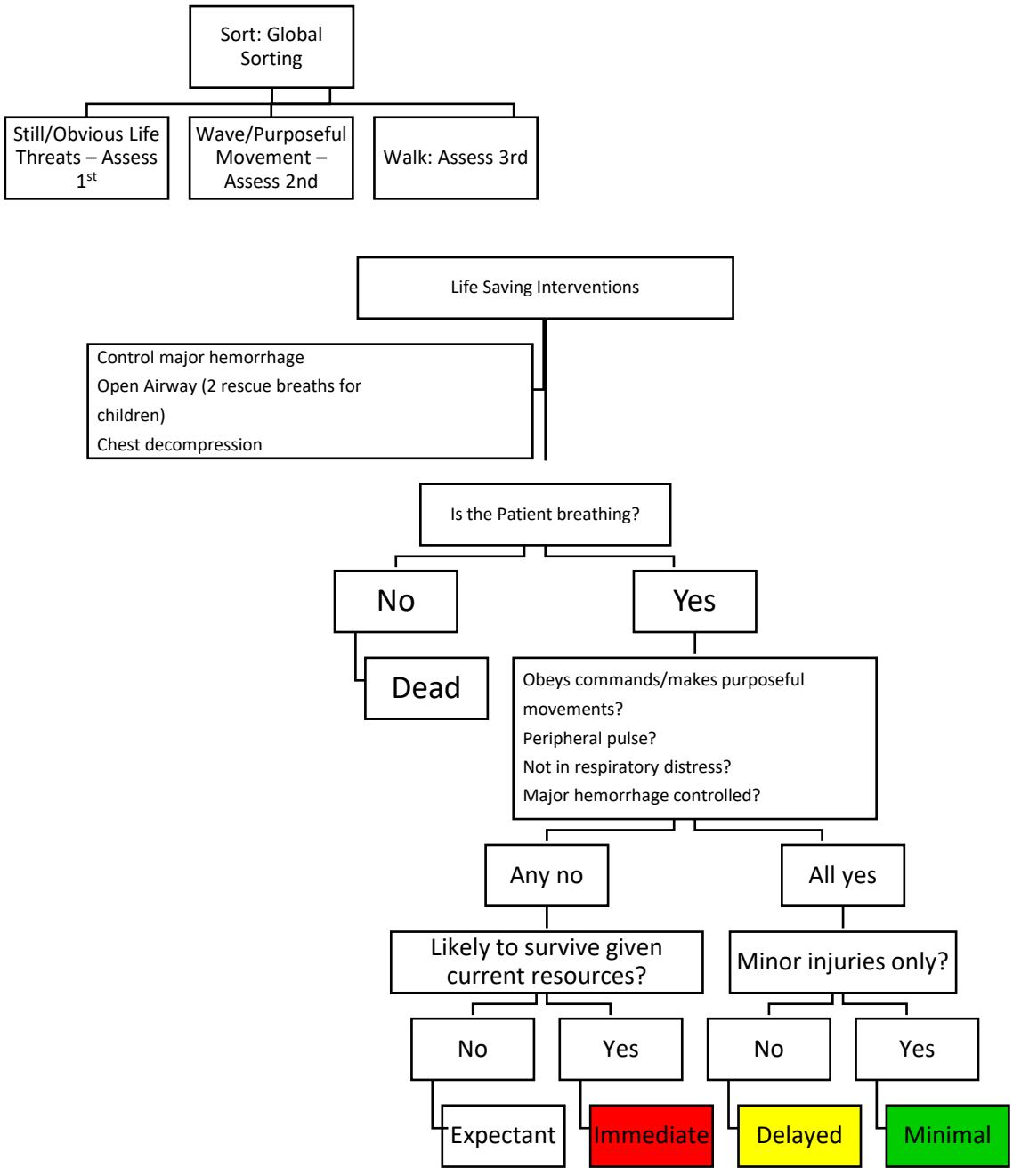
EMERGENCY COMMUNICATIONS CENTERS	Telephone #	Fax #
Clarke County	540-955-1234	540-955-4111
Frederick County	540-665-5645	540-667-9313
Harrisonburg City / Rockingham County	540-434-4436	540-434-2512
Page County	540-843-0911	540-843-0922
Shenandoah County	540-459-6101	540-459-6200
Warren County	540-635-4128	540-636-4950
Winchester City	540-662-4131	540-542-1312
Valley Medical Transport	540-536-0082	540-563-2723

OTHER	Telephone #	Fax #
Lord Fairfax EMS Council	540-665-0014	540-722-0094
CHEMTREC	800-424-9300	
CISM Team Activation / Requests Frederick County Public Safety Communications Center	540-665-5645	
Poison Control Center	800-222-1222	
Virginia Department of Emergency Management	800-468-8892	804-674-2419
Virginia Office of Emergency Medical Services	800-523-6019	804-371-3108
Virginia State Police (Culpeper)	800-572-2260	
Virginia State Police (Salem)	800-542-5959	





SALT - (Sort, Assess, Lifesaving Interventions, Treatment / Triage)



1

A

B

C

D

E

F

G

H

I

K

L

M

N

O

P

R

S

T

U

V

W

X

Z

REFERENCES

2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. American Heart Association. International Consensus on Science. 2020.

2020 Handbook of Emergency Cardiovascular Care for Healthcare Providers. American Heart Association. 2020.

AAOS Advanced Emergency Care and Transportation of the Sick and Injured. Jones and Bartlett. Pollak, Beck. Fourth Edition. 2022.

AAOS Emergency Care and Transportation of the Sick and Injured. Jones and Bartlett. Pollak, Barnes, Ciotola, Gulli. Twelfth Edition. 2021.

ACLS Provider Manual. American Heart Association. 2020.

Emergency Care. Prentice Hall. Limmer, O'Keefe, Dickinson, Grant, et al. Fourteenth Edition. 2021.

EZ-IO™ Training Manual. Vidacare. 2020.

Medical Treatment Guidelines, Fauquier County Department of Fire, Rescue, and Emergency Management. 2021.

LIFEPAK® 12/15 Defibrillator / Monitor Series Operating Instructions. Physio-Control. 2004 / 2009.

Medical Abbreviations. Neil M. Davis Associates. Davis. Twelfth Edition. 2005.

National Emergency Airway Registry

Nursing 2012 Drug Handbook. 32nd Edition, Wolters Kluwer Health. Lippincott Williams and Wilkins. 2012

Paramedic Care: Principles and Practice, Volumes 1-5: Introduction To Paramedicine, 5th Edition. Bledsoe, Porter, Cherry. 2017.

Highlights Of The 2021 Focused Updates To The American Heart Association Guidelines For CPR and ECC: Advanced Cardiovascular Life Support and Pediatric Advanced Life Support, American Heart Association. October 2021.

The Lord Fairfax EMS Council would like to acknowledge and thank the Central Shenandoah EMS Council, Fauquier County Department of Fire, Rescue, and Emergency Management, and Loudoun County Department of Fire, Rescue, and Emergency Management for allowing us to utilize their 2020, 2021, and 2022 Pre-Hospital Standard Patient Treatment Protocols for formatting and procedural purposes. This collaboration and cooperation will allow EMS Providers and healthcare facilities operating in both regions to provide a more consistent approach to patient management.