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# **Pre-Hospital Standard Patient Care Treatment Protocols**

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## TABLE OF CONTENTS

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### SECTION 1 – PATIENT ASSESSMENT

INTRODUCTION .....	6
PATIENT MANAGEMENT – INITIAL PATIENT CONTACT.....	7
PATIENT MANAGEMENT – SCENE SIZE-UP .....	7
PATIENT MANAGEMENT – PRIMARY SURVEY.....	8
PATIENT MANAGEMENT – SECONDARY SURVEY.....	9
PATIENT MANAGEMENT – REASSESSMENT .....	11

### SECTION 2 – DYSRHYTHMIA MANAGEMENT: ADULT

CARDIAC ARREST (ADULT) .....	12
BASIC LIFE SUPPORT – ALL AGES .....	14
CARDIAC ARREST – ASYSTOLE / PEA (ADULT).....	15
CARDIAC ARREST – V-FIB / PULSELESS V-TACH (ADULT).....	16
CARDIAC ARREST (GENERAL) – ADULT.....	17
BRADYCARDIA (ADULT) .....	18
TACHYCARDIA – SVT AND V-TACH W/PULSE (ADULT) .....	20
CARDIAC ARREST – POST RESUSCITATION CARE (ADULT).....	22
DEATH DETERMINATION – ALL AGES .....	23

### SECTION 3 – DYSRHYTHMIA MANAGEMENT: PEDIATRIC

GENERAL – CARDIAC ARREST (PEDIATRIC) .....	24
CARDIAC ARREST – ASYSTOLE / PEA (PEDIATRIC).....	26
CARDIAC ARREST – V-FIB / PULSELESS V-TACH (PEDIATRIC).....	27
CARDIAC ARREST (GENERAL) – PEDIATRIC .....	28
BRADYCARDIA (PEDIATRIC).....	29
SUPRAVENTRICULAR TACHYCARDIA (PEDIATRIC).....	31
VENTRICULAR TACHYCARDIA W/PULSE (PEDIATRIC) .....	33

### SECTION 4 – MEDICAL AND TRAUMA

ALTERED MENTAL STATUS.....	35
ALLERGIC REACTION / ANAPHYLAXIS .....	36
BURNS .....	37
BURNS – RULE OF NINES .....	40
CARDIAC CHEST PAIN .....	41
BEHAVIORAL / PATIENT RESTRAINT (NON-TRAUMATIC) .....	43
ENVIRONMENTAL – HEAT EXPOSURE .....	44
ENVIRONMENTAL – HYPOTHERMIA .....	46

BITES AND ENVENOMATION – LAND .....	48
HYPERGLYCEMIA .....	49
HYPOGLYCEMIA .....	50
NAUSEA / VOMITING.....	51
OB / GYN – CHILDBIRTH / LABOR / DELIVERY .....	52
OB / GYN – CARE OF THE NEWBORN.....	54
OB / GYN – APGAR SCORE .....	54
NEWBORN / NEONATAL RESUSCITATION.....	55
PROLAPSED UMBILICAL CORD.....	58
BREECH PRESENTATION.....	58
LIMB PRESENTATION .....	59
CARDIAC ARREST – HYPOTHERMIA – THERAPEUTIC.....	60
AIRWAY OBSTRUCTION – FOREIGN BODY .....	61
RESPIRATORY DISTRESS – ASTHMA / COPD.....	63
RESPIRATORY DISTRESS – CROUP / EPIGLOTTITIS .....	65
PULMONARY EDEMA / CHF .....	66
SEIZURES.....	68
SHOCK – HYPOVOLEMIA .....	70
SHOCK – NON-HYPOVOLEMIA (CARDIOGENIC) .....	72
SPINAL CORD INJURY.....	74
SPINAL IMMOBILIZATION / CLEARANCE.....	75
ST ELEVATION MYOCARDIAL INFARCTION (STEMI) .....	76
STROKE / TIA.....	78
STROKE / TIA – CINCINNATI PRE-HOSPITAL STROKE SCALE.....	79
OVERDOSE / POISONING / TOXIC INGESTION .....	80
GENERAL .....	80
ALCOHOL WITHDRAWAL .....	81
NARCOTICS / OPIATES.....	82
ORAL HYPOGLYCEMIC AGENTS .....	82
TRICYCLIC ANTIDEPRESSANTS.....	83
CHOLINERGICS .....	84
CALCIUM CHANNEL BLOCKERS.....	85
BETA BLOCKERS .....	86
STIMULANTS.....	87
EXPOSURE - CYANIDE .....	88
INJURY – BLEEDING / HEMORRHAGE CONTROL .....	89
INJURY – CRUSH SYNDROME .....	90
TRAUMA TRIAGE AND MANAGEMENT.....	91

<b>SECTION 5 – PROCEDURES</b>
-------------------------------

12-LEAD ECG.....	94
CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) .....	97
CRICOTHYROTOMY, SURGICAL.....	98

DEFIBRILLATION, MANUAL .....	99
END-TIDAL CO <sub>2</sub> DETECTION / MONITORING, CAPNOGRAPHY .....	100
END-TIDAL CO <sub>2</sub> DETECTION, COLORIMETRIC .....	102
ENDOTRACHEAL TUBE INTRODUCER.....	104
GASTRIC DECOMPRESSION .....	105
GLUCOMETRY.....	106
INTRAOSSEOUS INSERTION, EZ-IO .....	107
INTUBATION, OROTRACHEAL .....	112
KING LARYNGOTRACHEAL AIRWAY .....	115
SUCTIONING, ADULT / PEDIATRIC .....	118
SUCTIONING, MECONIUM.....	119
SUCTIONING, TRACHEOBRONCHIAL.....	120
SYNCHRONIZED CARDIOVERSION.....	121
THORACENTESIS, NEEDLE .....	123
TOURNIQUET .....	124
TRACHEOSTOMY OBSTRUCTION .....	125
TRANSCUTANEOUS PACING.....	126
VEIN CANNULATION, EXTERNAL JUGULAR.....	127
VEIN CANNULATION, PERIPHERAL.....	128

<b>SECTION 6 – DRUG FORMULARY</b>
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ADENOSINE (ADENOCARD®) .....	130
ALBUTEROL (PROVENTIL®).....	131
AMIODARONE (CORDARONE®) .....	132
ASPIRIN .....	133
ATROPINE .....	134
CALCIUM CHLORIDE 10% .....	135
DEXTROSE (GLUCOSE®).....	136
DIAZEPAM (VALIUM®) .....	137
DIPHENHYDRAMINE (BENADRYL®).....	138
DOPAMINE (INTROPIN®).....	139
EPINEPHRINE 1:1,000.....	140
EPINEPHRINE 1:10,000.....	141
EPIPEN®, EPIPEN JR.® .....	142
FENTANYL (SUBLIMAZE®).....	143
GLUCAGON (GLUCAGEN®) .....	144
HALOPERIDOL (HALDOL®) .....	145
HYDROXOCOBALAMIN (CYANOKIT®).....	146
IPRATROPIUM (ATROVENT®).....	147

LIDOCAINE (XYLOCAINE®) .....	148
MAGNESIUM SULFATE .....	149
METERED DOSE INHALER .....	150
METHYLPREDNISOLONE (SOLU-MEDROL®) .....	151
METOPROLOL (LOPRESSOR®).....	152
MIDAZOLAM (VERSED®).....	153
MORPHINE .....	154
NALOXONE (NARCAN®).....	155
NITROGLYCERIN (NITROSTAT®).....	156
NITROGLYCERIN, ASSISTED (NITROSTAT®).....	158
ONDANSETRON (ZOFRAN®) .....	159
ORAL GLUCOSE (INSTA-GLUCOSE®).....	160
SODIUM BICARBONATE .....	161
VASOPRESSIN (PITRESSIN®) .....	162

**SECTION 7 – REFERENCES**

ABBREVIATIONS AND SYMBOLS.....	163
DECEASED PATIENT GUIDELINES.....	170
DRUG BY WEIGHT CHART .....	171
GLASGOW COMA SCALE .....	172
IV INFUSION CHART .....	173
PEDIATRIC REFERENCES.....	174
WONG-BAKER FACES PAIN RATING SCALE .....	175
POUNDS-TO-KILOGRAMS CONVERSION TABLE .....	176
TELEPHONE NUMBERS .....	177
TRIAGE, JUMPSTART (CHILDREN).....	179
TRIAGE, START (ADULT).....	180
INDEX.....	181
REFERENCES .....	184

## INTRODUCTION

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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 operational medical director or medical control. The National EMS Scope of Practice Model, the Virginia EMS Education Standards (VEMSES) 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	<b>EMR</b>
Emergency Medical Technician	<b>EMT</b>
Advanced EMT	<b>AEMT</b>
Intermediate	<b>INT</b>
Paramedic	<b>PM</b>

## **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 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**

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 EMS was 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

	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 EMS was 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

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. **Alert** | Responds to **Verbal** stimuli | Responds to **Painful** stimuli | **Unresponsive** to verbal / painful stimuli (no gag or cough)
  - b. If the victim is unresponsive with no breathing or no normal breathing (ie only gasping), see **CARDIAC ARREST (BLS) – ADULT**.
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.

	EMR	EMT	AEMT	INT	PM
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5.	•	•	•	•	•
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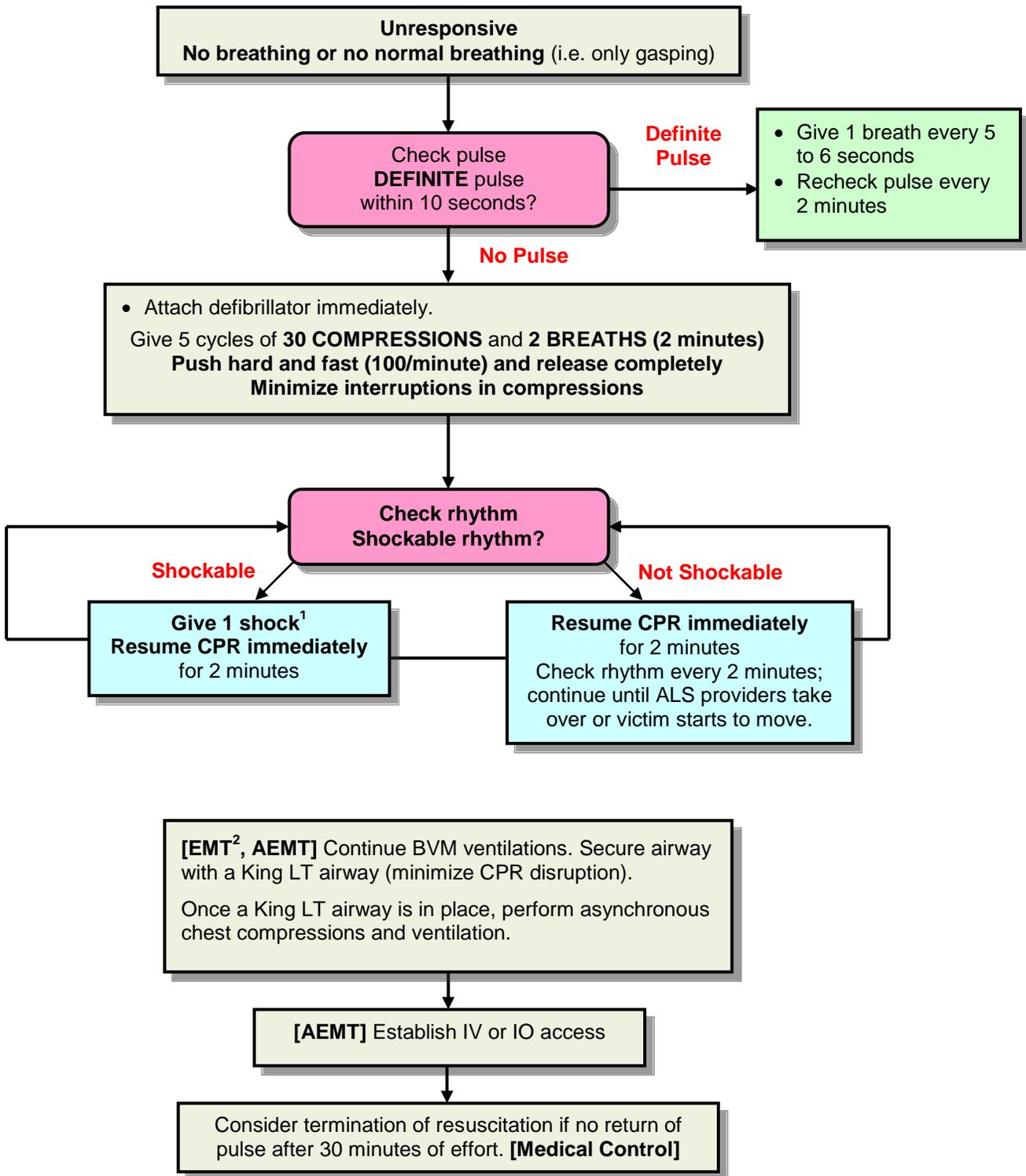




## Protocol 1.5 – GENERAL – UNIVERSAL PATIENT CARE / REASSESSMENT

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.

EMR	EMT	AEMT	INT	PM
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- <sup>1</sup> 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. If a monophasic defibrillator is used, providers should deliver an initial shock of 360 J and use that dose for subsequent shocks.
- <sup>2</sup> 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.

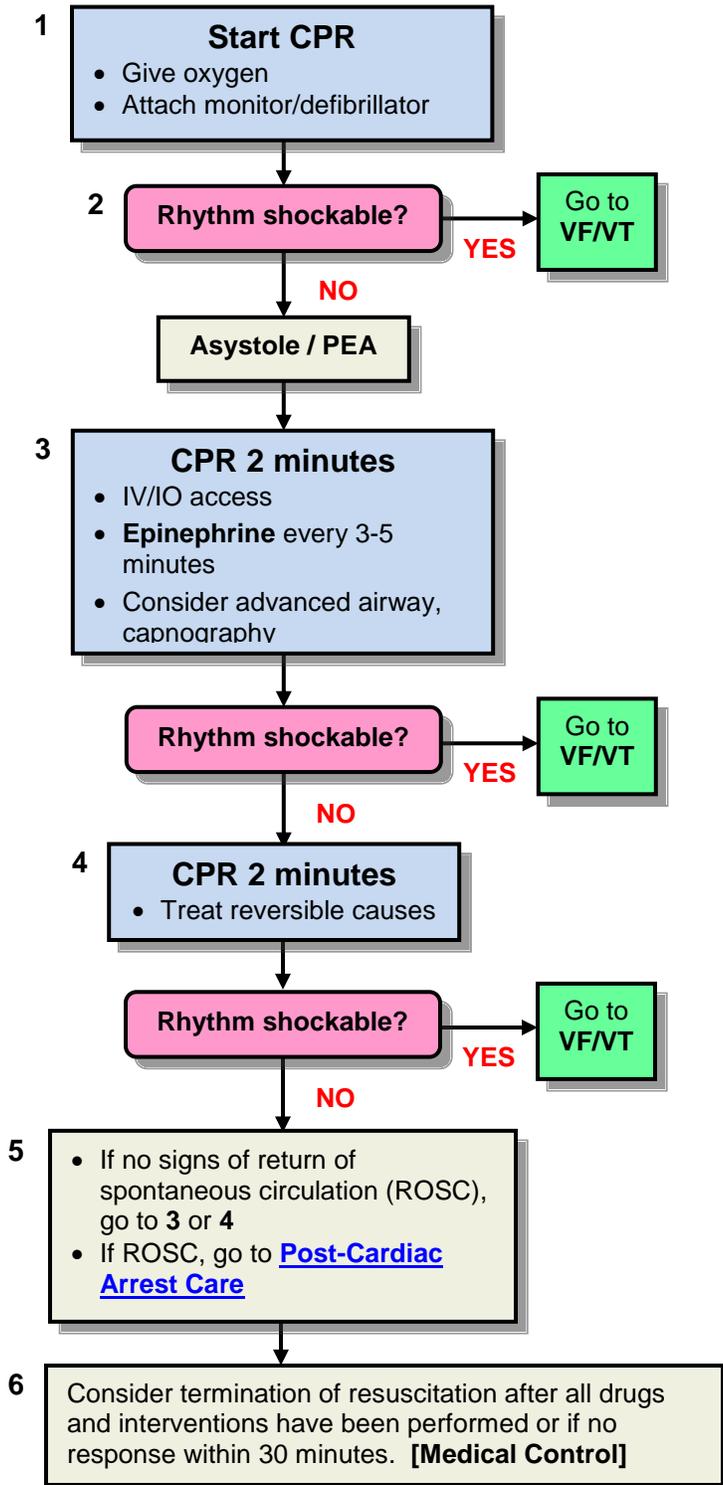
### Key Points: BASIC LIFE SUPPORT – ADULT

- 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.**
- When a rhythm check reveals VF/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 (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.
- **Minimize the frequency and duration of interruptions in compressions to maximize the number of compressions delivered per minute.**
- “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 at least 100 compressions per minute, with a compression depth of at least 2 inches (approximately 5 cm). Allow the chest to recoil completely after each compression, and allow approximately equal compression and relaxation times.
- If ALS care has been requested but is not available, initiate transport after 3 “No-Shock” advised or 6 “shocks” delivered.
- Resuscitation may be terminated by BLS or ALS providers under the direction of **[Medical Control]**.

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

Maneuver	Recommendations		
Component	Adult	Child	Infant <sup>1</sup>
<b>Recognition</b>	Unresponsive (for all ages)		
	No breathing or no normal breathing (ie, only gasping)	No breathing or only gasping	
	No pulse palpated within 10 seconds for all ages (HCP only)		
<b>CPR sequence</b>	C-A-B		
<b>Compression rate</b>	At least 100/minute		
<b>Compression depth</b>	At least 2 inches (5 cm)	At least $\frac{1}{3}$ AP diameter About 2 inches (5 cm)	At least $\frac{1}{3}$ AP diameter About 1½ inches (4 cm)
<b>Chest wall recoil</b>	Allow complete recoil between compressions Rotate compressors every 2 minutes		
<b>Compression interruptions</b>	Minimize interruptions in chest compressions Attempt to limit interruptions to <10 seconds		
<b>Airway</b>	Head tilt – chin lift (suspected trauma: jaw thrust)		
<b>Compression-to-ventilation ratio (until advanced airway placed)</b>	30:2 1 or 2 rescuers	30:2 (single rescuer) 15:2 (two rescuers)	
<b>Ventilations with advanced airway</b>	1 breath every 6-8 seconds (8-10 breaths/minute) Asynchronous with chest compressions. About 1 second per breath Visible chest rise		
<b>Defibrillation</b>	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.		

<sup>1</sup> Newborn information not included. See [OBSTETRICS – NEWBORN / NEONATAL RESUSCITATION](#).



**CPR Quality**

- Push hard ( $\geq 2$  inches) and fast ( $\geq 100$ /minute) and allow complete chest recoil
- Minimize interruptions in compressions
- Avoid excessive ventilation
- Rotate compressor every 2 minutes
- If no advanced airway, 30:2 compression-ventilation ratio
- Quantitative waveform capnography
  - If  $ETCO_2 < 10$  mm Hg, attempt to improve CPR quality

**Return of Spontaneous Circulation (ROSC)**

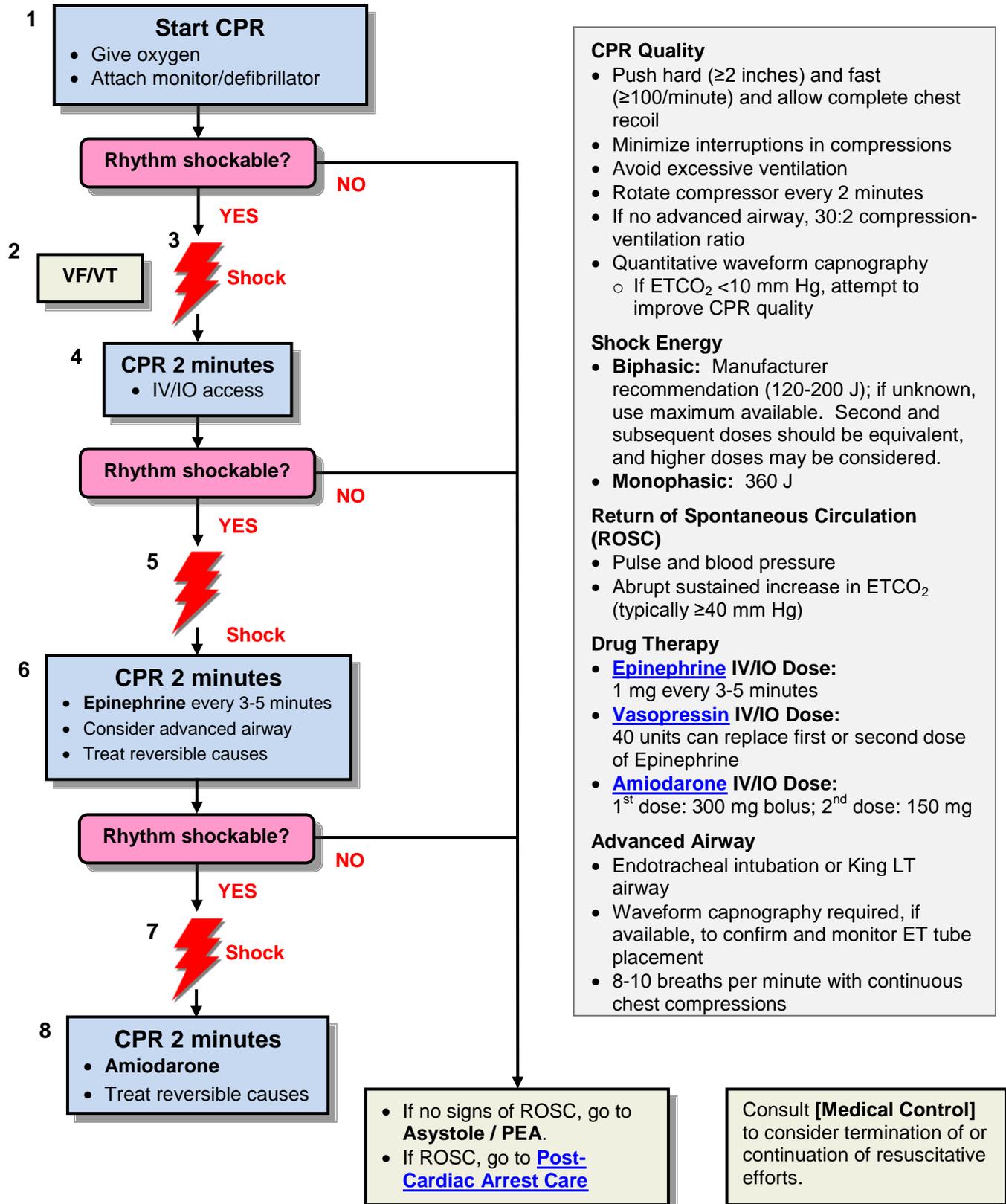
- Pulse and blood pressure
- Abrupt sustained increase in  $ETCO_2$  (typically  $\geq 40$  mm Hg)

**Drug Therapy**

- **Epinephrine IV/IO Dose:** 1 mg every 3-5 minutes
- **Vasopressin IV/IO Dose:** 40 units can replace first or second dose of Epinephrine

**Advanced Airway**

- Endotracheal intubation or King LT airway
- Waveform capnography required, if available, to confirm and monitor ET tube placement
- 8-10 breaths per minute with continuous chest compressions



## CARDIAC ARREST (GENERAL) – ADULT

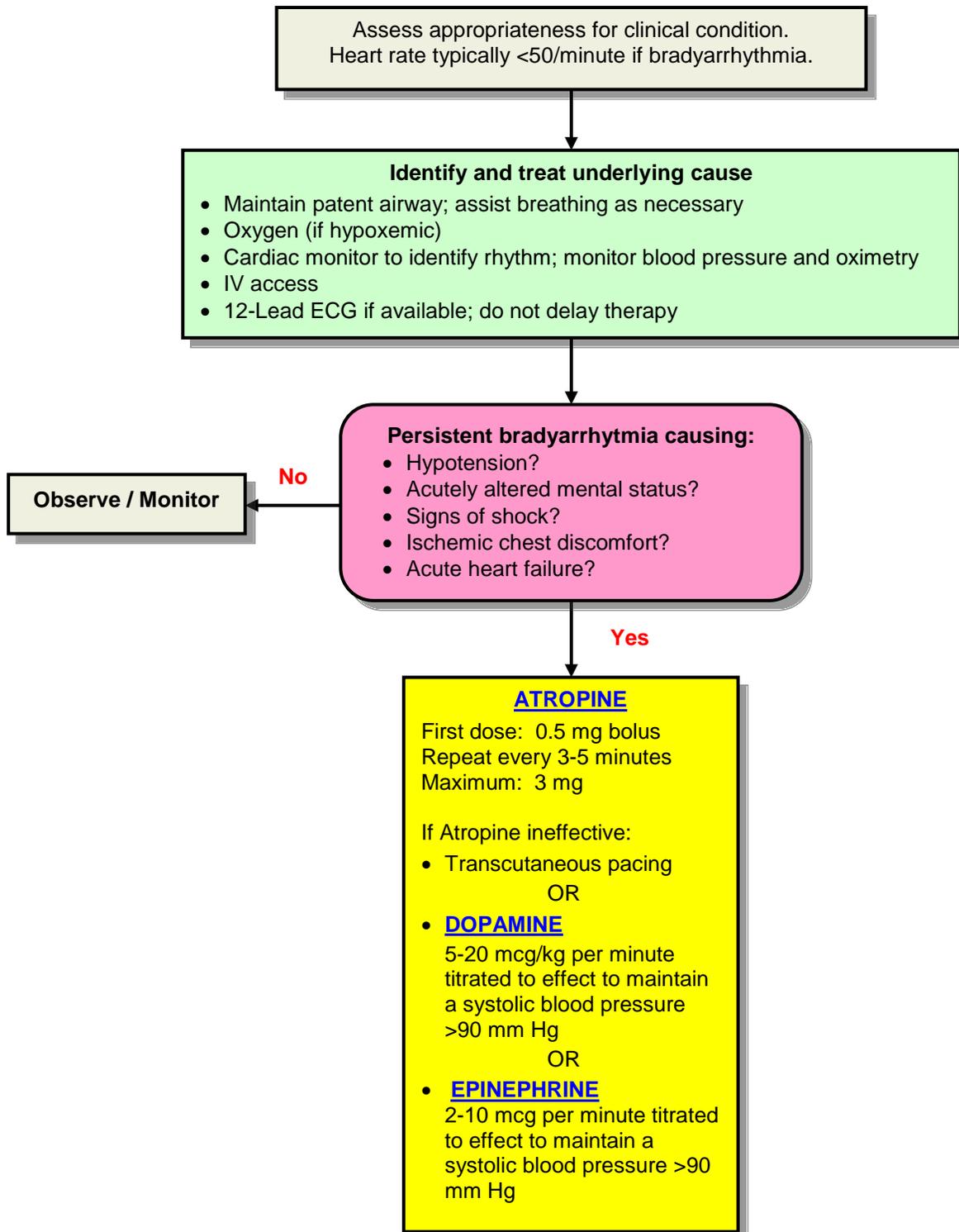
Scope **EMR** **EMT** **AEMT** **INT** **PM**

### Key Points: CARDIAC ARREST (GENERAL) – ADULT

- 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 10 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 8 to 10 breaths/minute. Check rhythm every 2 minutes.
- When a rhythm check reveals VF/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 (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.
- **Minimize the number of times that chest compressions are interrupted. Periodic pauses in CPR should be as brief as possible and only as necessary to assess rhythm, shock VF/VT, perform a pulse check when an organized rhythm is detected, or place an advanced airway.**
- “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 at least 100 compressions per minute, with a compression depth of 2 inches (5 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.
- The routine use of cricoid pressure in cardiac arrest is not recommended.
- Use quantitative waveform capnography 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  $\text{ETCO}_2 < 10$  mm Hg, consider trying to improve CPR quality by optimizing chest compression parameters. If  $\text{ETCO}_2$  abruptly increases to a normal value (35 to 40 mm Hg), it is reasonable to consider that this is an indicator of ROSC.
- If SVT  $\geq 170$ , perform immediate synchronized cardioversion in addition to other indicated procedures.
- After conversion from **shock refractory** VF/VT to a perfusing rhythm, consider a slow infusion of **AMIODARONE** at 1 mg/minute IV. **Post resuscitative drips should be in consultation with [Medical Control].**
- If patient converts from **shock refractory** VF/VT and Amiodarone has NOT been given during the cardiac arrest, administer a rapid 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].**

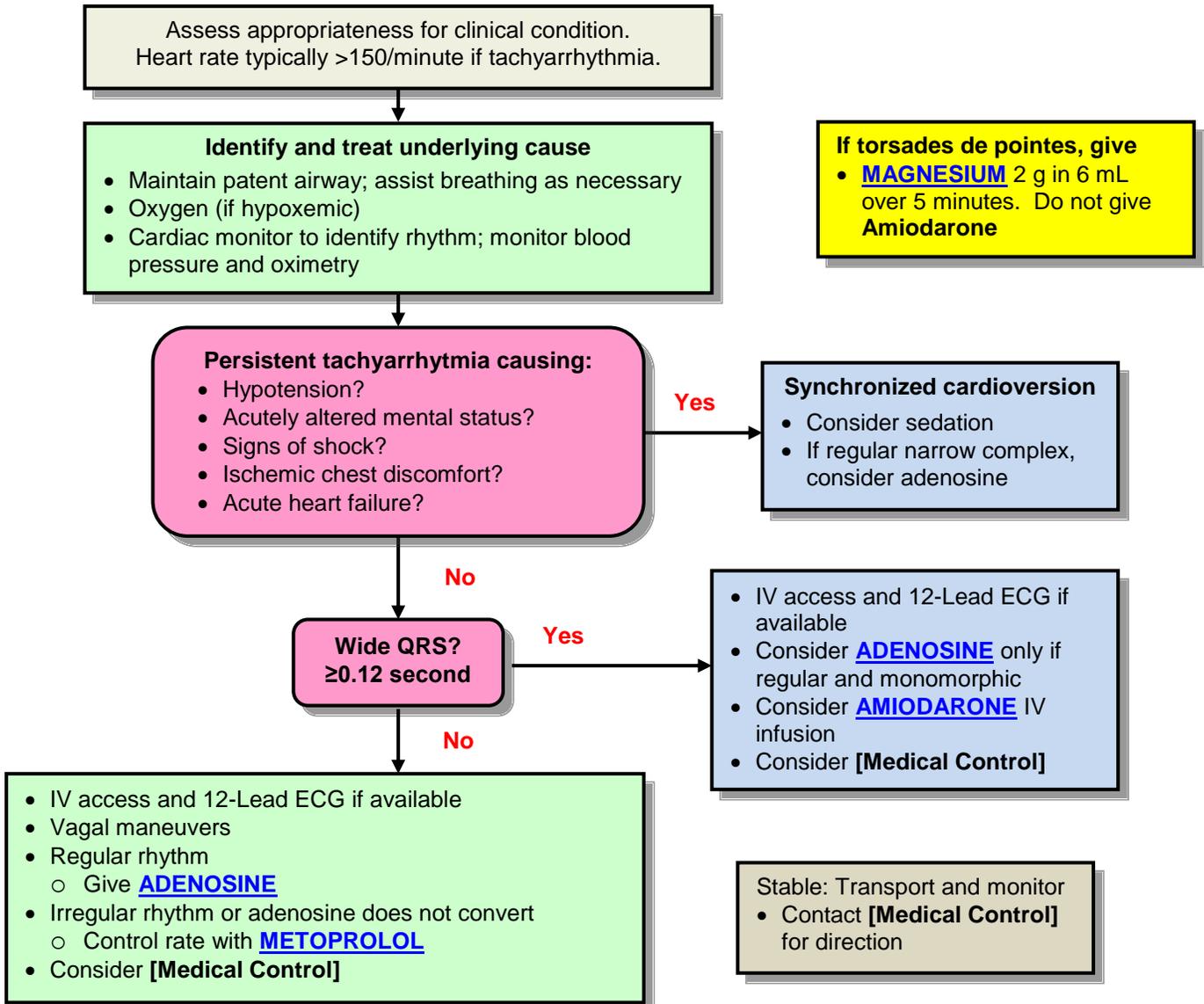
Search for and treat reversible causes.

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



**Key Points: BRADYCARDIA – ADULT**

- Immediate pacing might be considered in unstable patients with high-degree AV block or 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 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.
- Ondansetron may be used for nausea in a severely symptomatic bradycardic patient.



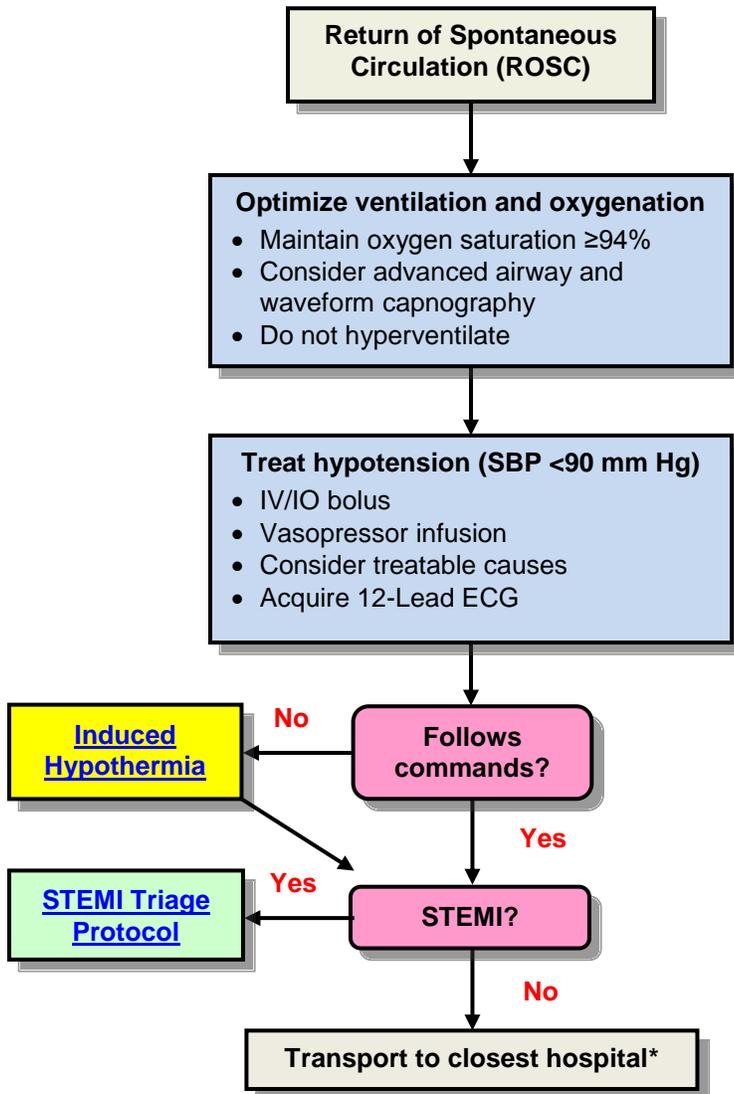
**If torsades de pointes, give**

- **MAGNESIUM** 2 g in 6 mL over 5 minutes. Do not give **Amiodarone**

<p><b>Synchronized Cardioversion</b></p> <p>Initial recommended doses:</p> <ul style="list-style-type: none"> <li>• Narrow regular: 50-100 J</li> <li>• Narrow irregular: 120-200 J biphasic or 200 J monophasic</li> <li>• Wide regular: 100 J</li> <li>• Wide irregular defibrillation dose (NOT synchronized)</li> </ul>	<p><b>Adenosine IV Dose:</b></p> <ul style="list-style-type: none"> <li>• First dose: 6 mg rapid IV push; follow with NS flush.</li> <li>• Second dose: 12 mg if required.</li> </ul> <p><b>Amiodarone IV Dose:</b></p> <ul style="list-style-type: none"> <li>• First dose: 150 mg over 10 minutes. Repeat if needed if VT recurs. Follow by maintenance infusion of 1 mg/minute.</li> </ul> <p><b>Metoprolol IV Dose:</b></p> <ul style="list-style-type: none"> <li>• First dose: 5 mg slow IV push. Repeat every 5 minutes to a maximum total dose of 15 mg.</li> </ul>
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### 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 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 a rapid 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. **Post resuscitative drips should be in consultation with [Medical Control].**
- 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. Cardioversion with monophasic waveforms should begin at 200 J and increase in stepwise fashion if not successful.
  - **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**

- Avoid excessive ventilation. Start at 10-12 breaths/minute and titrate to target ETCO<sub>2</sub> of 35-40 mm Hg.
- Titrate oxygen to minimum necessary to achieve SpO<sub>2</sub> ≥94%.
  - Start with 100% oxygen during the CPR phase
  - After ROSC, progressively reduce oxygen flow to the BVM until at room air or SpO<sub>2</sub> turn the oxygen flow to the bag down progressively until room air or SpO<sub>2</sub> ≥94%.

**IV Bolus for hypotension**

1-2 liters Normal Saline. If inducing hypothermia, may use 4°C fluid.

**Dopamine Infusion**

5-20 mcg/kg per minute titrated to maintain a systolic blood pressure >90 mm Hg

**Epinephrine Infusion**

2-10 mcg per minute titrated to maintain a systolic blood pressure >90 mm Hg

**Reversible Causes**

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

Scope	EMR	EMT	AEMT	INT	PM
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Resuscitation efforts are to be withheld on patients in cardiopulmonary arrest in accordance with the criteria listed below.

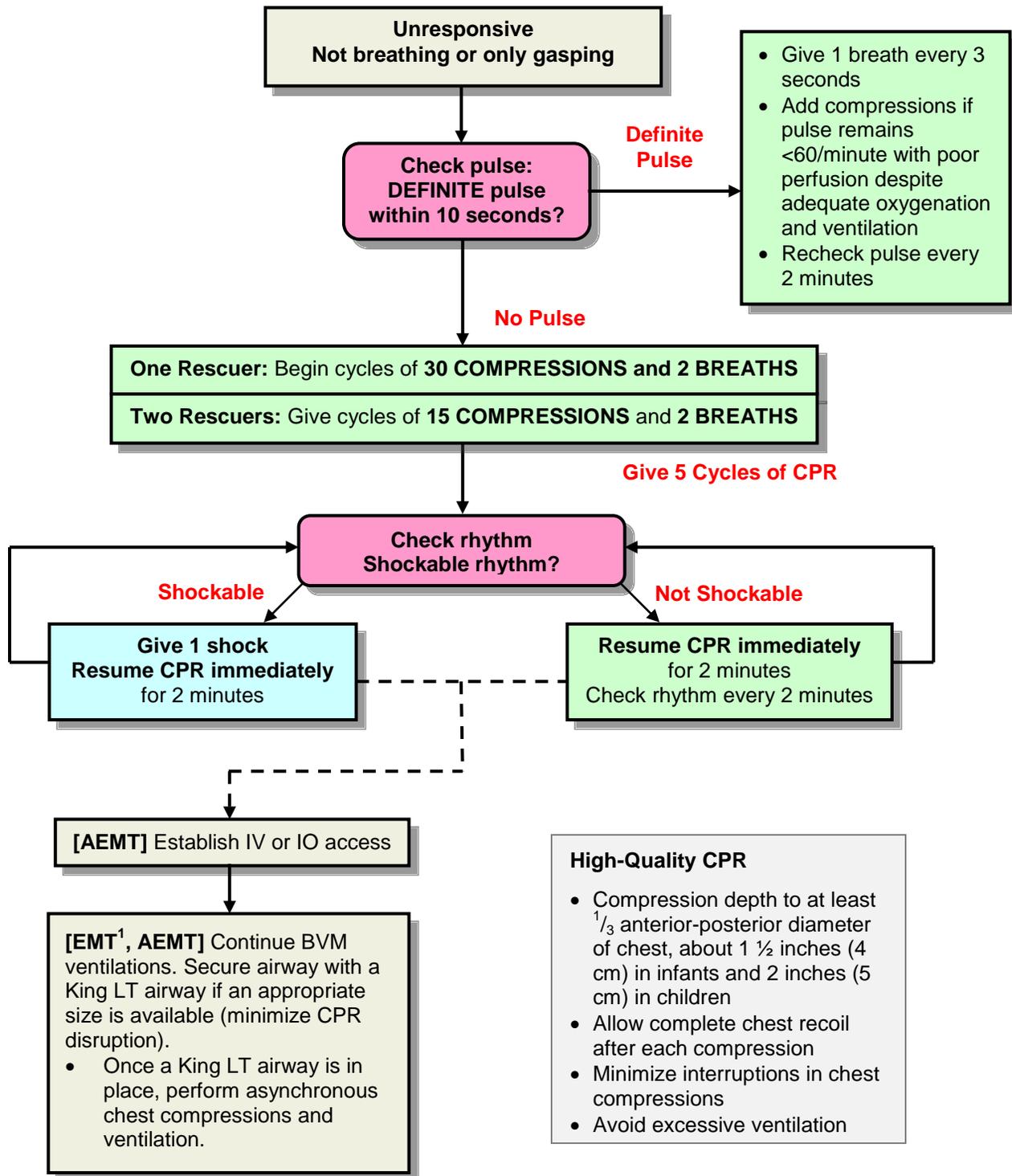
- Patient has a valid do not resuscitate order in accordance with Virginia DDNR regulations.
- Situations where attempts to perform CPR would place the rescuer at risk of serious injury or mortal peril.
- Clinical signs of obvious, irreversible death:
  - Decomposition.
  - Signs of rigor mortis such as rigidity or stiffening of muscular tissues and joints in the body, which occurs anytime 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-tinted 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.

**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 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.

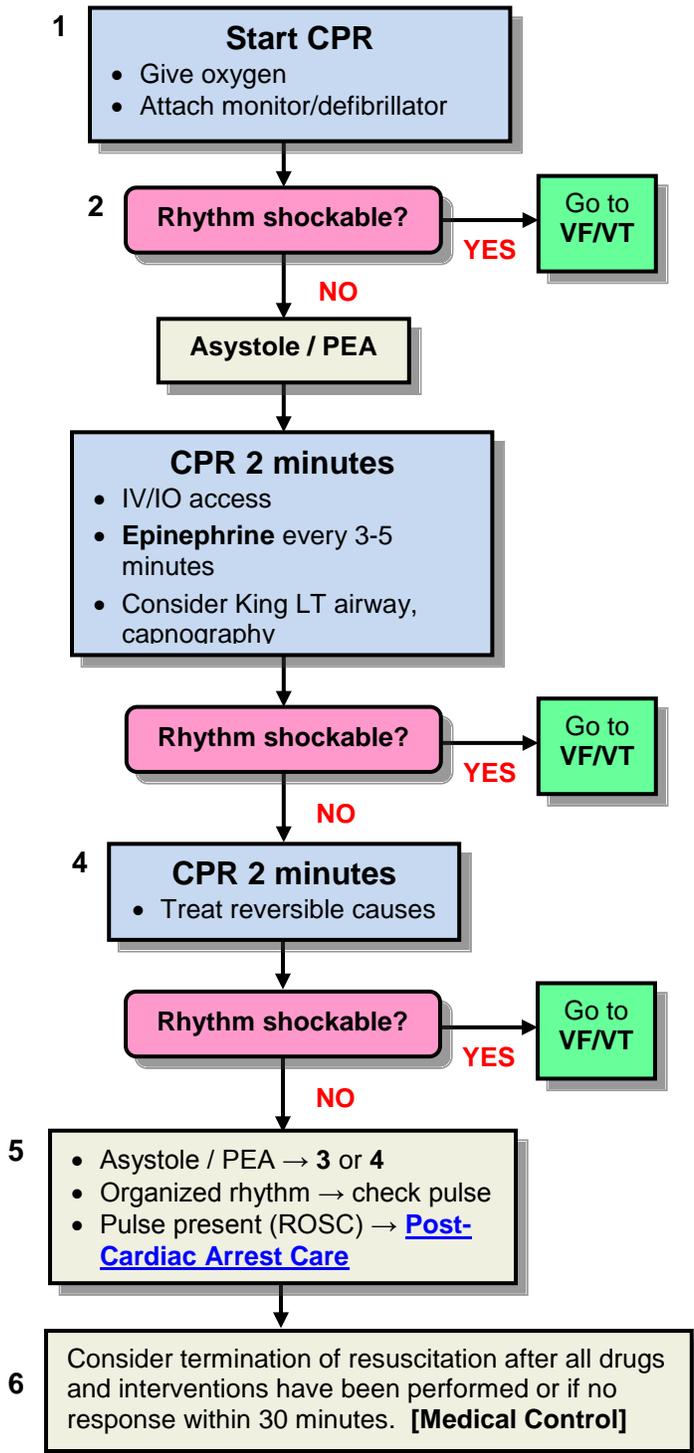
Once the death determination has been made, see [DECEASED PATIENT GUIDELINES](#).



<sup>1</sup> 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 – 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 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, a manual defibrillator is preferred to an AED for defibrillation. 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.



**CPR Quality**

- Push hard ( $\geq 1/3$  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

**Drug Therapy**

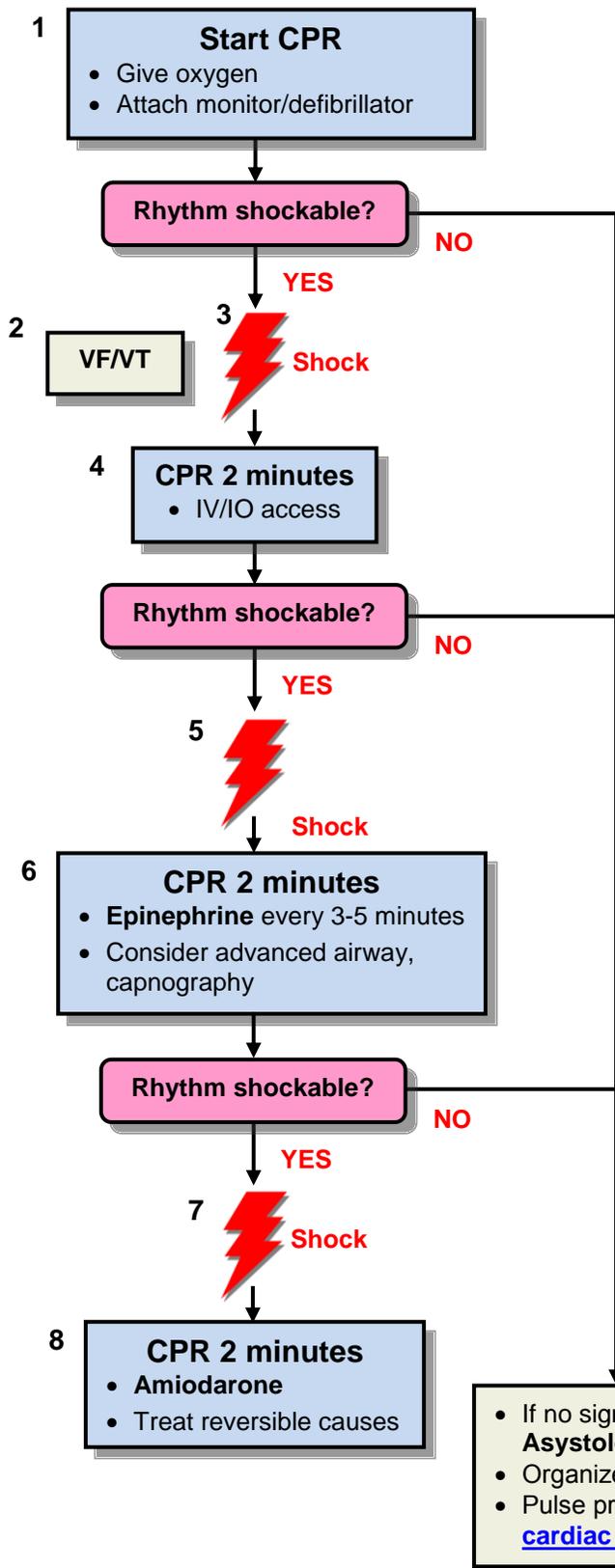
- **Epinephrine IO/IV Dose:** 0.01 mg/kg (0.1 mL/kg of 1:10,000 concentration). Repeat every 3-5 minutes.

**Advanced Airway**

- King LT airway or Endotracheal Intubation
- Waveform capnography required, if available, recommended to confirm and monitor airway placement
- Once advanced airway in place give 1 breath every 6-8 seconds (8-10 breaths per minute)

**Reversible Causes**

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



**CPR Quality**

- Push hard ( $\geq \frac{1}{3}$  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  $\geq 4$  J/kg, maximum 10 J/kg or adult dose.

**Drug Therapy**

- **Epinephrine IO/IV Dose:** 0.01 mg/kg (0/1 mL/kg of 1:10,000 concentration). Repeat every 3-5 minutes.
- **Amiodarone IO/IV Dose:** 5 mg/kg bolus during cardiac arrest. May repeat up to 2 times for refractory VT/pulseless VT. Maximum dosage 300 mg.

**Advanced Airway**

- King LT airway or Endotracheal Intubation
- Waveform capnography required, if available, to confirm and monitor airway placement
- Once advanced airway in place give 1 breath every 6-8 seconds (8-10 breaths per minute)

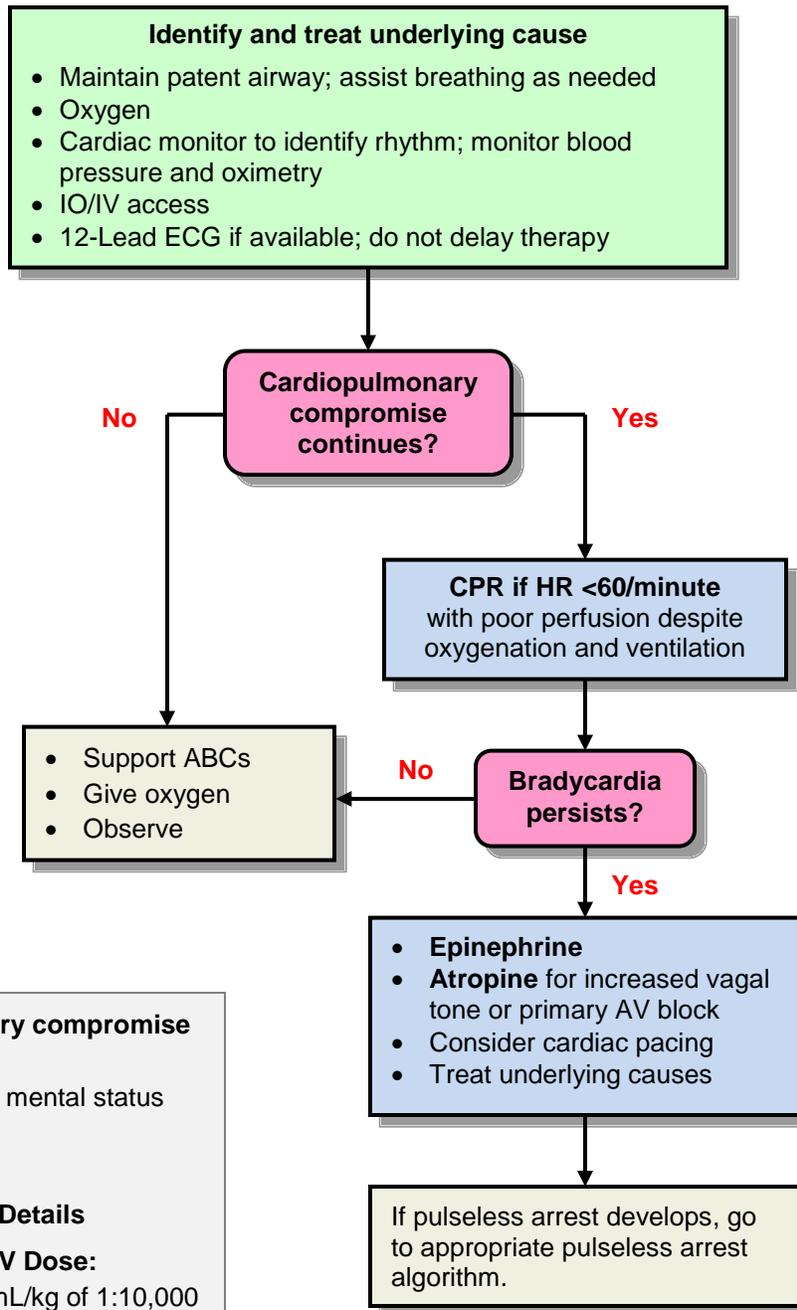
**Reversible Causes**

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

Consider termination of resuscitation after all drugs and interventions have been performed or if no response within 30 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 25 mg/kg IV/IO, maximum 2 g for torsades de pointes.**
- 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 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.
- Vasopressin is not used in pediatric patients.
- Search for and treat reversible causes.
  - Hypovolemia
  - Hypoxia
  - Hydrogen ion (acidosis)
  - Hypo-/hyperkalemia
  - Hypothermia
  - Hypoglycemia (Not AHA)
  - Tension pneumothorax
  - Tamponade, cardiac
  - Toxins
  - Thrombosis, pulmonary
  - Thrombosis, coronary



**Cardiopulmonary compromise**

- Hypotension
- Acutely altered mental status
- Signs of shock

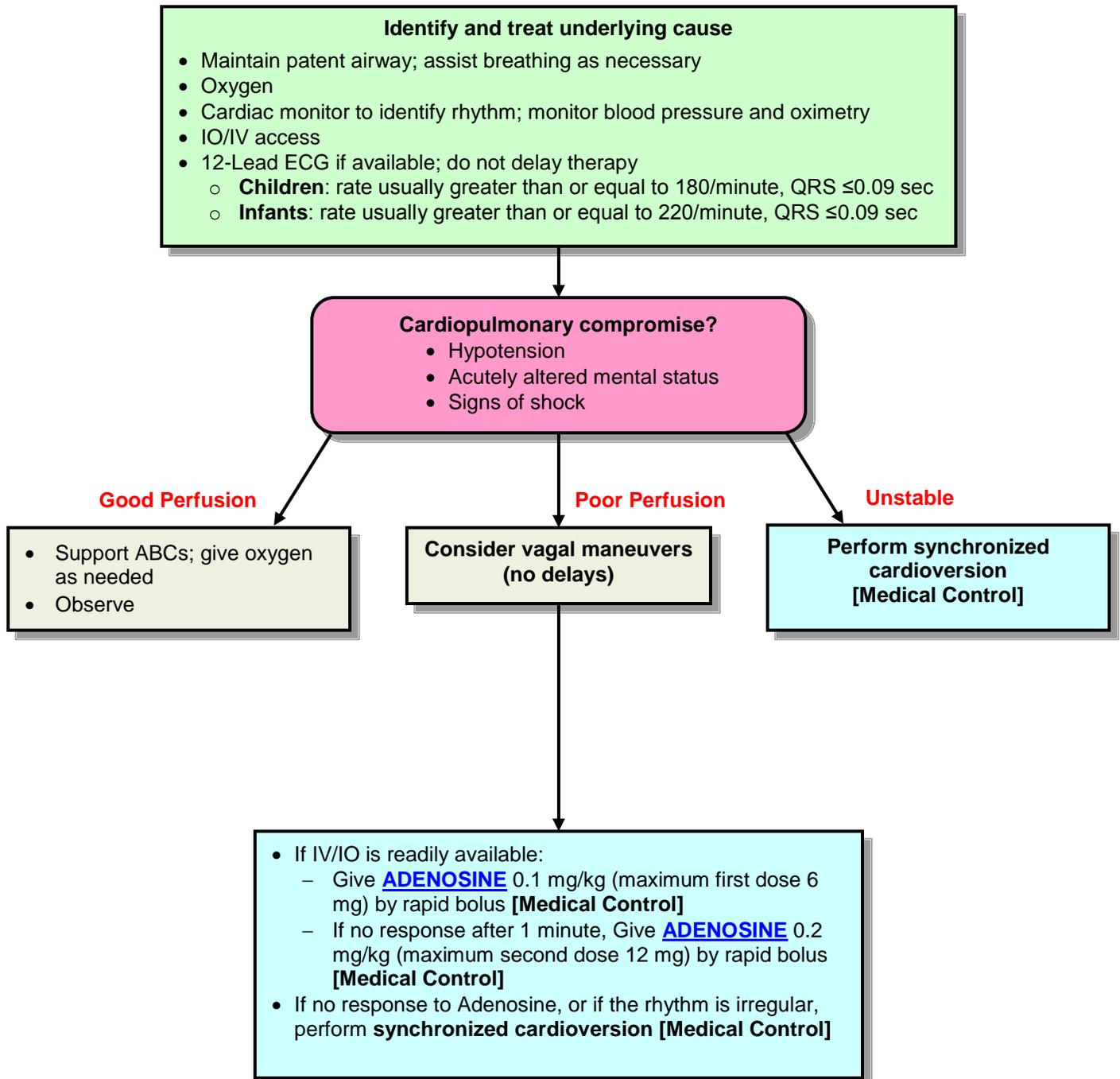
**Doses/Details**

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

**Atropine IO/IV 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 (Not AHA)
  - Tension pneumothorax
  - Tamponade, cardiac
  - Toxins
  - Thrombosis, pulmonary
  - Thrombosis, coronary



**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**

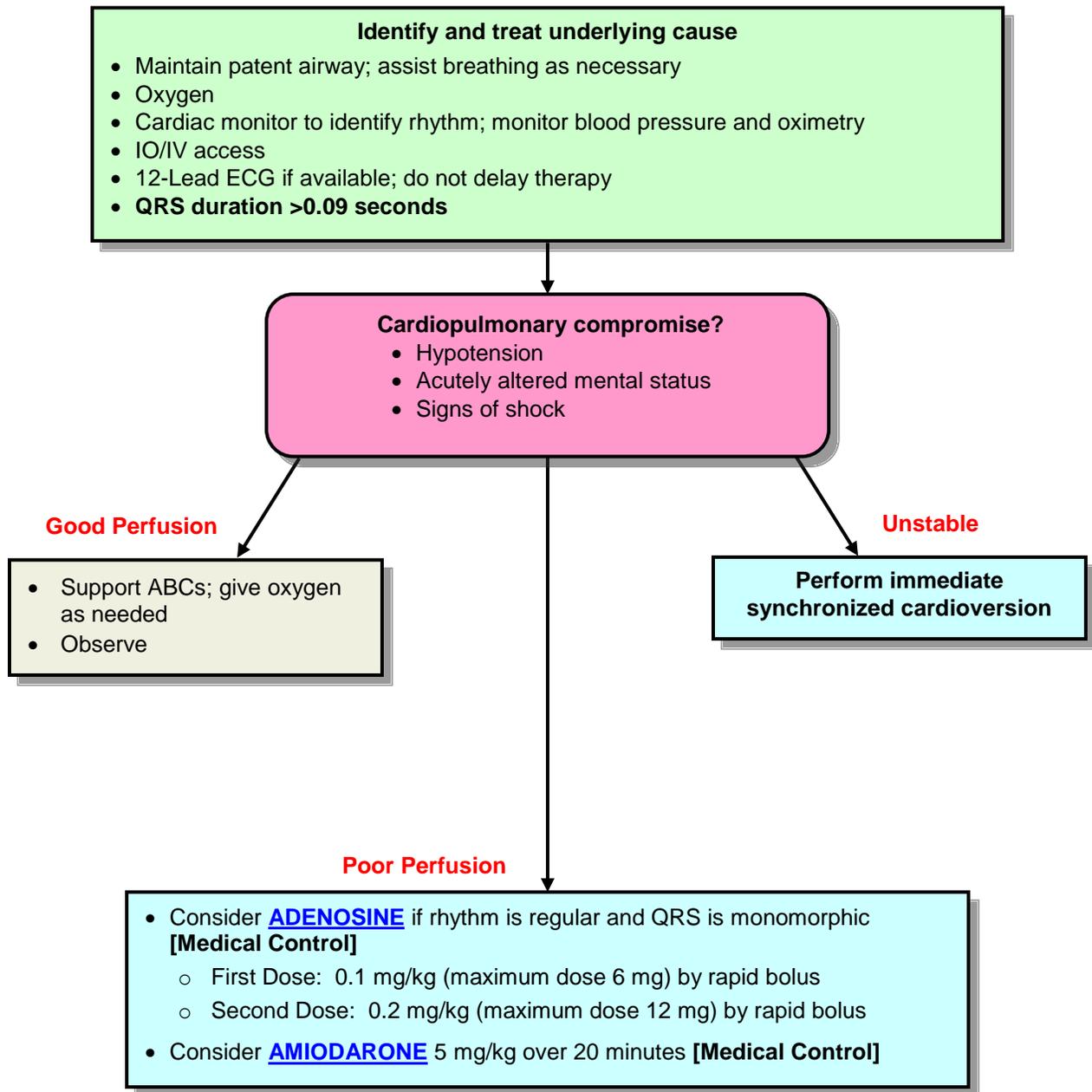
- Compatible history consistent with known cause
- P waves present/normal
- Variable R-R; constant P-R
- Infants: rate usually less than 220 bpm
- Children: rate usually less than 180 bpm

**Probable Supraventricular Tachycardia**

- Compatible history (vague, nonspecific)
- P waves absent/abnormal
- HR not variable
- History of abrupt rate changes
- Infants: rate usually  $\geq 220$  bpm
- Children: rate usually  $\geq 180$  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	○ Hypothermia	○ Toxins
○ Hypoxia	○ Hypoglycemia (Not AHA)	○ Thrombosis, pulmonary
○ Hydrogen ion (acidosis)	○ Tension pneumothorax	○ Thrombosis, coronary
○ Hypo-/hyperkalemia	○ Tamponade, cardiac	



### 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. **[Medical Control]**
- 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	○ Hypothermia	○ Toxins
○ Hypoxia	○ Hypoglycemia (Not AHA)	○ Thrombosis, pulmonary
○ Hydrogen ion (acidosis)	○ Tension pneumothorax	○ Thrombosis, coronary
○ Hypo-/hyperkalemia	○ Tamponade, cardiac	

## Protocol 4.1

### MEDICAL – ALTERED MENTAL STATUS

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 via non-rebreather mask at 10-15 L/minute as necessary.
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, refer to the [HYPOGLYCEMIA](#) protocol.
8. For glucose greater than 300 mg/dL, refer to the [HYPERGLYCEMIA](#) protocol.
9. For a suspected narcotic overdose complicated by respiratory depression, refer to the [TOXICOLOGY – POISONING/OVERDOSE](#) protocol.
10. Place patient on cardiac monitor.
11. Transport as soon as possible.

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#### 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

1. Perform general patient management ([SECTION 1](#)).
2. Support life-threatening problems associated with airway, breathing, and circulation.
3. Administer oxygen via non-rebreather mask at 10-15 L/minute as necessary.
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 in 10 minutes if available and no response from patient. or
6. Give [EPINEPHRINE 1:1,000](#) 0.01 mg/kg up to 0.3 mg IM. Repeat dose in 10 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) and [IPRATROPIUM](#) 0.5 mg via small volume nebulizer. Repeat as needed with Albuterol only.
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<sub>2</sub>), slow the IV to KVO.
12. Perform reassessment as indicated.
13. [EPINEPHRINE](#) 1:10,000 0.3 mg to 0.5 mg for dire circumstances. **[Medical Control]**

EMR	EMT	AEMT	INT	PM
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#### 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

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### American Burn Association – BURN UNIT REFERRAL CRITERIA

- Partial thickness and full thickness burns greater than 10% of the total body surface area (BSA) in patients under 10 or over 50 years of age.
- Partial thickness burns and full thickness burns greater than 20% BSA in other age groups.
- 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 greater than 5% BSA 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 illness that could complicate management, prolongs recovery, or affects mortality.
- Any burn patient in whom concomitant trauma poses an increased risk of morbidity or mortality may be treated initially in a trauma center until stable before transfer to a burn center.
- 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 and emotional or long term rehabilitative support, including cases involving child abuse and neglect.

### 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.
  - **Hydrofluoric Acid** is a common corrosive that reacts with water. It produces heat and subsequent chemical and thermal injuries resulting in extreme pain to the affected areas. Treatment to the affected areas is the use of Calcium Gluconate Gel.

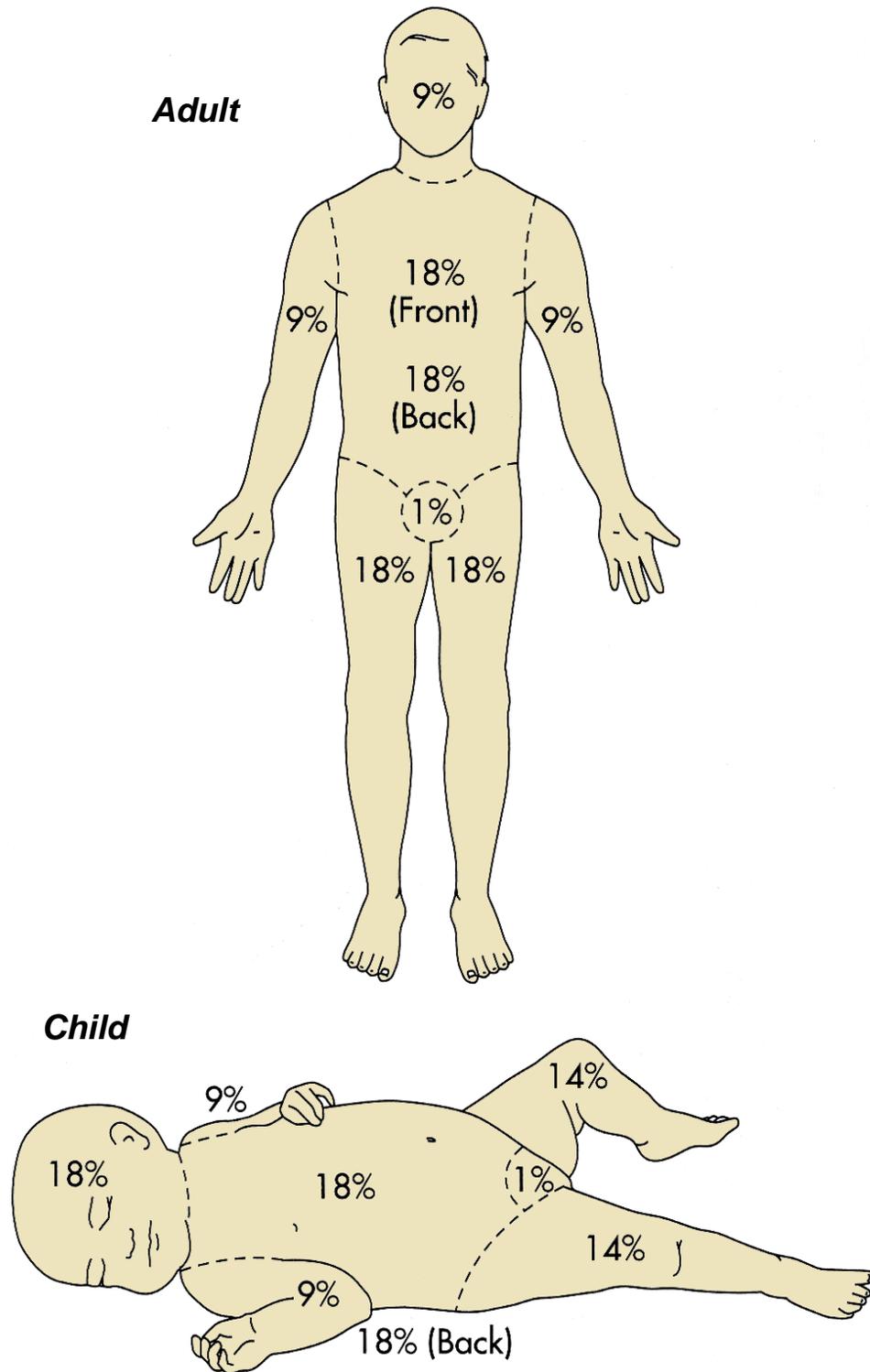


Figure 4.2.1 Rule of Nines



## Protocol 4.4 – MEDICAL – CARDIAC CHEST PAIN

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### 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.
- 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.
- 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.
- Avoid Nitroglycerin 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 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).
- Transport performing interventions en route. Time is muscle!



## Protocol 4.6

### ENVIRONMENTAL – HEAT EXPOSURE

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 via non-rebreather mask at 10-15 L/minute as necessary.
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. Give ¼ teaspoon salt in one liter of water. Other rehydration formulas such as Gatorade™ may be given as long as the patient maintains a patent airway.
  - b. *Do not* give the patient salt pills.
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<sub>2</sub>), 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<sub>2</sub>), slow the IV to KVO.
  - f. Place on cardiac monitor.
8. Perform reassessment as indicated.

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## Protocol 4.6 – ENVIRONMENTAL – HEAT EXPOSURE

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### Key Points: ENVIRONMENTAL – HYPERTHERMIA

- Hyperthermia should be considered in any patient presenting with an altered level of consciousness in a warm, humid environment. This is especially true in the pediatric and the geriatric populations. The pre-hospital goal is to prevent further heat gain 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.
- 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.
- Do not postpone transport in order to cool the patient in the field.
- Ice pack application and cold water immersion may produce reflex vasoconstriction and shivering because of their effect on peripheral thermoreceptors and should be avoided.
- Assess for hypoglycemia in the patient with altered mental status.



## Protocol 4.7 – ENVIRONMENTAL – HYPOTHERMIA

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### 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.
- 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

1. Perform general patient management ([SECTION 1](#)).
2. Support life-threatening problems associated with airway, breathing, and circulation.
3. Treat for shock and conserve body heat. Keep the patient calm.
4. Locate the fang marks and clean the site with soap and water. Note: There may be only one fang mark.
5. Remove any rings, bracelets, or other constricting items on the bitten extremity.
6. Keep any bitten extremities immobilized – the application of a splint will help. Keep the bite at the level of the heart. When not possible, keep the bite below the level of the heart.
7. **DO NOT** apply constricting bands.
8. Every 15 minutes, use a pen to mark the border of the advancing edema and document the time.
9. Consult **[Medical Control]**. For serious envenomation, the patient may need to be transported or evacuated to a hospital with the appropriate antivenin.
10. 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!!!**
11. Start an INT or IV of Normal Saline at KVO.
12. For signs and symptoms of shock, follow the [SHOCK – HYPOVOLEMIA](#) protocol
13. Perform reassessment as indicated.

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#### 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 – HYPERGLYCEMIA

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 via non-rebreather mask at 10-15 L/minute as necessary.
5. For altered mental status or clinical signs/symptoms suggestive of hyperglycemia, perform rapid glucose determination.
6. If glucose greater than 300 mg/dL, 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. Consider obtaining a 12-Lead ECG in accordance with [12-LEAD ECG ACQUISITION](#).
9. Transport as soon as possible.
10. Perform reassessment as indicated.

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#### 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 – HYPOGLYCEMIA

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 via non-rebreather mask at 10-15 L/minute as necessary.
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](#). 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 > 2 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 < 2 years old:** Give [DEXTROSE](#) 25% 1 g/kg up to 25 g IV. Repeat once in 2 minutes if altered mental status persists.
  - d. **Neonate (< 28 days old):** Give [DEXTROSE](#) 12.5% 1 g/kg (8 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.

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#### 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**

1. Perform general patient management ([SECTION 1](#)).
2. Support life-threatening problems associated with airway, breathing, and circulation.
3. Administer oxygen at via a nasal cannula at 2-4 L/minute. Use higher flow rates via a non-rebreather mask if necessary.
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](#) 0.1 mg/kg up to 4 mg IV over 2 to 5 minutes (may repeat in 5 minutes if needed) or IM.
8. Perform reassessment as indicated.

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**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

1. Perform general patient management ([SECTION 1](#)).
2. Administer oxygen at via a nasal cannula at 2-4 L/minute. Use higher flow rates via a non-rebreather mask if necessary.
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 fontanelle.
9. If the amniotic sac does not break, or 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. As the feet are born, grasp the feet.
13. 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.
14. Wrap newborn in a warm blanket and place on its side, head slightly lower than trunk.
15. Keep newborn level with vagina until the cord is cut.
16. Assign partner to monitor newborn and complete initial [CARE OF THE NEWBORN](#).
17. Clamp, tie, and cut umbilical cord (between the clamps). Delay cord clamping for at least one minute 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.
18. Observe for delivery of placenta while preparing mother and newborn for transport.
19. When delivered, wrap placenta in towel and put in plastic bag; transport placenta to hospital with mother.
20. Place sterile pad over vaginal opening, lower mother's legs, help her hold them together.
21. Record time of delivery and transport mother, newborn and placenta to hospital.

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**Key Points: OBSTETRICS – NORMAL 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**

**OB / GYN – CARE OF THE NEWBORN**

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 feasible.

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

## Protocol 4.14

### MEDICAL – NEWBORN / NEONATAL RESUSCITATION

1. Suction newborns that have an obvious obstruction to spontaneous breathing or require positive-pressure ventilation. Otherwise, routine suctioning of amniotic fluid is not recommended.
2. If thick meconium is obstructing the airway in a non-vigorous newborn (poor or absent respiratory effort, flaccid, lethargic), do not stimulate the newborn.
  - a. Perform immediate suctioning with bulb syringe.
  - b. Perform immediate **MECONIUM ASPIRATION** via endotracheal suctioning. If attempted intubation is prolonged and unsuccessful, BVM ventilation should be initiated, particularly if there is persistent bradycardia.
3. If meconium is not present, rub the newborn's back vigorously. Simultaneously begin drying and warming measures.
4. **KEEP THE NEWBORN WARM AND DRY.**
5. Evaluate respirations, heart rate (apical pulse or pulse at the base of the umbilical cord), skin color, and oxygen saturation.
6. **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 or blended oxygen. Titrate the oxygen concentration to achieve a SpO<sub>2</sub> in the target range listed in [Table 4.14.1, Targeted Preductal SpO<sub>2</sub> 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.
7. **If labored breathing or persistent cyanosis:**
  - a. Properly position newborn; do not hyperextend the neck. Clear the airway.
  - b. Initiate resuscitation with room air or blended oxygen by blow-by. Titrate the oxygen concentration to achieve a SpO<sub>2</sub> in the target range listed in [Table 4.14.1, Targeted Preductal SpO<sub>2</sub> after birth.](#)
8. **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 (eg, 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.

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## Protocol 4.14 – MEDICAL – NEWBORN / NEONATAL RESUSCITATION

9. If HR remains less than 60 bpm despite positive-pressure ventilation and chest compressions:

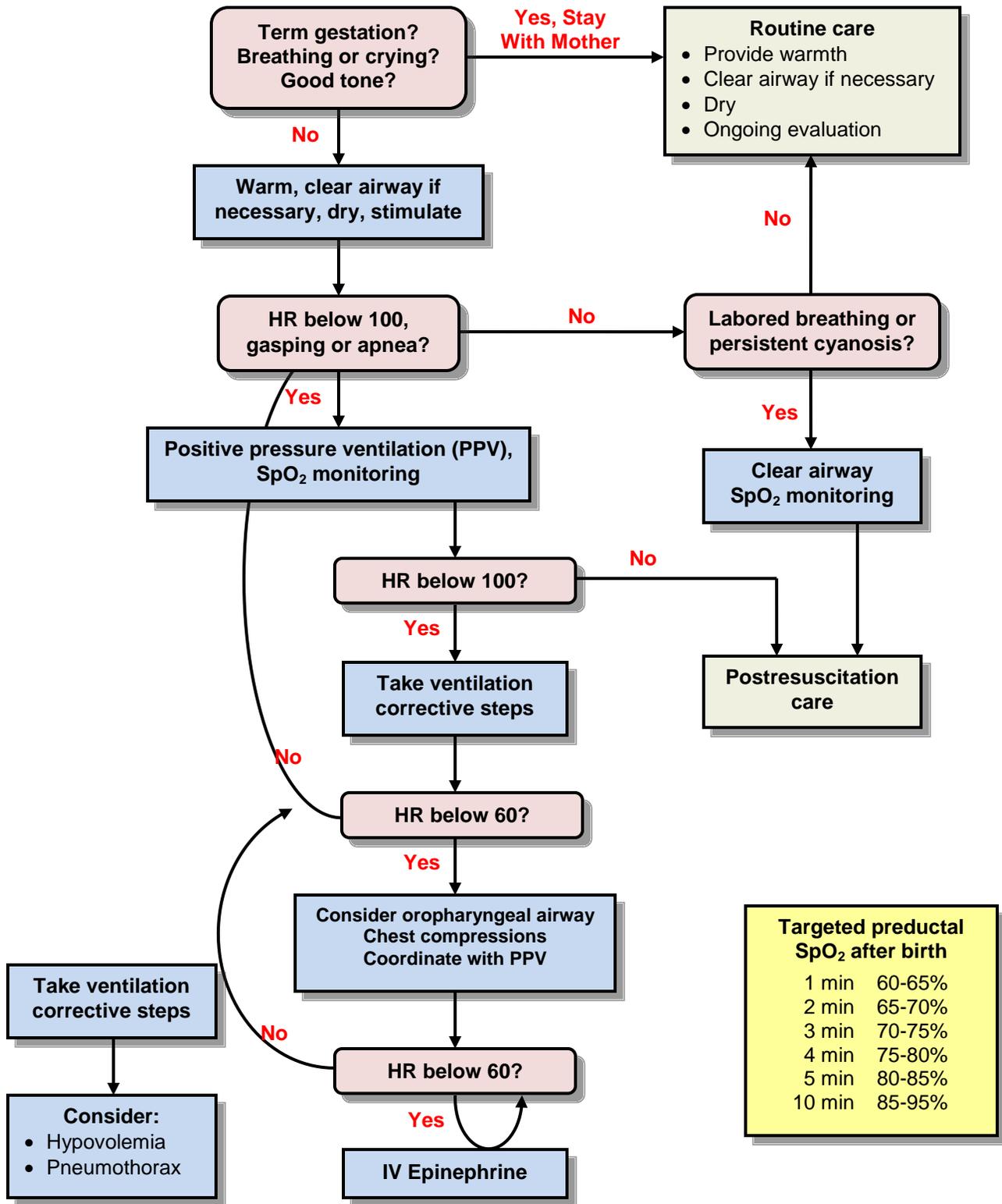
- a. Establish IV/IO access.
- b. Give [EPINEPHRINE 1:10,000](#) 0.01 mg/kg IV/IO (0.1 mL/kg).
- c. Repeat Epinephrine every 3 to 5 minutes if HR remains less than 60 bpm.
- d. Consider [DEXTROSE 12.5%](#) 1 g/kg (8 mL/kg).
- e. Consider 10 mL/kg Normal Saline. Administer fluid bolus using a syringe and a three-way stopcock.

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### 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 (eg, 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.

**Protocol 4.14 – MEDICAL – NEWBORN / NEONATAL RESUSCITATION**



## Protocol 4.15.1

### OB / GYN – PREGNANCY RELATED EMERGENCIES

#### PROLAPSED UMBILICAL CORD

1. Administer oxygen to the mother via a non-rebreather mask at 10-15 LPM. Support respirations as necessary with a BVM.
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.

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## Protocol 4.15.2

### OB / GYN – PREGNANCY RELATED EMERGENCIES

#### BREECH PRESENTATION

1. Administer oxygen to the mother via a non-rebreather mask at 10-15 LPM. Support respirations as necessary with a BVM.
2. Never attempt to deliver the newborn by pulling on the legs.
3. 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.
4. As the newborn's body is delivered, support it and prevent an explosive delivery. Dry the torso and wrap it in a towel if the delivery is incomplete. Avoid pressure on the cord.
5. If the newborn completely delivers, follow [CARE OF THE NEWBORN](#).
6. If time permits, establish an INT or IV or Normal Saline at KVO.
7. Initiate rapid transport upon recognition of a breech presentation.

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**Protocol 4.15.3**

**OB / GYN – PREGNANCY RELATED EMERGENCIES**

**LIMB PRESENTATION**

1. Administer oxygen to the mother via a non-rebreather mask at 10-15 LPM. Support respirations as necessary with a BVM.
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.

EMR	EMT	AEMT	INT	PM
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**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.

**Protocol 4.16**

**CARDIAC ARREST – HYPOTHERMIA – THERAPEUTIC (OPTIONAL)**

1. Perform general patient management ([SECTION 1](#)).
2. Support life-threatening problems associated with airway, breathing, and circulation. Monitor closely for reoccurrence of cardiac arrest. The patient must tolerate an advanced airway to induce hypothermia.
3. For *patients tolerating an advanced airway following ROSC from a medical cardiac arrest*, begin infusion of cold Normal Saline. Place a cold pack around the bag of Normal Saline.

**CONTRAINDICATIONS:**

- Major trauma.
- Preexisting hypothermia.
- Known bleeding disorders or liver failure.
- Age birth to adolescent.

4. For signs and symptoms of hypovolemic shock, follow the [SHOCK – HYPOVOLEMIA](#) protocol. Use chilled Normal Saline for volume resuscitation.
5. For hypotension (SBP less than 90 mm Hg) associated with cardiogenic shock, give a [DOPAMINE](#) infusion at 5–20 mcg/kg/minute IV. Titrate to SBP greater than 90 mm Hg.
6. Infuse saline rapidly. Consider using a pressure bag, blood pressure cuff, or manually squeeze the bag.
  - a. Maximum infusion = 2 liters.
  - b. *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<sub>2</sub>), slow the IV to KVO.
7. Expose the patient and apply ice packs to groin, axillae, and neck. Monitor for local cold injury to ice pack application sites.
8. If patient begins shivering, sedate with [MIDAZOLAM](#) 5 mg slow IV push, titrated to effect. Repeat dose in 5 minutes if shivering persists.

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**Key Points: POST-ROSC INDUCED HYPOTHERMIA**

- The Post-ROSC induced hypothermia procedure is optional for ground transport agencies providing Intermediate and Paramedic level services.

<sup>1</sup> Return of spontaneous circulation.

<sup>2</sup> 2010 AHA Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care.

## Protocol 4.17.1

### AIRWAY – OBSTRUCTION / FOREIGN BODY

#### FBAO – CONSCIOUS PATIENT ≥1 YEAR OF AGE

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.

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## Protocol 4.17.2

### AIRWAY – OBSTRUCTION / FOREIGN BODY

#### FBAO – CONSCIOUS PATIENT <1 YEAR OF AGE

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.

EMR	EMT	AEMT	INT	PM
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### 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**

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](#).

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**Protocol 4.17.4**

**AIRWAY – OBSTRUCTION / FOREIGN BODY**

**FBAO – UNCONSCIOUS PATIENT <1 YEAR OF AGE**

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.

EMR	EMT	AEMT	INT	PM
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<b>Key Points: RESPIRATORY DISTRESS – AIRWAY OBSTRUCTION</b>
<ul style="list-style-type: none"> <li>BLS providers should request ALS assistance if BLS maneuvers do not clear the airway.</li> </ul>

## Protocol 4.18

### RESPIRATORY DISTRESS – ASTHMA / COPD

1. Perform general patient management ([SECTION 1](#)).
2. Support life-threatening problems associated with airway, breathing, and circulation.
3. Administer oxygen via non-rebreather mask at 10-15 L/minute as necessary. Support respirations as necessary with a BVM.
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 mouth piece 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. (**COPD patients only**). 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 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 for dire circumstances for asthmatics only. **[Medical Control]**

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### 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 non compliance. 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

### RESPIRATORY DISTRESS – CROUP / EPIGLOTTITIS

1. Perform general patient management ([SECTION 1](#)).
2. Support life-threatening problems associated with airway, breathing, and circulation.
3. Administer *humidified* oxygen via non-rebreather mask at 10-15 L/minute. Support respirations as necessary with a BVM.
4. Place patient in a position of comfort.
5. Consider monitoring 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 2 to 3 mg (2 to 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 mouth piece or face mask.
9. Consider [METHYLPREDNISOLONE](#) 2 mg/kg up to 125 mg IV over 1 to 2 minutes or IM.
10. Place on cardiac monitor.
11. Perform reassessment as indicated.

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#### 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**

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

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management ( <a href="#">SECTION 1</a> ).	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen via non-rebreather mask at 10-15 L/minute as necessary. Consider supporting respirations with a BVM.	•	•	•	•	•
4. Administer <a href="#">CPAP</a> 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. <b>SBP 100 mm Hg and higher:</b> Give <a href="#">NITROGLYCERIN</a> , 1 tablet, 0.4 mg SL and 1 inch of <a href="#">NITROPASTE 2%</a> . If respiratory distress persists <i>and</i> SBP greater than or equal to 100 mm Hg <i>and</i> HR greater than or equal to 60 bpm, repeat Nitroglycerin, 1 tablet SL every 5 minutes.			•	•	•
11. Consider endotracheal intubation for severe respiratory distress if tolerated by the patient.				•	•
12. Perform reassessment as indicated.	•	•	•	•	•

**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 assisted ventilation for these patients.
- Do not delay transport.

## Protocol 4.21

### MEDICAL – SEIZURES

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 (avoid in head trauma).
3. Administer oxygen via non-rebreather mask at 10-15 L/minute as necessary. 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 [DIAZEPAM](#) 0.25 mg/kg up to 5 mg slow IV push or IM, titrated to effect. Diazepam may also be administered PR in pediatric patients.
  - 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 Diazepam, give [MIDAZOLAM](#) 5 mg slow IV push, titrated to effect. **[Medical Control]**
  - a. Repeat dose in 5 minutes if seizure persists. **[Medical Control]**
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.

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#### 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. Give [DIAZEPAM](#) 0.25 mg/kg up to 5 mg slow IV push or IM, titrated to effect. Repeat dose in 5 minutes if seizure persists.
16. 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]**.
17. Perform reassessment as indicated.

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## Protocol 4.21 – MEDICAL – SEIZURES

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### 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 seizure.
- Be alert for respiratory depression following the administration of Diazepam or Midazolam.
- If seizures result from excessive alcohol intake refer to Combative Patient (Non-Traumatic) Protocol 4.5.



## Protocol 4.22 – SHOCK – HYPOVOLEMIA

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### 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.
  - Pediatric note: Children often lose 30% of their blood supply before experiencing a drop in blood pressure.

**Protocol 4.23**

**SHOCK – NON-HYPOVOLEMIA (CARDIOGENIC)**

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 via non-rebreather mask at 10-15 L/minute as necessary. Support respirations as necessary with a BVM.
5. Transport as soon as possible.
6. Start an IV of Normal Saline.
7. 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<sub>2</sub>), slow the IV to KVO.
8. 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 [DOPAMINE](#) infusion at 5–20 mcg/kg/minute IV. Titrate to SBP = 90 mm Hg.
9. Perform reassessment as indicated.

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management ( <a href="#">SECTION 1</a> ).	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Assess for signs of shock including, but not limited to: <ul style="list-style-type: none"> <li>• 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.</li> </ul>	•	•	•	•	•
4. Administer oxygen via non-rebreather mask at 10-15 L/minute as necessary. Support respirations as necessary with a BVM.	•	•	•	•	•
5. Transport as soon as possible.	•	•	•	•	•
6. Start an IV of Normal Saline.			•	•	•
7. 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. <b>While administering fluid boluses, frequently reassess perfusion for improvement and/or fluid overload respiratory distress.</b> If perfusion improves, slow the IV to KVO and monitor closely. If patient develops fluid overload respiratory distress (dyspnea, rales, crackles, decreasing SpO <sub>2</sub> ), slow the IV to KVO.			•	•	•
8. 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 <a href="#">DOPAMINE</a> infusion at 5–20 mcg/kg/minute IV. Titrate to SBP = 90 mm Hg.				•	•
9. Perform reassessment as indicated.	•	•	•	•	•

## Protocol 4.23 – SHOCK – NON-HYPOVOLEMIA (CARDIOGENIC)

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### 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.
- Dopamine should not be given to a patient who is significantly volume depleted. Hypovolemia must be corrected prior to administration of a 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 INJURY

1. Perform general patient management ([SECTION 1](#)).
2. Apply the [Selective Spinal Immobilization](#) procedure (next page) as appropriate.
3. Provide manual in-line stabilization of the head and neck.
4. Apply an appropriately sized rigid cervical collar.
5. Assess sensory and motor function in all four extremities.
6. Based on the patient's priority, apply the appropriate spinal immobilization device or perform the appropriate procedure, including, but not limited to:
  - a. **Extrication vest or short board** – stable, low-priority patient found in a sitting position.
  - b. **Rapid extrication procedure** – high-priority patient, dangers at the scene requiring rapid movement, or to provide access to more seriously injured patients.
  - c. **Long backboard** – patient found in a supine position.
  - d. **Rapid takedown** – patient found in a standing position.
7. Reassess sensory and motor function in all four extremities.
8. Transport as soon as possible.
9. Perform reassessment as indicated.

EMR	EMT	AEMT	INT	PM
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- Spinal immobilization may be performed by a Emergency Medical Responder if the provider has received specific training on the procedure and authorization from the agency operational medical director.

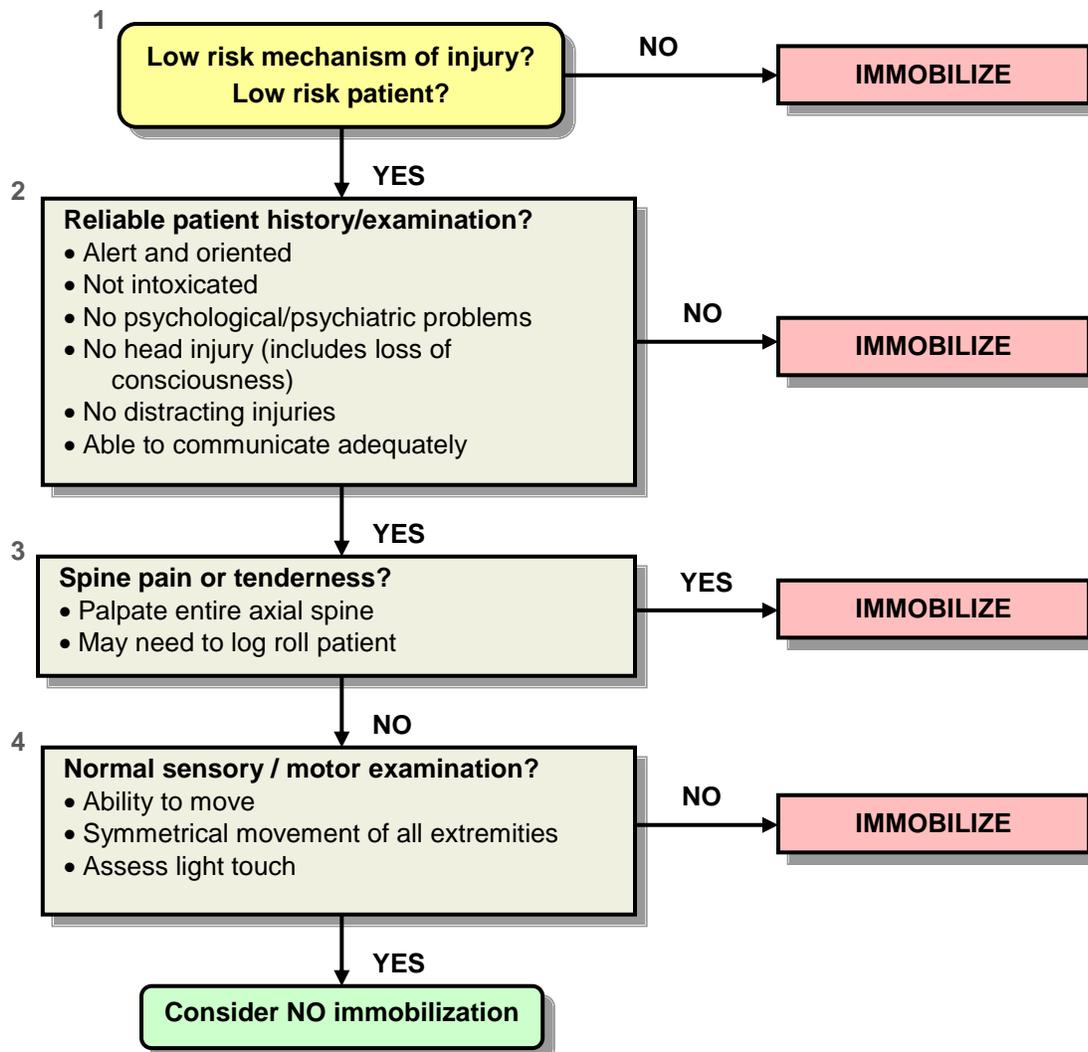
#### Key Points: SPINAL INJURIES

- 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 immobilization and must include assessment of motor, sensory, and distal circulation.

## Protocol 4.24 – GENERAL – SPINAL IMMOBILIZATION / CLEARANCE

EMS providers may withhold spinal immobilization if the following algorithm is applied and the end-point is “Consider No Immobilization.” Algorithm may be applied to patients 14 years of age or older.

### Selective Spinal Immobilization



### Key Points: SPINAL INJURIES

- **High risk patient** includes, but is not limited to fragile elderly, bone disease, and dementia.
- High mechanism of injury suggestive of spinal injury includes, but is not limited to:
  - Violent impact to the head, neck, torso, or pelvis
  - Moderate to high speed motor vehicle incident
  - Pedestrian struck by a vehicle
  - Explosion
  - Ejection from a vehicle
  - Shallow-water diving incident
  - Fall from a height (relative to the patient)
  - Axial load
  - Penetrating trauma in or near the spine
  - Sports injury to the head or neck

## Protocol 4.25

### MEDICAL – ST ELEVATION MYOCARDIAL INFARCTION (STEMI)

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. Obtain a 12-Lead ECG in accordance with [12-LEAD ECG ACQUISITION](#).
  - 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.
5. 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.**

- 12-Lead ECG interpretation with an “ACUTE MI” or “...INFARCT, ACUTE” statement.
- Contact **[Medical Control]** at the receiving facility as soon as practical to provide a complete patient report.
- 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).**
- If transport time to the cardiac catheterization facility minus transport time to the closest hospital is greater than 45 minutes, transport to the closest hospital.

#### **CATEGORY 2**

##### **TRANSPORT TO CLOSEST HOSPITAL**

- Any hemodynamically unstable patient (SBP less than 90 mm Hg, altered mental status, bradycardia, respiratory distress, etc.)
  - If transport time to the cardiac catheterization facility minus transport time to the closest hospital is greater than 45 minutes, transport to the closest hospital.
6. Consider application of defibrillation pads to a patient with an indicated myocardial infarction. Be prepared to defibrillate if needed.
  7. Perform reassessment as indicated. Notify the receiving medical facility of any changes in the patient’s condition.
  8. If ALS is not available contact **[Medical Control]**.

	EMR	EMT	AEMT	INT	PM
1. Perform general patient management ( <a href="#">SECTION 1</a> ).	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Treat dysrhythmias. Be prepared to initiate CPR and defibrillation, if necessary.	•	•	•	•	•
4. Obtain a 12-Lead ECG in accordance with <a href="#">12-LEAD ECG ACQUISITION</a> .					
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 <b>[Medical Control]</b> at the receiving facility and advise the ECG machine interpretation.					
5. Triage the patient into one of the following two categories based on the 12-Lead ECG machine interpretation and clinical presentation:		•	•	•	•
<b>CATEGORY 1</b>					
<b><u>DIRECT TRANSPORT TO CARDIAC CATHETERIZATION FACILITY.</u></b>					
○ 12-Lead ECG interpretation with an “ACUTE MI” or “...INFARCT, ACUTE” statement.					
○ Contact <b>[Medical Control]</b> at the receiving facility as soon as practical to provide a complete patient report.		•	•	•	•
○ If the transport time to the cardiac catheterization facility is greater than 30 minutes, consider rendezvous with air medical support. <b>Do not delay patient transport (Key Points).</b>					
○ If transport time to the cardiac catheterization facility minus transport time to the closest hospital is greater than 45 minutes, transport to the closest hospital.					
<b>CATEGORY 2</b>					
<b><u>TRANSPORT TO CLOSEST HOSPITAL</u></b>					
○ Any hemodynamically unstable patient (SBP less than 90 mm Hg, altered mental status, bradycardia, respiratory distress, etc.)		•	•	•	•
○ If transport time to the cardiac catheterization facility minus transport time to the closest hospital is greater than 45 minutes, transport to the closest hospital.					
6. Consider application of defibrillation pads to a patient with an indicated myocardial infarction. Be prepared to defibrillate if needed.				•	•
7. Perform reassessment as indicated. Notify the receiving medical facility of any changes in the patient’s condition.		•	•	•	•
8. If ALS is not available contact <b>[Medical Control]</b> .		•	•	•	•

## Protocol 4.25 – MEDICAL – ST ELEVATION MYOCARDIAL INFARCTION (STEMI)

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### 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).
- 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.
- Refer to the [CHEST PAIN \(NON-TRAUMATIC\)](#) protocol and contact **[Medical Control]** for additional [FENTANYL](#) or [MORPHINE](#) dosing for continuing chest pain.
- 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.

## Protocol 4.26

### MEDICAL – STROKE / TIA

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 for patients experiencing respiratory distress or titrate oxygen to minimum necessary to achieve SpO<sub>2</sub> ≥94%.
4. Determine time of onset of signs and symptoms or time last known to be normal.
5. Position patient with head elevated 35° unless the patient shows signs or symptoms of hypoperfusion.
6. Transport rapidly, but carefully. Notify the receiving hospital as early as possible. Ensure hospital is notified of the time of onset of signs and symptoms or time patient last seen normal. Scene time should be less than 10 minutes.
7. Perform rapid glucose determination. If glucose less than 60 mg/dL or clinical signs and symptoms indicate hypoglycemia, refer to the [HYPOGLYCEMIA](#) protocol.
8. Perform Cincinnati Pre-hospital Stroke Scale evaluation.
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 **≤3 hours since onset of symptoms**, preferentially transport to a Designated Stroke Center. Patients may be transported to Level 3 or 4 stroke-ready hospitals.  
*Note: If patient does not have a patent airway and/or is hypotensive, consider transport to the closest hospital.*
  - b. If **>3 hours since onset of symptoms**, discuss case with **[Medical Control]** as a potential acute stroke for assistance in destination determination and mode of transport.
12. 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.
14. Perform reassessment as indicated.

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## Protocol 4.26 – MEDICAL – STROKE / TIA

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

### 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.

#### 4.27.1

### MEDICAL – OVERDOSE / POISONING / TOXIC INGESTION

#### GENERAL

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 via non-rebreather mask at 10-15 L/minute as necessary. Support respirations as necessary with a BVM.
5. Contact **[Medical Control]** for direction for overdoses, poisonings, and exposures not specifically covered by protocol.
6. Perform reassessment as indicated.

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### 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.
- 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.

4.27.2

**MEDICAL – OVERDOSE / POISONING / TOXIC INGESTION**  
**ALCOHOL WITHDRAWAL**

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 [DIAZEPAM](#) 0.25 mg/kg up to 5 mg slow IV, titrated to effect.
  - c. Repeat dose in 5 minutes if needed.
  - c. If unable to start an IV, give [MIDAZOLAM](#) 5 mg IM.
7. Perform reassessment as indicated.

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Key Points: ALCOHOL INTOXICATION / WITHDRAWAL
<ul style="list-style-type: none"> <li>• Emergencies involving alcohol can range from acute intoxication to alcohol withdrawal and delirium tremens (DT's).</li> <li>• Acute intoxication causes behavioral changes and can cause respiratory depression, particularly if other sedative drugs are involved.</li> <li>• The possibility of another illness (diabetes/hypoglycemia) or injury (head injury) must always be considered.</li> <li>• 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.</li> <li>• True alcohol withdrawal can represent a medical emergency, particularly in patients with other illnesses.</li> </ul>

### 4.27.3

#### MEDICAL – OVERDOSE / POISONING / TOXIC INGESTION NARCOTICS / OPIATES

1. Perform general patient management ([SECTION 1](#)).
2. Support life-threatening problems associated with airway, breathing, and circulation.
3. Administer oxygen via non-rebreather mask at 10-15 L/minute as necessary. Support respirations as necessary with a BVM. *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](#) 0.1 mg/kg up to 2 mg IV at 0.4 mg/minute.
    - i. If unable to obtain IV access, give Naloxone 1.6 mg IM (2 injections of 0.8 mg).
  - b. Halt the IV injection if respiratory effort improves or agitation occurs.
7. For signs and symptoms of shock, follow the [SHOCK – HYPOVOLEMIA](#) protocol.

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### 4.27.4

#### MEDICAL – OVERDOSE / POISONING / TOXIC INGESTION ORAL HYPOGLYCEMIC AGENTS

1. Perform general patient management ([SECTION 1](#)).
2. Support life-threatening problems associated with airway, breathing, and circulation.
3. Administer oxygen via non-rebreather mask at 10-15 L/minute as necessary. Support respirations as necessary with a BVM.
4. Follow [HYPOGLYCEMIA](#) protocol for administration of Dextrose.

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#### 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).

#### 4.27.5

### MEDICAL – OVERDOSE / POISONING / TOXIC INGESTION

#### TRICYCLIC ANTIDEPRESSANTS

1. Perform general patient management ([SECTION 1](#)).
2. Support life-threatening problems associated with airway, breathing, and circulation.
3. Administer oxygen via non-rebreather mask at 10-15 L/minute as necessary. Support respirations as necessary with a BVM.

**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<sub>2</sub>), 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 over 5 minutes for VT unresponsive to alkalinization.

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#### Key Points: TRICYCLIC ANTIDEPRESSANT

- **Tricyclic Antidepressants include:** Amitriptyline (Elavil), Amoxapine (Asendin), Clomipramine (Anafranil), Doxepin (Sinequan, Adepin), Imipramine (Tofranil) and Nortriptyline (Aventyl, Pamelor).

4.27.6

**MEDICAL – OVERDOSE / POISONING / TOXIC INGESTION**  
**CHOLINERGICS**

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 via non-rebreather mask at 10-15 L/minute as necessary. Support respirations as necessary with a BVM.

**For serious signs and symptoms** (respiratory distress, SLUDGE 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.

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Key Points: CHOLINERGICS	
<ul style="list-style-type: none"> <li>• Pesticides (Organophosphates, Carbamates) and nerve gas agents (Sarin, Soman) are the most common exposures.</li> <li>• For cholinergic poisoning/exposures involving multiple patients, consider activation of CHEMPAK Protocol.</li> </ul>	<p><b>S</b> – Salivation  <b>L</b> – Lacrimation  <b>U</b> – Urination  <b>D</b> – Defecation  <b>G</b> – Gastrointestinal cramping  <b>E</b> – Emesis</p>

4.27.7

**MEDICAL – OVERDOSE / POISONING / TOXIC INGESTION**  
**CALCIUM CHANNEL BLOCKERS**

1. Perform general patient management ([SECTION 1](#)).
2. Support life-threatening problems associated with airway, breathing, and circulation.
3. Administer oxygen via non-rebreather mask at 10-15 L/minute as necessary. Support respirations as necessary with a BVM.

**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**].

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Key Points: CALCIUM CHANNEL BLOCKERS
<ul style="list-style-type: none"> <li>• <b>Calcium Channel Blockers include:</b> 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).</li> </ul>

4.27.8

**MEDICAL – OVERDOSE / POISONING / TOXIC INGESTION**  
**BETA BLOCKERS**

1. Perform general patient management ([SECTION 1](#)).
2. Support life-threatening problems associated with airway, breathing, and circulation.
3. Administer oxygen via non-rebreather mask at 10-15 L/minute as necessary. Support respirations as necessary with a BVM.

**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<sub>2</sub>), slow the IV to KVO.
5. Give [GLUCAGON](#) 2 mg IV.
  - a. If no response, repeat Glucagon dose in 10 minutes **[Medical Control]**.

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<b>Key Points: BETA BLOCKERS</b>	
<ul style="list-style-type: none"> <li>• <b>Beta Blockers include:</b> 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).</li> </ul>	

#### 4.27.9

### MEDICAL – OVERDOSE / POISONING / TOXIC INGESTION STIMULANTS

1. Perform general patient management ([SECTION 1](#)).
2. Support life-threatening problems associated with airway, breathing, and circulation.
3. Administer oxygen via non-rebreather mask at 10-15 L/minute as necessary. Support respirations as necessary with a BVM.

#### 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 [DIAZEPAM](#) 0.25 mg/kg up to 5 mg slow IV push, titrated to effect. Repeat dose in 5 minutes if seizure persists.
  - 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.

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

### Key Points: COCAINE / METHAMPHETAMINE

- **Common stimulant drugs include:**
  - Amphetamine (Biphedamine, 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)
  - Methylenedioxypropylone (Bath Salts, Ivory Wave, Ivory Coast, Purple Wave, Vanilla Sky)

4.27.10

**EXPOSURE – CYANIDE (OPTIONAL)**

1. Perform general patient management ([SECTION 1](#)).
2. Support life-threatening problems associated with airway, breathing, and circulation.
3. Administer oxygen via non-rebreather mask at 10-15 L/minute as necessary. Support respirations as necessary with a BVM.

**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.

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

**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. Each 5 g vial of hydroxocobalamin for injection is to be reconstituted with 200 mL of diluent (not provided with Cyanokit®) using the supplied sterile transfer spike.
- The recommended diluent is Normal Saline. D<sub>5</sub>W has also been found to be compatible with Hydroxocobalamin and may be used if Normal Saline is not readily available.
- The line on the vial label represents 200 mL volume of diluent.
- Following the addition of diluent to the lyophilized powder, each vial should be repeatedly inverted or rocked, **not shaken**, for at least 30 seconds prior to infusion.
- Hydroxocobalamin solutions should be visually inspected for particulate matter and color prior to administration. If the reconstituted solution is not dark red or if particulate matter is seen after the solution has been appropriately mixed, the solution should be discarded.
- 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

1. Perform general patient management ([SECTION 1](#)).
2. Support life-threatening problems associated with airway, breathing, and circulation.
3. Administer oxygen via non-rebreather mask at 10-15 L/minute as necessary. Support respirations as necessary with a BVM.
4. **STOP MAJOR HEMORRHAGE IMMEDIATELY!** Go directly to a tourniquet 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](#).
7. Once bleeding is controlled, bandage the dressing in place, maintaining pressure on the wound.
8. Assess for signs of shock. If shock is suspected, follow the [SHOCK – HYPOVOLEMIA](#) protocol.
9. Perform reassessment as indicated.

	EMR	EMT	AEMT	INT	PM
1.	•	•	•	•	•
2.	•	•	•	•	•
3.	•	•	•	•	•
4.	•	•	•	•	•
5.	•	•	•	•	•
6.	•	•	•	•	•
7.	•	•	•	•	•
8.	•	•	•	•	•
9.	•	•	•	•	•

#### Key Points: TRAUMA – 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.

## Protocol 4.29

### INJURY – CRUSH SYNDROME

1. Perform general patient management ([SECTION 1](#)).
2. Support life-threatening problems associated with airway, breathing, and circulation.
3. Administer oxygen via non-rebreather mask at 10-15 L/minute as necessary. Support respirations as necessary with a BVM.
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, consider **FENTANYL** 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. or [MORPHINE](#) 5 mg IV. Titrate to effect. May repeat every 5 minutes.
9. For patients entrapped in excess of 60 minutes, consider the following options in consultation with **[Medical Control]**.
  - a. Continued boluses of Normal Saline.
  - b. [SODIUM BICARBONATE](#) 1 mEq/kg IV over 2 minutes.
  - c. [ALBUTEROL](#) 2.5 mg via small volume nebulizer.
  - d. [CALCIUM CHLORIDE](#) 8 mg/kg of 10% solution IV over 5 minutes.
10. Perform reassessment as indicated.

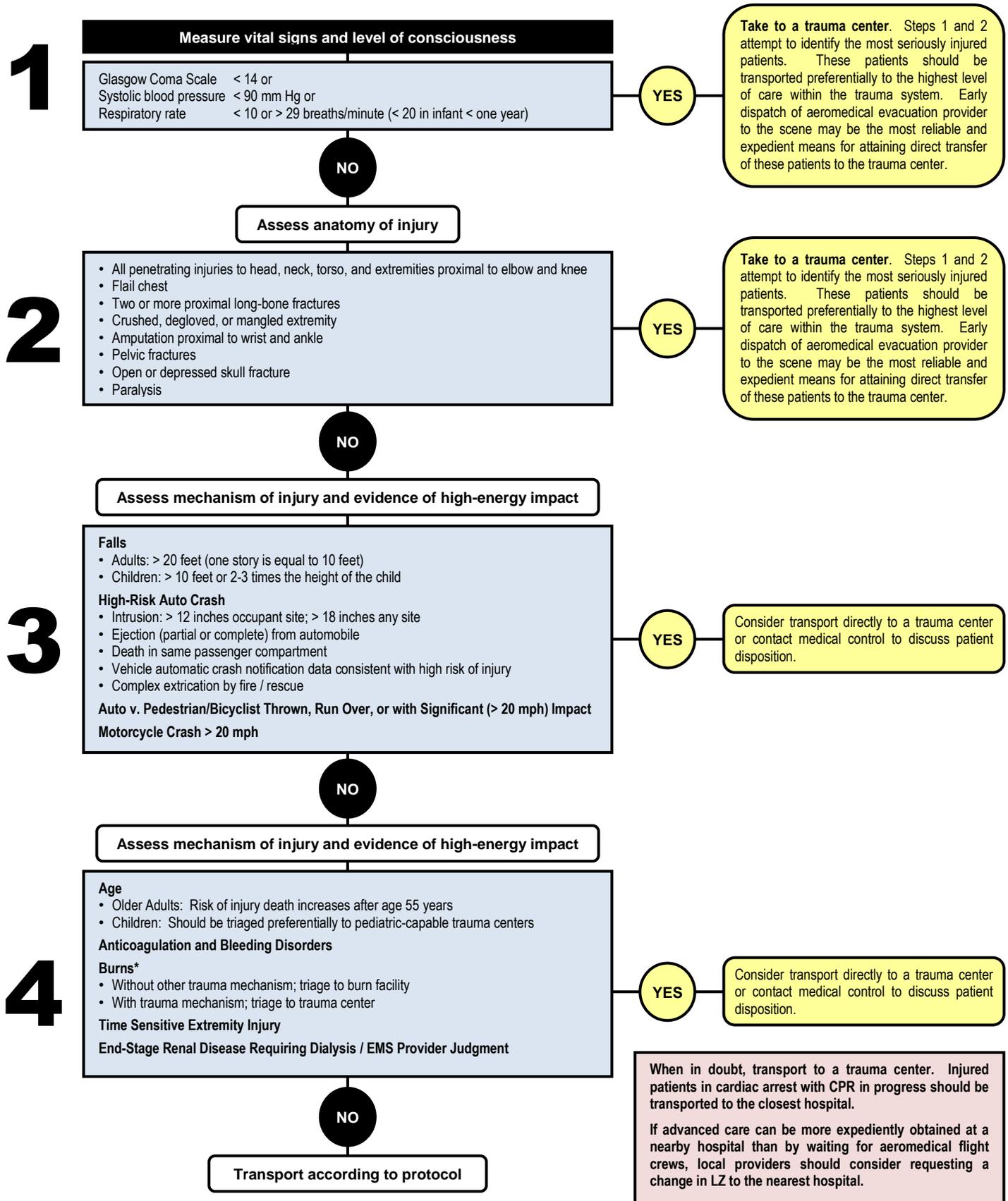
EMR	EMT	AEMT	INT	PM
•	•	•	•	•
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#### Key Points: TRAUMA – CRUSH SYNDROME

- 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.
- 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.

# Protocol 4.30 – TRAUMA – TRAUMA TRIAGE AND MANAGEMENT

## Field Trauma Triage Decision Scheme



\* American Burn Association guidelines.

## **Protocol 4.30 – TRAUMA – TRAUMA TRIAGE AND MANAGEMENT**

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“**Priority**” patients are those that are critically ill 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.
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. 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 are hypothermic, recently drowned, electrocuted, or indications of non-traumatic cause. 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.
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.

## **Protocol 4.30 – TRAUMA – TRAUMA TRIAGE AND MANAGEMENT**

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### **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.

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):

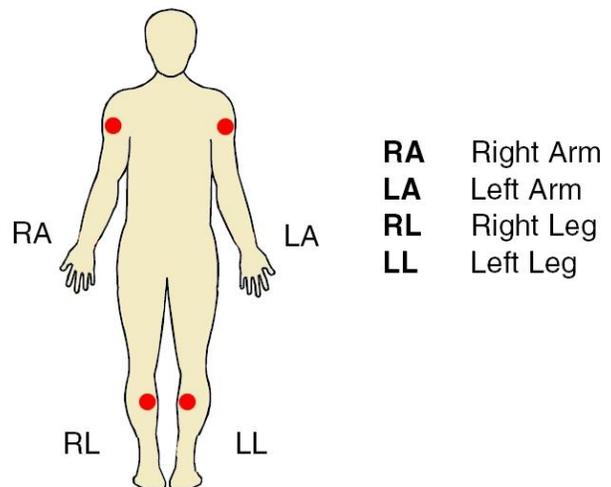
1. Chest pain
2. Dyspnea
3. Palpitations
4. Syncope
5. General weakness or dizziness
6. Activation of an implantable cardioverter defibrillator (ICD)

### 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 to acquire 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 of 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.

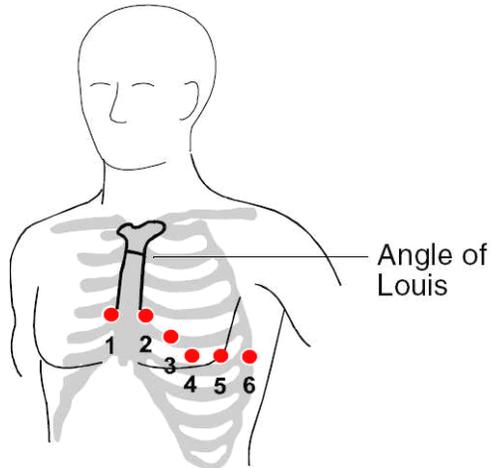


**Figure 5.1-A Limb Lead Electrode Placement for 12-lead ECG**

**CONTINUED ON NEXT PAGE**

Scope	EMR	EMT	AEMT	INT	PM
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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<sub>1</sub> through V<sub>6</sub>.



Lead	Lead Location
V <sub>1</sub>	Fourth intercostal space to the right of the sternum
V <sub>2</sub>	Fourth intercostal space to the left of the sternum
V <sub>3</sub>	Directly between leads V <sub>2</sub> and V <sub>4</sub>
V <sub>4</sub>	Fifth intercostal space at midclavicular line
V <sub>5</sub>	Level with V <sub>4</sub> at left anterior axillary line
V <sub>6</sub>	Level with V <sub>5</sub> at left midaxillary line

**Figure 5.1-B Precordial Lead Electrode Placement**

- a. Locating the V<sub>1</sub> 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<sub>1</sub> 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<sub>1</sub> position.
  - v. Place V<sub>1</sub> by attaching the positive electrode to the identified location.
- b. Place V<sub>2</sub> by attaching the positive electrode to the left of the sternum at the further intercostal space.
- c. Place V<sub>4</sub> by attaching the positive electrode at the midclavicular line at the fifth intercostal space (Note: V<sub>4</sub> must be placed prior to V<sub>3</sub>).
- d. Place V<sub>3</sub> by attaching the positive electrode in the line midway between lead V<sub>2</sub> and V<sub>4</sub>.
- e. Place V<sub>5</sub> by attaching the positive electrode at the anterior axillary line as the same level as V<sub>4</sub>.
- f. Place V<sub>6</sub> by attaching the positive electrode to the midaxillary line at the same level as V<sub>4</sub>.

**CAUTION:** When placing electrodes on female patients, always place leads V<sub>3</sub>-V<sub>6</sub> under the breast rather than on the breast.

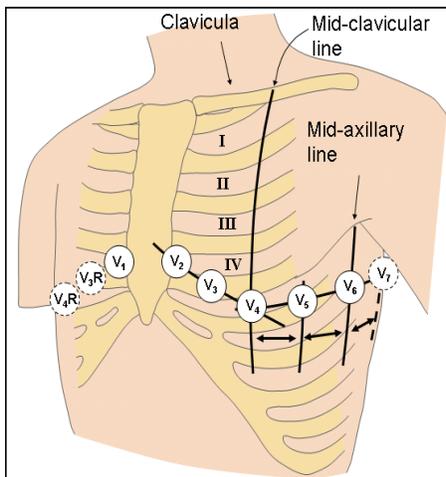
**CAUTION:** Never use the nipples as reference points for locating the electrodes for male or female patients, because nipple locations may vary widely.

**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**

**INDICATION**

Conscious patient in severe respiratory distress due to suspected pulmonary edema or COPD.

**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 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 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.

**INDICATION**

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

**CONTRAINDICATIONS**

1. Ability to intubate the trachea.
2. Ability to maintain the airway by other means.
3. 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 caudal (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 central horizontal stab incision through the cricothyroid membrane (cut through the skin, subcutaneous tissue, and cricothyroid membrane). The incision may be extended if the tube cannot be inserted. The incision should not to exceed 2 cm (¾ inch).

**NOTE:** Brisk bleeding may occur. Do not waste time attempting to control bleeding.

7. Insert a trach hook 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 cannulate 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<sub>2</sub> 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.

## 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**

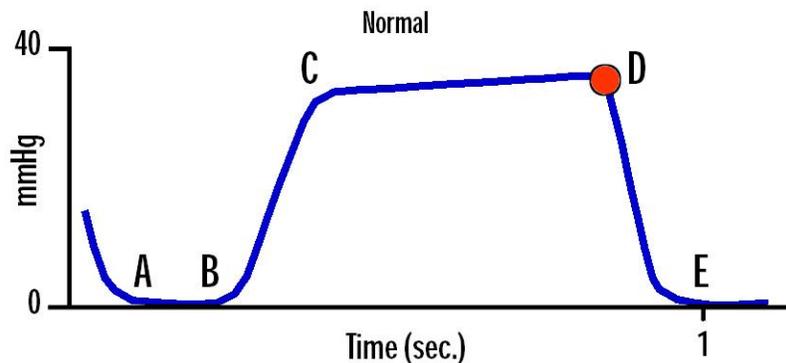
1. Primary confirmation, monitoring, and documentation of endotracheal intubation. **[IF AVAILABLE]**
2. Primary confirmation, monitoring, and documentation of King LT insertion.
3. Assessment, monitoring, and documentation of the respiratory status of the non-intubated patient experiencing respiratory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

**PROCEDURE – INTUBATED PATIENTS (Includes King Airways)**

1. Turn cardiac monitor/defibrillator ON. If CO<sub>2</sub> is not already displayed, select display to monitor the CO<sub>2</sub> 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<sub>2</sub> values.
5. ETCO<sub>2</sub> numerical values and corresponding capnograph should be compared to normal values and morphology (Figure 5.5A).

Normal ETCO<sub>2</sub> 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 <sub>2</sub> concentration (end-tidal CO <sub>2</sub> )
D-E	Inhalation

**Figure 5.5A The Normal CO<sub>2</sub> Waveform**

**PROCEDURE – NON-INTUBATED PATIENTS**

1. Patients should be assessed, oxygenated, and ventilated with the appropriate delivery device dependant upon their presenting degree of respiratory distress or obstruction.
2. Interface the end-tidal CO<sub>2</sub> sampling device with the oxygen delivery device being used (i.e., nasal sampling device used under a non-rebreather mask, ETCO<sub>2</sub>/O<sub>2</sub> 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<sub>2</sub> numerical values and corresponding capnograph should be compared to normal values and morphology (Figure 5.5A).

**NOTE:** ETCO<sub>2</sub> monitoring should be discontinued while administering nebulized medications.

5. ETCO<sub>2</sub> 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*<sup>®</sup> and *Pedi-Cap*<sup>®</sup> end-tidal CO<sub>2</sub> (ETCO<sub>2</sub>) detectors is indicated for all patients that have been intubated with an endotracheal tube or King LT airway.

- Adult ETCO<sub>2</sub> detector – patient weighing greater than 15 kg.
- Pediatric ETCO<sub>2</sub> detector – patient weighing less than or equal to 15 kg.

**NOTE: END-TIDAL CO<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> 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 [KING LT AIRWAY](#) 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 <sub>2</sub> less than 4 mm Hg ↓ Airway <b>not</b> properly positioned ↓ Reinsert tube ↓ Recheck with CO <sub>2</sub> detector	0.5 to less than 2 % ETCO <sub>2</sub> 4 to less than 15 mm Hg ↓ Retained CO <sub>2</sub> 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 <sub>2</sub> 15 to 38 mm Hg ↓ Airway properly positioned ↓ Secure tube ↓ Continue to observe color change

**CONTINUED ON NEXT PAGE**

**Table 5.6B. Patients with Poor Perfusion / Cardiac Arrest**

COLOR RANGE "A" (Purple)	COLOR RANGE "B" (Tan)	COLOR RANGE "C" (Yellow)
<p>0.03 to less than 0.5 % ETCO<sub>2</sub> less than 4 mm Hg</p> <p style="text-align: center;">↓</p> <p>Airway <b>not</b> properly positioned or inadequate perfusion (ineffective CPR)</p> <p style="text-align: center;">↓</p> <p>Is ET tube through vocal cords or King ventilating properly? Check ET via direct laryngoscopy</p> <p style="text-align: center;">↙      ↘</p> <p><b>No</b>      <b>Yes</b></p> <p>Airway <b>not</b> properly positioned      Airway properly positioned with inadequate perfusion</p> <p style="text-align: center;">↓      ↓</p> <p>Reinsert tube      Take appropriate clinical action</p> <p style="text-align: center;">↓      ↓</p> <p>Check with CO<sub>2</sub> detector</p>	<p>0.5 to less than 2 % ETCO<sub>2</sub> 4 to less than 15 mm Hg</p> <p style="text-align: center;">↓</p> <p>Retained CO<sub>2</sub> in esophagus or low perfusion</p> <p style="text-align: center;">↓</p> <p>Deliver 6 more breaths</p> <p style="text-align: center;">↓</p> <p>Color remains tan</p> <p style="text-align: center;">↓</p> <p>Airway properly positioned with low perfusion</p>	<p>2 to 5 % ETCO<sub>2</sub> 15 to 38 mm Hg</p> <p style="text-align: center;">↓</p> <p>Airway properly positioned</p> <p style="text-align: center;">↓</p> <p>Secure tube</p> <p style="text-align: center;">↓</p> <p>Continue to observe color change</p>

**CONSIDERATIONS**

1. End-tidal CO<sub>2</sub> 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<sub>2</sub> by patients who weigh less than 15 kg and a potential inaccurate reading.
6. Detectors may be used for up to 2 hours.
7. Waveform capnography is required, if available, for endotracheal intubation. Colorimetric monitoring may be used temporarily while troubleshooting issues with capnography.

**INDICATIONS**

1. To assist in endotracheal tube placement **[OPTIONAL]**.
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° counter clockwise 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 required 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.

**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**

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
  - b. Pediatrics: Use length-based resuscitation tape (6 to 16 French)
4. Explain the procedure to the patient, if conscious.
5. Measure length of NG 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.

**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**

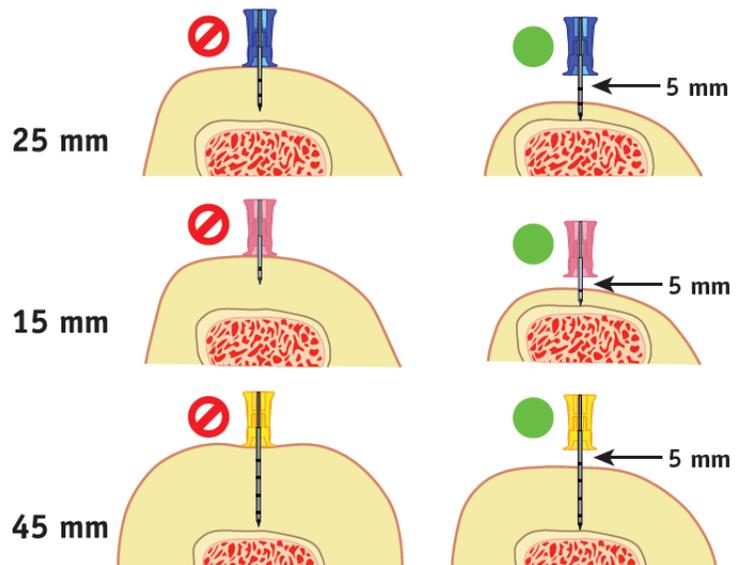
1. Glucometry is considered an invasive procedure requiring the medical practitioner who assumes responsibility for the patient sign the patient care report.

**INDICATION**

The EZ-IO<sup>®</sup> 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.

**CONTRAINDICATIONS**

1. Fracture of the tibia or femur.
2. Previous orthopedic procedures. (Example – knee replacement)
3. An extremity that is compromised by a pre-existing medical condition. (Example – tumor or peripheral vascular disease)
4. Any infection over the insertion site.
5. The inability to locate the anatomical landmarks.
6. Excessive tissue over the insertion site. If suspected this can be determined by introducing the needle set through the skin and up to but not into the bone. At this point the 5 mm mark on the EZ-IO catheter should be visible. If this mark is NOT visible, then there is excessive tissue over the site. This excessive tissue may prevent the catheter from penetrating into the IO space. (Figure 5.10A)



**Figure 5.10A – Ensure 5 mm of catheter is visible.**

**CONSIDERATIONS:**

1. 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.
2. Insertion of the EZ-IO in conscious patients causes mild to moderate discomfort and is usually no more painful than a large bore IV.
3. The EZ-IO is not intended for prophylactic use.

**EQUIPMENT**

- Alcohol or Povidone-Iodine swab
- Extension set or EZ-Connect
- EZ-IO<sup>™</sup> driver
- 10 mL syringe
- Normal Saline
- Tape or gauze
- Pressure bag
- EZ-IO<sup>™</sup> needle sets

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

**PROCEDURE**

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

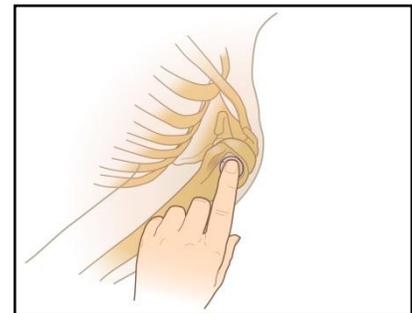
1. Always observe body substance isolation (BSI) procedures and aseptic techniques when using the EZ-IO.
2. Locate proper site for EZ-IO insertion.

a. **Adult proximal tibial insertion:** There are three anatomical landmarks of the insertion site that the **MUST** be identified before using the device. The first landmark is the patella or kneecap. To locate it, feel the front surface of the leg just below the femur or thigh bone for a “floating” bony structure. The second landmark is approximately 2 finger widths below the patella. It is the tibial tuberosity, a round oval elevation or “bump” on the front surface of the tibia or lower leg. Now, 1 finger width medial (toward the inside) of the tibial tuberosity is the final landmark. This is the insertion site for the EZ-IO (Figure 5.10B).



**Figure 5.10B**

b. **Adult humeral insertion:** Expose shoulder and adduct humerus (place the patient’s arm against the patient’s body) resting the elbow on the stretcher or ground and the forearm resting on the abdomen. With the patient in this position you may immediately note the humeral head on the anterior-superior aspect of the upper arm or anterior-lateral shoulder. Palpate and identify the mid-shaft humerus and continue palpating toward the proximal aspect or humeral head. As you near the shoulder you will note a small protrusion. This is the base of the greater tubercle insertion site. With the opposite hand you may consider “pinching” the anterior and inferior aspects of the humeral head while confirming the identification of the greater tubercle. This will ensure that you have identified the midline of the humerus itself (Figure 5.10C).

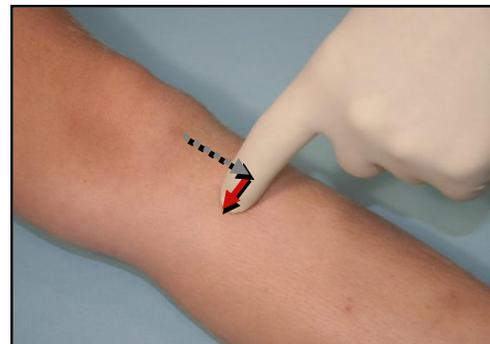


**Figure 5.10C**

c. **Pediatric proximal tibial insertion:** If the tibial tuberosity **CANNOT** be palpated, the insertion site is two finger widths below the patella and then medial along the flat aspect of the tibia (Figure 5.10D). If the tibial tuberosity **CAN** be palpated, the insertion site is one finger width below the tuberosity and then medial along the flat aspect of the tibia (Figure 5.10E).

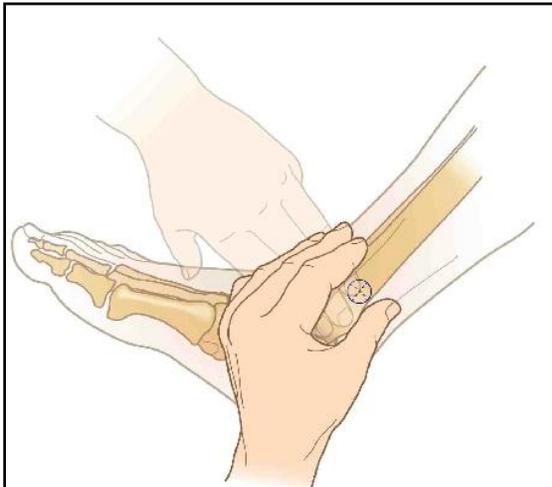


**Figure 5.10D**

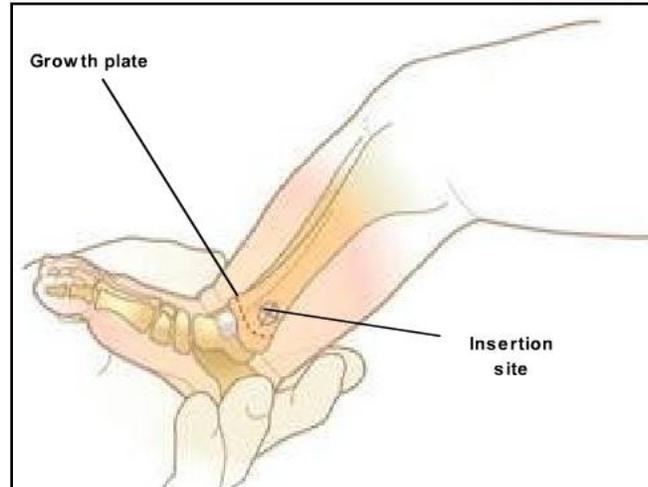


**Figure 5.10E**

- d. **Adult distal tibial insertion:** The insertion site is approximately two finger widths proximal to the medial malleolus and midline along the tibia (Figure 5.10F).
- e. **Pediatric distal tibial insertion:** The insertion site is approximately one finger width (patients less than 12 kg) and one to two finger widths (patients between 12 and 39 kg) proximal to the medial malleolus and midline along the tibia (Figure 5.10G).

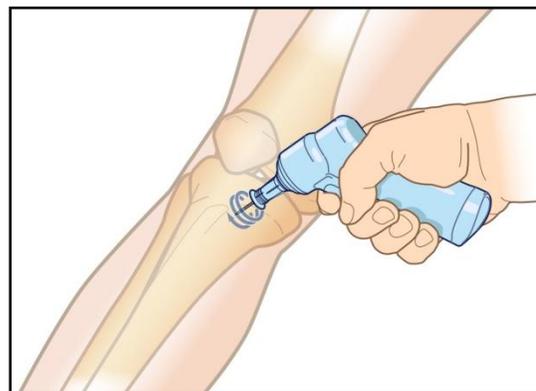


**Figure 5.10F**



**Figure 5.10G**

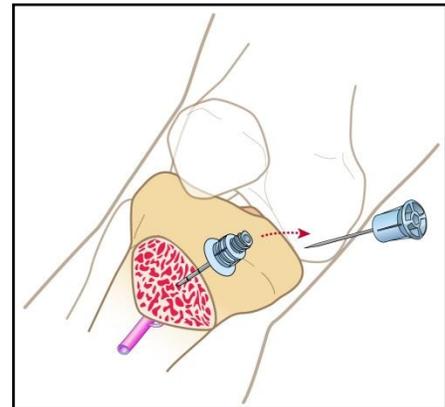
- 3. Clean the insertion site (use aseptic technique). Use Povidone-Iodine swab and/or alcohol to clean the site prior to powering the EZ-IO into position.
- 4. Prepare the EZ-IO driver and needle set:
  - a. Open the EZ-IO case.
  - b. Remove the driver and one EZ-IO cartridge.
  - c. Open the EZ-IO cartridge and attach the needle set to the driver (you should feel a “snap” as the small magnet connects).
  - d. Remove the needle set from the cartridge.
  - e. Remove the safety cap from the needle set. One way to remove the cap from the needle set (with the needle facing you) is to grasp the cap tightly and rotate clockwise to loosen and remove. Attempting to “pull” the cap off may remove the entire needle set from the driver – rotating counterclockwise will cause the catheter and stylet to separate.
- 5. Begin insertion of the EZ-IO Needle Set (Figure 5.10H).
  - a. Holding the EZ-IO driver in one hand, stabilize the leg near the insertion site with the opposite hand. Make sure your hands and fingers are a safe distance from the path of insertion. Be cautious of sudden patient movements.
  - b. Position the driver at the insertion site with the needle at a 90 degree angle to the surface of the bone. Power the needle set through the skin at the insertion site until you feel the needle set tip encounter the bone itself.



**Figure 5.10H**

- c. At this point if there is any doubt that the needle set is not long enough, verify that you can see the 5 mm marking on the catheter itself (this is the mark closest to the flange). If this mark is not visible, you should abandon the procedure as the needle set may not be long enough to penetrate the IO space.
- 6. Continue to insert the EZ-IO.
  - a. Apply firm and steady pressure on the driver and power through the cortex (hard, outer surface) of the bone, ensuring the driver is maintained at a 90 degree angle at all times.
  - b. Stop when the needle flange touches the skin or a sudden decrease in resistance is felt. This indicates entry into the bone marrow cavity (intramedullary space).

- 7. Remove driver from the needle set.
  - a. While supporting the needle set in one hand, gently pull straight up on the driver and lift away.
  - b. Return the driver to its case.

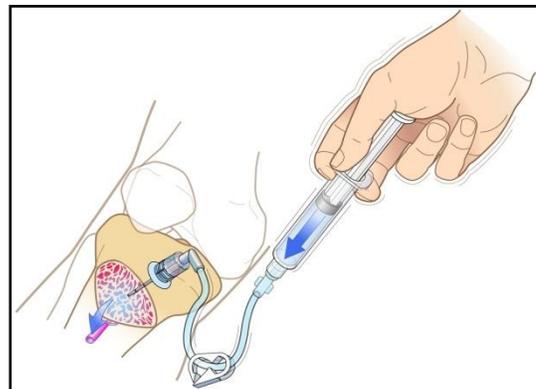


**Figure 5.10I**

- 8. Remove the stylet from the catheter (Figure 5.10I). While grasping the hub firmly with one hand, rotate the stylet counter clockwise (unscrew the stylet from the catheter). Pull the stylet out of the catheter and consider placing it into the empty cartridge, now called the stylet shuttle. The stylet shuttle must then be placed in an FDA-approved biohazard container as soon as possible. Do not replace or attempt to “recap” the stylet.

- 9. Confirm proper EZ-IO catheter tip position. Proper placement of the IO catheter tip can be confirmed through any of the following:
  - a. The IO catheter stands straight up at a 90-degree angle and is firmly seated in the tibial bone.
  - b. Blood at tip of the stylet (sometimes visible).
  - c. Aspiration of a small amount of bone marrow with a syringe.
  - d. A free-flow of drugs or fluids without difficulty and with no evidence of leakage (extravasation) underneath the skin.

- 10. Attach the primed EZ-Connect or any standard luer lock extension set to the EZ-IO hub and then SYRINGE FLUSH the IO space with 10 mL of Normal Saline (Figure 5.10J). Prior to any drug or fluid administration be certain to flush the EZ-IO catheter with 10 mL of fluid. A rapid syringe flush will “clear the pathway” allowing for an acceptable infusion rate.



**Figure 5.10J**

- 11. Initiate the infusion. Administer the infusion or medications per your local medical protocol. A pressure infuser may be necessary to maintain adequate flow rates.
- 12. For pain with fluid administration, administer **LIDOCAINE 2%** (preservative free) 20-40 mg for adults, 0.5 mg/kg for children. *Use extreme dosage precautions to avoid medication error. Intermediate and Paramedic Levels Only!*
- 13. Apply the wristband and a dressing. The wristband is designed as a reminder of EZ-IO placement and need for timely removal. The EZ-IO catheter may be secured in place with a standard dressing.

**REMOVAL**

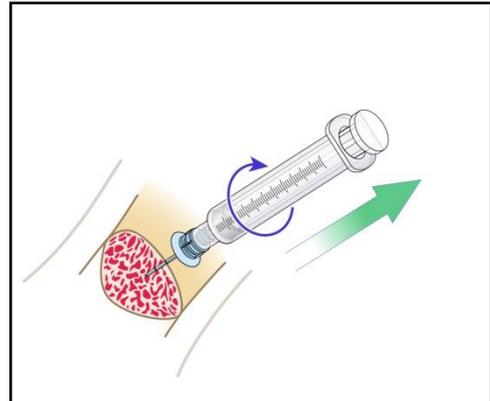
1. The EZ-IO® catheter should be removed within 24 hours.
2. Either grasp the hub directly or attach a sterile syringe. The syringe will serve as a larger handle for the catheter hub and is preferred (Figure 5.10K). Support the patient's extremity while rotating the catheter clockwise and gently pulling. Rotating the hub during removal reduces catheter to bone friction and will allow for an easier removal process. Once the catheter has been removed immediately place it in an approved biohazard sharps container.

**NOTE:** Removal of the extension or fluid administration set, without proper protection of the EZ-IO hub (in the form of a sterile cap, port or extension set), could cause bleeding or infection.

**NOTE:** Maintaining a 90 degree angle while rotating the catheter will insure proper removal without complications.

**NOTE:** Be certain that you DO NOT ROCK the catheter while removing. Rocking or bending the catheter with a syringe may cause the catheter to separate from the hub.

**NOTE:** If hub-catheter separation occurs use an appropriate hemostat to grasp and gently remove the catheter in the same manner as suggested above (rotating while gently pulling).



**Figure 5.10K**

**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)**

**NOTE:** Use of an [ENDOTRACHEAL TUBE INTRODUCER](#) is optional for all intubation attempts.

1. Use standard isolation precautions including eye protection. Use a face mask and gown when splashing is likely.
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 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.

**CONTINUED ON NEXT PAGE**

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<sub>2</sub> 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 8 to 10 breaths per minute. Deliver each breath over about 1 second while chest compressions are delivered at a rate of 100 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 6 to 7 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 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.

Scope	EMR	EMT	AEMT	INT	PM
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**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.

<b>Key Points: INTUBATION, OROTRACHEAL</b>
<ul style="list-style-type: none"> <li>• 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.</li> <li>• It is sometimes best to remove dental appliances such as dentures and partials before intubation (unless they fit tightly).</li> <li>• Do not use the teeth as a fulcrum.</li> <li>• Male average tube size: 8.0 to 8.5 ID.</li> <li>• Female average tube size: 7.5 to 8.0 ID.</li> <li>• Male average tube insertion depth: 22 cm at the teeth.</li> <li>• Female average tube insertion depth: 21 cm at the teeth.</li> <li>• Tube size formula for children older than 2 years of age:  <math display="block">\text{ET tube (in mm)} = (16 + \text{age in years}) \div 4</math> </li> </ul>

**[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**

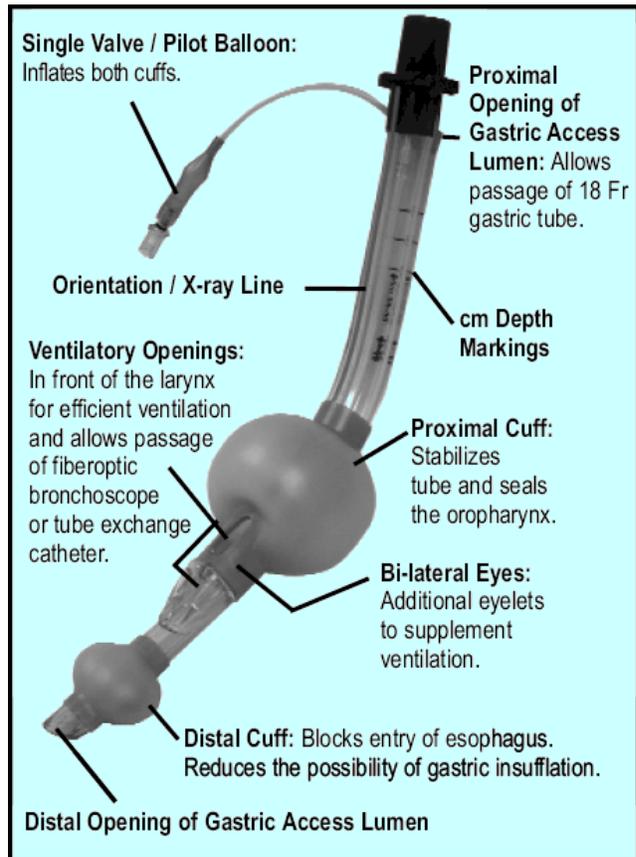
The King LT Airway is an airway device designed for emergency or difficult intubation in the apneic or unresponsive patient without a gag reflex.

**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

**CONTINUED ON NEXT PAGE**

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 45-90° 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).

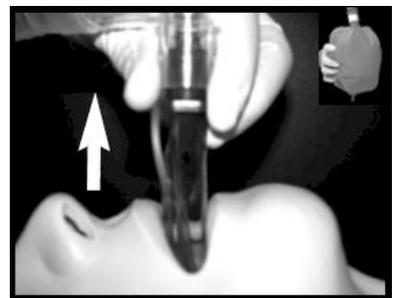


9. Without exerting excessive force, advance KING LT airway until proximal opening of gastric access lumen (*LTS-D model*) or the base of connector (*LT-D model*) is aligned with teeth or gums.
10. Inflate cuffs with the minimum volume necessary to seal the airway at the peak ventilatory pressure employed (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<sub>2</sub> 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 8 to 10 breaths per minute. Deliver each breath over about 1 second while chest compressions are delivered at a rate of 100 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.
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.

Scope	EMR	EMT	AEMT	INT	PM
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**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 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.

**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.

**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.

**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:

<b>SYNCHRONIZED CARADIOVERSION – INITIAL ENERGY DOSES</b>				
	<b>Atrial Fibrillation</b>	<b>Atrial Flutter</b>	<b>SVT</b>	<b>Ventriclar Tachycardia</b>
<b>Monophasic</b>	<b>200J</b>	<b>50 – 100J</b>	<b>50 – 100J</b>	<b>100J</b>
<b>Biphasic</b>	<b>120 – 200J</b>	<b>50 – 100J</b>	<b>50 – 100J</b>	<b>100J</b>

The energy levels listed are monophasic and biphasic initial does energy levels to use if manufacturer recommended settings are unkown 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.

**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 14 or 16 gauge, 2 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. Finger cut off of 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.

Scope	EMR	EMT	AEMT	INT	PM
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## INDICATION

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

## CONSIDERATIONS

1. Commercial windless tourniquets are preferred. In the event that the commercial windless 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. Tourniquets must be applied tightly enough to obliterate the distal pulse.
4. Do not use wire, rope, belts, or any other materials that may cut into the underlying tissues.
5. 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.
2. When using a commercial tourniquet, follow the manufacturer's application guidelines.
3. It is paramount that the tourniquet is tightened to the point that the distal pulse is obliterated and the bleeding stops.
4. Notify other emergency personnel who may care for the patient that a tourniquet has been applied.
5. 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).
6. The tourniquet should be left uncovered so that the site can be monitored for recurrent hemorrhage.
7. If the tourniquet is applied for greater than four (4) hours, contact **[Medical Control]** for further instruction.

## 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 a 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.

**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 infrascapular 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 60 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.

**INDICATION**

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

**CONTRAINDICTION**

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.

## 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**

Scope	EMR	EMT	AEMT	INT	PM
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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:**

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

<b>Generic Name:</b>	Adenosine (ah-den'oh-seen)
<b>Trade Name:</b>	Adenocard®
<b>Chemical Class:</b>	Endogenous nucleoside
<b>Therapeutic Class:</b>	Antiarrhythmic
<b>Actions:</b>	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.
<b>Pharmacokinetics:</b>	Cleared from plasma in less than 30 seconds; $t_{1/2}$ = 10 seconds
<b>Indications:</b>	<ol style="list-style-type: none"> <li>1. Unstable narrow QRS tachycardia refractory to vagal maneuvers.</li> <li>2. Stable, regular, monomorphic wide-complex tachycardia.</li> </ol>
<b>Contraindications:</b>	<ol style="list-style-type: none"> <li>1. Second- or third-degree heart block.</li> <li>2. Sick sinus syndrome.</li> <li>3. Hypersensitivity to the drug.</li> <li>4. Bradycardia.</li> <li>5. Bronchoconstrictive lung disease (i.e. asthma).</li> <li>6. Irregular wide-complex tachycardias</li> </ol>
<b>Precautions:</b> <b>Pregnancy Cat. C</b>	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.
<b>Side Effects:</b>	<p><i>CNS:</i> dizziness, headache</p> <p><i>CV:</i> dysrhythmia outlined under precautions; chest pain, facial flushing, palpitations, diaphoresis</p> <p><i>GI:</i> nausea</p> <p><i>RESP:</i> chest pressure, dyspnea</p>
<b>Administration:</b>	<p><i>Adult:</i> Give 6 mg IV over 1 to 3 seconds. If not effective after 2 minutes, give 12 mg IV over 1 to 3 seconds.</p> <p><i>Pediatric:</i> <b>[Medical Control]</b> 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).</p>
<b>Supply:</b>	Vials or prefilled syringes containing 6 mg in 2 mL.
<b>Notes:</b>	<ol style="list-style-type: none"> <li>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.</li> <li>2. Higher doses than usual may be needed for patients receiving Theophylline preparations or consuming large quantities of Caffeine.</li> <li>3. Dipyridamole (Persantine) can potentiate the effects of Adenosine. The dosage of Adenosine may need to be reduced in patients receiving Dipyridamole.</li> <li>4. Use of Adenosine for irregular wide-complex tachycardias may cause degeneration of the rhythm to VF.</li> </ol>

<b>Generic Name:</b>	<b>Albuterol (al-byoo'ter-ole)</b>
<b>Trade Name:</b>	Airet®, Proventil®, Repetabs®, Respirol®, Ventolin®, Volmax®; Combivent® (combined with Ipratropium Bromide)
<b>Chemical Class:</b>	Sympathomimetic amine; $\beta_2$ -adrenergic agonist
<b>Therapeutic Class:</b>	Antiashtmatic; bronchodilator
<b>Actions:</b>	Albuterol is a selective $\beta_2$ -adrenergic agonist with a minimal number of side effects. It causes prompt bronchodilation and has a duration of action of approximately 5 hours.
<b>Pharmacokinetics:</b>	Onset 5 to 15 minutes. Peak 1 to 1½ hours. Duration 4 to 6 hours. $t_{1/2}$ = 2½ to 4 hours.
<b>Indications:</b>	<ol style="list-style-type: none"> <li>1. Bronchial asthma.</li> <li>2. Reversible bronchospasm associated with chronic bronchitis and emphysema.</li> <li>3. Anaphylactic respiratory distress.</li> <li>4. Crush syndrome <b>[Medical Control]</b>.</li> </ol>
<b>Contraindications:</b>	<ol style="list-style-type: none"> <li>1. Hypertension (SBP greater than 180 mm Hg).</li> <li>2. Tachycardia (HR greater than 140 adult, HR greater than 180 child).</li> <li>3. Severe cardiac disease.</li> <li>4. Hypersensitivity to the drug.</li> </ol>
<b>Precautions:</b>	<ol style="list-style-type: none"> <li>1. Hyperthyroidism.</li> </ol>
<b>Pregnancy Cat. C</b>	<ol style="list-style-type: none"> <li>2. Diabetes mellitus.</li> <li>3. Convulsive disorders.</li> </ol>
<b>Side Effects:</b>	<p><b>CNS:</b> dizziness, headache, stimulation, tremors</p> <p><b>CV:</b> chest pain, dysrhythmias, hypertension, palpitations, tachycardia</p> <p><b>GI:</b> nausea, vomiting</p>
<b>Administration:</b>	<p>Using a small volume nebulizer, adjust the oxygen flowmeter to 6 to 10 L/minute to produce a steady, visible mist.</p> <p><i>Adult:</i> Give 2.5 mg (3 mL of 0.083% solution) with a mouthpiece or facemask. Repeat every 10 minutes, up to 4 treatments, if needed.</p> <p><i>Pediatric:</i> Give 2.5 mg (3 mL of 0.083% solution) with a mouthpiece or blow-by. Repeat every 10 minutes, up to 4 treatments, if needed.</p>
<b>Supply:</b>	Unit dose vials containing 2.5 mg in 3 mL.
<b>Notes:</b>	<ol style="list-style-type: none"> <li>1. The possibility of developing unpleasant side effects increases when Albuterol is administered with other sympathetic agonists.</li> <li>2. <math>\beta</math>-blockers may blunt the pharmacological effects of Albuterol.</li> <li>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.</li> </ol>

<b>Generic Name:</b>	<b>Amiodarone (a-mee'oh-da-rone)</b>
<b>Trade Name:</b>	Cordarone®, Pacerone®
<b>Chemical Class:</b>	Iodinated benzofuran derivative
<b>Therapeutic Class:</b>	Antiarrhythmic
<b>Actions:</b>	Amiodarone prolongs myocardial action potential and effective refractory period and causes noncompetitive $\alpha$ - and $\beta$ -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.
<b>Pharmacokinetics:</b>	$t_{1/2}$ = 20 to 47 days
<b>Indications:</b>	<ol style="list-style-type: none"> <li>Shock refractory ventricular fibrillation and pulseless ventricular tachycardia.</li> <li>Ventricular tachycardia.</li> <li>Wide-complex tachycardia of unknown type (regular rhythm).</li> </ol>
<b>Contraindications:</b>	<ol style="list-style-type: none"> <li>Cardiogenic shock (SBP &lt;90 mm Hg).</li> <li>Marked sinus bradycardia.</li> <li>Second- or third-degree heart block.</li> <li>Hypersensitivity to the drug.</li> <li>Torsades de pointes</li> </ol>
<b>Precautions:</b> <b>Pregnancy Cat. D</b>	<ol style="list-style-type: none"> <li>May worsen existing or precipitate new dysrhythmias, including torsades de pointes and VF.</li> <li>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.</li> <li>Use with caution in pregnancy and with nursing mothers.</li> </ol>
<b>Side Effects:</b>	<p><b>CNS:</b> dizziness, headache</p> <p><b>CV:</b> bradycardia, cardiac conduction abnormalities, CHF, dysrhythmias, hypotension, SA node dysfunction, sinus arrest</p> <p><b>RESP:</b> dyspnea, pulmonary inflammation</p>
<b>Administration:</b>	<p><i>Adult:</i> <b>VF and pulseless VT:</b> Give 300 mg IV/IO. Give additional 150 mg IV push in 3 to 5 minutes for refractory or recurrent VF/VT.</p> <p><b>VT with pulse:</b> Give a slow infusion of 150 mg over 10 minutes. Mix in 100 mL of D<sub>5</sub>W and infuse at 150 gtts/minute (15 drop set).</p> <p><i>Pediatric:</i> <b>VF and pulseless VT:</b> Give 5 mg/kg IV/IO. May repeat up to 2 times for refractory VT/pulseless VT. Maximum single dose 300 mg.</p> <p><b>VT with pulse:</b> Give an infusion of 5 mg/kg over 20 minutes. Mix in 100 mL of D<sub>5</sub>W and infuse at 75 gtts/minute (15 drop set). Maximum dosage is 300 mg.</p> <p><i>Slow Infusion:</i> 1 mg/minute. Mix 150 mg in 250 mL D<sub>5</sub>W and infuse at 100 gtts/minute (60 drop set).</p>
<b>Supply:</b>	Vial containing 150 mg in 3 mL.
<b>Notes:</b>	

<b>Generic Name:</b>	Aspirin (as'pir-in)
<b>Trade Name:</b>	Bayer <sup>®</sup> , Bufferin <sup>®</sup> , Ecotrin <sup>®</sup>
<b>Chemical Class:</b>	Salicylate derivative
<b>Therapeutic Class:</b>	Antiplatelet agent
<b>Actions:</b>	Aspirin blocks the formation of the substance thromboxane A <sub>2</sub> , 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.
<b>Pharmacokinetics:</b>	Onset 15 to 30 minutes. Peak 1 to 2 hours. Duration 4 to 6 hours. t <sub>1/2</sub> = 3 hours at low doses.
<b>Indications:</b>	Chest pain suggestive of an acute myocardial infarction.
<b>Contraindications:</b>	<ol style="list-style-type: none"> <li>1. Hypersensitivity to the drug, NSAIDS, and Tartrazine (FDC yellow dye #5).</li> <li>2. Bleeding disorders including GI hemorrhage and hemophilia.</li> <li>3. Hemorrhagic states.</li> </ol>
<b>Precautions:</b> <b>Pregnancy Cat. C</b>	Children or teenagers with flu-like symptoms (may be associated with the development of Reye's syndrome).
<b>Side Effects:</b>	<i>GI:</i> GI bleeding, heartburn, nausea <i>HEME:</i> prolonged bleeding time
<b>Interactions:</b>	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.
<b>Administration:</b>	Give four (4) 81 mg chewable tablets (324 mg total dose) PO as soon as possible after the onset of chest pain.
<b>Supply:</b>	81 mg low dose chewable tablets
<b>Notes:</b>	

<b>Generic Name:</b>	<b>Atropine (a'troe-peen)</b>
<b>Trade Name:</b>	Atropine Care <sup>®</sup> , Atropen Autoinjector <sup>®</sup> , Atropisol <sup>®</sup> , Atrosulf-1 <sup>®</sup>
<b>Chemical Class:</b>	Belladonna alkaloid
<b>Therapeutic Class:</b>	Anticholinergic
<b>Actions:</b>	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.
<b>Pharmacokinetics:</b>	Peak 2 to 4 minutes. Duration 4 to 6 hours.
<b>Indications:</b>	<ol style="list-style-type: none"> <li><b>[Adult]</b> Hemodynamically significant bradycardia (HR less than 60): <ol style="list-style-type: none"> <li>Acute altered mental status, ongoing chest pain, hypotension, or other signs of shock.</li> <li>Bradycardia associated with "escape" ventricular ectopy (i.e., PVCs attributed to the underlying slow heart rate).</li> </ol> </li> <li><b>[Pediatric]</b> Hemodynamically significant bradycardia [HR less than 60 (neonate less than 80/minute)] due to increased vagal tone or primary AV block.</li> <li>Severe organophosphate poisonings (insecticides).</li> </ol>
<b>Contraindication:</b>	Hypersensitivity to the drug
<b>Precautions:</b> <b>Pregnancy Cat. C</b>	<ol style="list-style-type: none"> <li>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.</li> <li>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.</li> </ol>
<b>Side Effects:</b>	<p><i>CNS:</i> drowsiness, confusion</p> <p><i>CV:</i> angina, PVCs, tachycardia</p> <p><i>EENT:</i> blurred vision, dilated pupils</p> <p><i>GI:</i> dry mouth</p>
<b>Administration:</b>	<p><i>Adult:</i> <b>Bradycardia:</b> Give 0.5 mg IV. May repeat every 5 minutes to a total dose of 3 mg if needed.</p> <p><b>Cholinergic Toxicity:</b> Give 2 mg IV. Repeat every 5 minutes if needed.</p> <p><i>Pediatric:</i> <b>Bradycardia:</b> 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)</p>
<b>Supply:</b>	Prefilled syringe containing 1 mg in 10 mL.
<b>Notes:</b>	

<b>Generic Name:</b>	<b>Calcium Chloride (kal'se-um klor-ide)</b>
<b>Trade Name:</b>	N/A
<b>Chemical Class:</b>	Divalent cation
<b>Therapeutic Class:</b>	Electrolyte
<b>Actions:</b>	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.
<b>Pharmacokinetics:</b>	Rapid increase in serum levels, with return to pre-drug level within 30 minutes to 2 hours.
<b>Indications:</b>	<ol style="list-style-type: none"> <li>1. Magnesium sulfate toxicity <b>[Medical Control]</b>.</li> <li>2. Acute hyperkalemia (elevated potassium) <b>[Medical Control]</b>.</li> <li>3. Acute hypocalcemia (decreased calcium) <b>[Medical Control]</b>.</li> <li>4. Calcium channel blocker toxicity (Nifedipine, Verapamil, Diltiazem) <b>[Medical Control]</b>.</li> <li>5. Crush syndrome <b>[Medical Control]</b>.</li> </ol>
<b>Contraindication:</b>	Patients receiving Digitalis (can result in sudden cardiac death from VF if Digitalis toxicity is present).
<b>Precautions:</b>	<ol style="list-style-type: none"> <li>1. Ensure administration by slow IV push; rapid push can cause VF.</li> </ol>
<b>Pregnancy Cat. C</b>	<ol style="list-style-type: none"> <li>2. Extravasation can cause tissue necrosis at the injection site.</li> <li>3. Ensure IV line is flushed between administrations of Calcium Chloride and Sodium Bicarbonate to avoid precipitation.</li> </ol>
<b>Side Effects:</b>	<p><i>CNS:</i> dizziness</p> <p><i>CV:</i> bradycardia, cardiac arrest, dysrhythmias, heart block, hemorrhage, hypotension, shortened Q-T</p> <p><i>GI:</i> nausea, vomiting</p>
<b>Administration:</b>	Give 8 mg/kg of 10% solution IV over 5 minutes. Repeat dose in 10 minutes if needed.
<b>Supply:</b>	Prefilled syringe containing 1 g in 10 mL (10% solution)
<b>Notes:</b>	

<b>Generic Name:</b>	<b>Dextrose (dex'trose)</b>
<b>Trade Name:</b>	Glucose <sup>®</sup> , Glutose <sup>®</sup> , Insta-Glucose <sup>®</sup>
<b>Chemical Class:</b>	Carbohydrate
<b>Therapeutic Class:</b>	Nutrient, caloric
<b>Actions:</b>	Dextrose supplies supplemental glucose in cases of hypoglycemia and restores blood sugar level to normal (70 to 110 mg/dL).
<b>Pharmacokinetics:</b>	N/A
<b>Indications:</b>	<ol style="list-style-type: none"> <li>1. Altered mental status of unknown etiology (GCS less than or equal to 12).</li> <li>2. Hypoglycemia (less than 60 mg/dL) based on rapid glucose determination or clinical judgment.</li> <li>3. Status epilepticus.</li> <li>4. Oral hypoglycemic agent overdose.</li> <li>5. Neonatal resuscitation not responsive to ventilation and chest compressions.</li> </ol>
<b>Contraindications:</b>	No contraindications for a patient with suspected hypoglycemia.
<b>Precautions:</b>	<ol style="list-style-type: none"> <li>1. Use with caution in patients with increased intracranial pressure because the Dextrose load may worsen cerebral edema.</li> <li>2. Localized venous irritation may occur when smaller veins are used.</li> <li>3. Infiltration may result in tissue necrosis.</li> <li>4. Dextrose is only administered via the IV or IO route.</li> </ol>
<b>Side Effects:</b>	Tissue necrosis and phlebitis at the injection site.
<b>Administration:</b>	<p><b>Patient &gt; 2 years old:</b> Give Dextrose 50% 1 g/kg up to 25 g IV. Repeat once in 2 minutes if altered mental status persists.</p> <p><b>Child &lt; 2 years old:</b> Give Dextrose 25% 1 g/kg up to 25 g IV. Repeat once in 2 minutes if altered mental status persists.</p> <p><b>Neonate (&lt; 28 days old):</b> Give Dextrose 12.5% 1 g/kg (8 mL/kg).</p>
<b>Supply:</b>	Prefilled syringe containing 25 g in 50 mL (50% solution)
<b>Notes:</b>	<ol style="list-style-type: none"> <li>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.</li> <li>2. Hypoglycemic states require immediate intervention. Prolonged hypoglycemia can result in permanent brain damage.</li> <li>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.</li> </ol>

<b>Generic Name:</b>	Diazepam (dye-az'e-pam)	<b>DEA Class:</b> Schedule IV
<b>Trade Name:</b>	Valium®	
<b>Chemical Class:</b>	Benzodiazepine	
<b>Therapeutic Class:</b>	Anesthesia adjunct, anticonvulsant, sedative/hypnotic, skeletal muscle relaxant	
<b>DEA Class:</b>	Schedule IV	
<b>Actions:</b>	Diazepam causes central nervous system depression via facilitation of inhibitory GABA <sup>1</sup> at benzodiazepine receptor sites (BZ <sub>1</sub> – associated with sleep; BZ <sub>2</sub> – associated with memory, motor, sensory and cognitive function).	
<b>Pharmacokinetics:</b>	<i>IV:</i> Onset 1 to 3 minutes. Duration 15 minutes. t <sub>½</sub> = 20 to 50 hours. <i>PR:</i> Onset 5 to 15 minutes. Peak 1.5 hours.	
<b>Indications:</b>	<ol style="list-style-type: none"> <li>1. Seizures not caused by hypoglycemia.</li> <li>2. Severe agitation, tachycardia, or hallucinations cause by alcohol withdrawal.</li> <li>3. Sedation for cardioversion and transcutaneous pacing, <i>secondary to Midazolam</i>.<sup>2</sup></li> <li>4. Sedation for endotracheal intubation only <b>after</b> the ET tube is inserted, <i>secondary to Midazolam</i>.<sup>2</sup></li> <li>5. Tachydysrhythmias with HR greater than 120 bpm associated with stimulant (i.e. Cocaine and Methamphetamine) abuse.</li> </ol>	
<b>Contraindications:</b>	<ol style="list-style-type: none"> <li>1. Hypersensitivity to the drug.</li> <li>2. Altered mental status not related to seizures.</li> <li>3. Respiratory depression.</li> </ol>	
<b>Precautions:</b> <b>Pregnancy Cat. D</b>	<ol style="list-style-type: none"> <li>1. Use cautiously with the elderly, the debilitated, hepatic disease, and renal disease.</li> <li>2. The benefits of giving Diazepam to the pregnant patient for seizures outweigh the associated risks.</li> </ol>	
<b>Side Effects:</b>	<i>CNS:</i> dizziness, drowsiness, headache; <i>CV:</i> hypotension; <i>EENT:</i> blurred vision; <i>GI:</i> nausea, vomiting; <i>RESP:</i> respiratory depression	
<b>Interactions:</b>	<ol style="list-style-type: none"> <li>1. Diazepam is incompatible with many medications. Whenever Diazepam is given intravenously in conjunction with other drugs, the IV line should be adequately flushed.</li> <li>2. The effects of Diazepam can be additive when used in conjunction with other CNS depressants and alcohol.</li> </ol>	
<b>Administration:</b>	<p><i>Adult:</i> Give 0.25 mg/kg up to 5 mg slow IV push, titrated to effect. Repeat dose in 5 minutes if seizure persists.</p> <p style="padding-left: 40px;">Diazepam may also be administered 5 mg IM if unable to readily establish IV access.</p> <p><i>Pediatric:</i> <i>IV:</i> 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.</p> <p style="padding-left: 40px;"><i>PR:</i> Give 0.25 mg/kg up to 5 mg PR.</p>	
<b>Supply:</b>	Carpujet or vial containing 10 mg in 2 mL.	
<b>Notes:</b>	<ol style="list-style-type: none"> <li>1. GABA – Gammaaminobutyric Acid, the chief inhibitory neurotransmitter in the CNS. GABA hyperpolarizes the membrane of the CNS neurons decreasing their response to stimuli.</li> <li>2. <b>[Medical Control]</b> must authorize administration of Diazepam for sedation secondary to Midazolam.</li> </ol>	

<b>Generic Name:</b>	Diphenhydramine (dye-fen-hye'dra-meen)
<b>Trade Name:</b>	Benadryl®
<b>Chemical Class:</b>	Ethanolamine derivative
<b>Therapeutic Class:</b>	Antihistamine, antianaphylactic (adjunct)
<b>Actions:</b>	Diphenhydramine is an antihistamine with anticholinergic (drying) and sedative side effects. Diphenhydramine decreases the allergic response by blocking Histamine at H <sub>1</sub> receptor sites.
<b>Pharmacokinetics:</b>	PO: Peak 2 to 4 hours. t <sub>1/2</sub> = 2 to 8 hours. (IV pharmacokinetics not available)
<b>Indications:</b>	<ol style="list-style-type: none"> <li>1. Anaphylaxis, as an adjunct to Epinephrine.</li> <li>2. Severe vomiting and motion sickness <b>[Medical Control]</b>.</li> <li>3. To treat dystonic reactions and extrapyramidal reactions caused by phenothiazines.</li> </ol>
<b>Contraindications:</b>	<ol style="list-style-type: none"> <li>1. Bronchial asthma.</li> <li>2. Nursing mothers.</li> <li>3. Children less than 10 kg.</li> <li>4. Glaucoma.</li> <li>5. Hypersensitivity to the drug or other antihistamines.</li> </ol>
<b>Precautions:</b>	Use with caution in patients with a history of hyperthyroidism, cardiovascular disease, and hypertension.
<b>Pregnancy Cat. B</b>	
<b>Side Effects:</b>	<p><i>CNS:</i> dizziness, drowsiness, sedation, sleepiness</p> <p><i>CV:</i> headache, palpitations</p> <p><i>GI:</i> dryness of mouth, nose and throat</p> <p><i>RESP:</i> thickening of bronchial secretions, wheezing</p>
<b>Interactions:</b>	<ol style="list-style-type: none"> <li>1. Diphenhydramine has additive effects with alcohol and other CNS depressants (hypnotics, sedatives, tranquilizers, etc).</li> <li>2. MAO inhibitors prolong and intensify the anticholinergic (drying) effects of antihistamines.</li> </ol>
<b>Administration:</b>	<p><i>Adult:</i> Give 1 mg/kg up to 50 mg IM or slow IV push (25 mg/minute).</p> <p><i>Pediatric:</i> Give 1 mg/kg up to 50 mg IM or slow IV push (25 mg/minute).</p>
<b>Supply:</b>	Vial containing 50 mg in 1 mL
<b>Notes:</b>	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.

<b>Generic Name:</b>	Dopamine (doe'pa-meen)
<b>Trade Name:</b>	Intropin®
<b>Chemical Class:</b>	Catecholamine
<b>Therapeutic Class:</b>	Vasopressor, α- and β-adrenergic sympathomimetic
<b>Actions:</b>	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 <sub>1</sub> -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.
<b>Pharmacokinetics:</b>	Onset 5 minutes. Duration less than 10 minutes. t <sub>1/2</sub> = 2 minutes.
<b>Indications:</b>	<ol style="list-style-type: none"> <li>1. Hemodynamically significant bradycardia that does not respond to Atropine and/or transcutaneous pacing.</li> <li>2. Hemodynamically significant hypotension associated with cardiogenic shock.</li> </ol>
<b>Contraindications:</b>	<ol style="list-style-type: none"> <li>1. Hypovolemic shock; volume replacement <i>must</i> be accomplished prior to using Dopamine.</li> <li>2. Pheochromocytoma (tumor of the adrenal gland).</li> </ol>
<b>Precautions:</b> <b>Pregnancy Cat. C</b>	<ol style="list-style-type: none"> <li>1. Dopamine increases heart rate and can induce or worsen supraventricular and ventricular dysrhythmias.</li> <li>2. Dopamine should not be administered in the presence of tachydysrhythmias or ventricular fibrillation.</li> </ol>
<b>Side Effects:</b>	<p><b>CNS:</b> headache, nervousness</p> <p><b>CV:</b> anginal pain, ectopic beats, hypertension, palpitation, tachycardia, vasoconstriction</p> <p><b>GI:</b> nausea, vomiting</p> <p><b>RESP:</b> dyspnea</p>
<b>Administration:</b>	IV infusion at 5 to 20 mcg/kg/minute. Titrate to SBP = 90 mm Hg. Piggyback the Dopamine infusion into an already established IV infusion.
<b>Supply:</b>	Premixed Bag containing 800 mg in 250 mL (3,200 mcg/mL).
<b>Notes:</b>	<ol style="list-style-type: none"> <li>1. To prepare a Dopamine infusion, mix 200 mg Dopamine in a 250 mL bag of D<sub>5</sub>W 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.</li> <li>2. Tissue sloughing may occur with extravasation. Antecubital veins are preferable sites. Monitor closely for leakage and/or infiltration.</li> </ol>

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

<b>Generic Name:</b>	<b>Epinephrine 1:1,000</b>
<b>Trade Name:</b>	Adrenalin®
<b>Chemical Class:</b>	Catecholamine
<b>Therapeutic Class:</b>	Bronchodilator, vasopressor
<b>Actions:</b>	Epinephrine is a naturally occurring catecholamine. It acts directly on $\alpha$ - and $\beta$ -adrenergic receptors. Its effect on $\beta$ -receptors is much more profound than its effect on $\alpha$ -receptors. The effects of Epinephrine on $\beta_1$ -adrenergic receptors include a positive chronotropic effect (increased heart rate) and a positive inotropic effect (cardiac contractile force). The effects of Epinephrine on $\alpha$ -adrenergic receptor sites include increased systemic vascular resistance. The effects on these receptor sites together cause an increased blood pressure. Epinephrine also causes bronchodilation due to its effects on $\beta_2$ -adrenergic receptors.
<b>Pharmacokinetics:</b>	<i>IM:</i> Onset variable; Peak unknown; Duration 1 to 4 hours <i>SC:</i> Onset 5 to 10 minutes; Peak 30 minutes; Duration 1 to 4 hours
<b>Indications:</b>	<ol style="list-style-type: none"> <li>1. Anaphylaxis.</li> <li>2. Bronchial asthma.</li> <li>3. Respiratory distress due to epiglottitis or croup <b>[Medical Control]</b>.</li> </ol>
<b>Contraindications:</b>	Epinephrine should be avoided in the following patients unless signs and symptoms are severe: <ol style="list-style-type: none"> <li>1. Hypertension (SBP greater than 180 mm Hg).</li> <li>2. Tachycardia (HR greater than 140 adult, HR greater than 180 child).</li> <li>3. Cardiovascular disease.</li> <li>4. Elderly (age greater than 55 years).</li> <li>5. Angle closure glaucoma.</li> </ol>
<b>Precautions:</b>	<ol style="list-style-type: none"> <li>1. Hyperthyroidism.</li> </ol>
<b>Pregnancy Cat. C</b>	<ol style="list-style-type: none"> <li>2. Diabetes Mellitus.</li> <li>3. Give Epinephrine cautiously in geriatric and cardiac patients.</li> </ol>
<b>Side Effects:</b>	<i>CNS:</i> anxiety, dizziness, restlessness, tremulousness, headache <i>CV:</i> anginal pain, dysrhythmias, hypertension, palpitations <i>GI:</i> nausea, vomiting <i>SKIN:</i> pallor
<b>Interactions:</b>	Cyclic antidepressants and antihistamines may potentiate the effects of Epinephrine.
<b>Administration:</b>	<i>Adult:</i> Give 0.3 mg IM. Repeat dose in 10 minutes if needed. <i>Pediatric:</i> Give 0.01 mg/kg up to 0.3 mg IM. Repeat dose in 10 minutes if needed. <i>Infusion:</i> 0.1 to 0.5 mcg/minute. Mix 1 mg in 100 mL D <sub>5</sub> W and titrate to desired effect.
<b>Supply:</b>	Ampule containing 1 mg in 1 mL. Multidose Vial containing 30 mg in 30 mL.
<b>Notes:</b>	The IM route is preferred for the patient in severe shock.

<b>Generic Name:</b>	<b>Epinephrine 1:10,000</b>
<b>Trade Name:</b>	Adrenalin®
<b>Chemical Class:</b>	Catecholamine
<b>Therapeutic Class:</b>	Bronchodilator, vasopressor
<b>Actions:</b>	Epinephrine is a naturally occurring catecholamine. It acts directly on $\alpha$ - and $\beta$ -adrenergic receptors. Its effect on $\beta$ -receptors is much more profound than its effect on $\alpha$ -receptors. The effects of Epinephrine on $\beta_1$ -adrenergic receptors include a positive chronotropic effect (increased heart rate) and a positive inotropic effect (cardiac contractile force). The effects of Epinephrine on $\alpha$ -adrenergic receptor sites include increased systemic vascular resistance. The effects on these receptor sites together cause an increased blood pressure. Epinephrine also causes bronchodilation due to its effects on $\beta_2$ -adrenergic receptors.
<b>Pharmacokinetics:</b>	<i>IV</i> : Onset immediate; Peak 5 minutes; Duration short
<b>Indications:</b>	<ol style="list-style-type: none"> <li>1. Cardiac arrest.</li> <li>2. Pediatric bradycardia unresponsive to ventilation.</li> <li>3. Neonatal bradycardia unresponsive to ventilation and chest compressions.</li> <li>4. Anaphylaxis and asthma patients in dire circumstances.</li> </ol>
<b>Contraindications:</b>	No contraindications when used for indicated conditions.
<b>Precautions:</b>	No precautions when used for indicated conditions.
<b>Pregnancy Cat. C</b>	
<b>Side Effects:</b>	<p><i>CNS</i>: anxiety, dizziness, restlessness, tremulousness, headache</p> <p><i>CV</i>: anginal pain, dysrhythmias, hypertension, palpitations</p> <p><i>GI</i>: nausea, vomiting</p> <p><i>SKIN</i>: pallor</p>
<b>Administration:</b>	<p><i>Adult</i>: Give 1 mg (10 mL) IV/IO. Repeat every 3 to 5 minutes if needed.</p> <p><i>Pediatric</i>: Give 0.01 mg/kg (0.1 mL/kg) IV/IO. Repeat every 3 to 5 minutes if needed.</p> <p><i>Anaphylaxis</i>: 0.3 mg to 0.5 mg</p>
<b>Supply:</b>	Prefilled syringe containing 1 mg in 10 mL
<b>Notes:</b>	

<b>Drug Names:</b>	Epinephrine (EpiPen <sup>®</sup> , EpiPen Jr. <sup>®</sup> )
<b>Overview:</b>	Epinephrine auto-injector (EpiPen <sup>®</sup> ) 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.
<b>Indications:</b>	Patient exhibiting the assessment findings of an allergic reaction (shock and/or respiratory distress).
<b>Contraindications:</b>	No contraindications when used in a life-threatening situation.
<b>Precautions:</b>	Give Epinephrine cautiously in geriatric and cardiac patients.
<b>Side Effects:</b>	Increased pulse rate, tremors, nervousness.
<b>Administration:</b>	<ol style="list-style-type: none"> <li>1. Assure right medication, right patient, right route, and right dose.</li> <li>2. Ensure medication is not discolored (liquid may not be visible inside all types of devices).</li> <li>3. Remove safety cap from the auto-injector.</li> <li>4. Place tip of auto-injector against the thigh and press firmly until the injector activates.</li> <li>5. Hold injector firmly against thigh for a <i>minimum of 10 seconds</i> to allow for full dose delivery.</li> <li>6. Record activity and time.</li> <li>7. Dispose of injector in biohazard container.</li> <li>8. If patient condition continues to worsen: <ol style="list-style-type: none"> <li>a. Decreasing mental status, increasing breathing difficulty, decreasing blood pressure.</li> <li>b. Give an additional dose of Epinephrine using a second EpiPen<sup>®</sup>.</li> </ol> </li> </ol>
<b>Supply:</b>	<ol style="list-style-type: none"> <li>1. EpiPen<sup>®</sup> contains 0.3 mg of Epinephrine</li> <li>2. EpiPen Jr.<sup>®</sup> contains 0.15 mg of Epinephrine</li> </ol>
<b>Notes:</b>	

<b>Generic Name:</b>	<b>Fentanyl (fen'-ta-nil)</b>	<b>DEA Class: Schedule II</b>
<b>Trade Name:</b>	Sublimaze®, Duragesic®, Fentora®	
<b>Chemical Class:</b>	Opiate derivative	
<b>Therapeutic Class:</b>	Narcotic analgesic	
<b>Actions:</b>	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.	
<b>Pharmacokinetics:</b>	<i>IV:</i> Onset immediate. Peak effect several minutes. Duration of action 30 to 60 minutes. <i>IM:</i> Onset of action 7 – 8 minutes. Duration of action 1 – 2 hours.	
<b>Indication:</b>	Moderate to severe pain.	
<b>Contraindications:</b>	1. Known hypersensitivity 2. Respiratory depression	
<b>Precautions:</b>	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 bradyarrhythmias.	
<b>Pregnancy Cat. C</b>		
<b>Side Effects:</b>	<i>CNS:</i> dizziness <i>CV:</i> hypotension, hypertension, bradycardia <i>EENT:</i> blurred vision <i>GI:</i> nausea, vomiting <i>RESP:</i> respiratory depression, apnea, laryngospasm <i>SKIN:</i> diaphoresis	
<b>Administration:</b>	<i>Pain</i> 1 mcg/kg up to 100 mcg IM or IV over 1 to 2 minutes. <i>Adult/Ped:</i> Titrate to effect. Repeat every 5 minutes, if needed, at ½ the initial dose. Do not exceed 3 mcg/kg.	
	<i>Pain</i> 0.5 mcg/kg up to 50 mcg IM or IV over 1 to 2 minutes. <i>&gt;65 years:</i> Titrate to effect. Repeat every 5 minutes, if needed, at ½ the initial dose. Do not exceed 3 mcg/kg.	
	<i>Chest pain:</i> 50 mcg IV, repeat every 5 minutes (up to 150 mcg).	
<b>Supply:</b>	100 mcg in 2 mL	
<b>Notes:</b>	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.	

<b>Generic Name:</b>	Glucagon (gloo'ka-gon)
<b>Trade Name:</b>	GlucaGen®
<b>Chemical Class:</b>	Polypeptide hormone
<b>Therapeutic Class:</b>	Antihypoglycemic
<b>Actions:</b>	Glucagon is a protein secreted by the $\alpha$ 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.
<b>Pharmacokinetics:</b>	Onset within 15 minutes. $t_{1/2}$ = 3 to 6 minutes.
<b>Indications:</b>	When unable to obtain IV access and give Dextrose, <i>and</i> : <ol style="list-style-type: none"> <li>1. Altered mental status of unknown etiology (GCS less than or equal to 12).</li> <li>2. Hypoglycemia (less than 60 mg/dL) based on rapid glucose determination or clinical judgment.</li> <li>3. Status epilepticus.</li> <li>4. Oral hypoglycemic agent overdose.</li> </ol>
<b>Contraindications:</b>	Hypersensitivity to the drug.
<b>Precautions:</b>	Glucagon is only effective if there are sufficient stores of glycogen with the liver. In an emergency situation, intravenous Dextrose is the agent of choice.
<b>Pregnancy Cat. C</b>	
<b>Side Effects:</b>	<i>CNS:</i> dizziness, headache <i>CV:</i> hypotension <i>GI:</i> nausea, vomiting
<b>Administration:</b>	<i>Adult:</i> 1 mg IM <i>Pediatric:</i> 1 mg IM
<b>Supply:</b>	Glucagon must be reconstituted before administration. It is supplied in rubber-stoppered vials containing 1 mg of powder and 1 mL of diluting solution.
<b>Notes:</b>	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).

<b>Generic Name:</b>	<b>Haloperidol (ha-loe-per'idole)</b>
<b>Trade Name:</b>	Haldol®
<b>Chemical Class:</b>	Butyrophenone derivative
<b>Therapeutic Class:</b>	Antipsychotic
<b>Actions:</b>	Haloperidol is a major tranquilizer that has proved effective in the management of acute psycholitic episodes. Haloperidol appears to block Dopamine receptors in the brain associated with mood and behavior. Haloperidol has weak anticholinergic properties.
<b>Pharmacokinetics:</b>	<i>IM:</i> Peak 10-20 minutes, $t_{1/2}$ = 17 hours; <i>IV:</i> N/A
<b>Indications:</b>	Combative patients secondary to acute psychotic episodes.
<b>Contraindications:</b>	<ol style="list-style-type: none"> <li>1. Severe toxic central nervous system depression or comatose states from any cause.</li> <li>2. Hypersensitivity to the drug.</li> <li>3. Parkinson's disease.</li> <li>4. Age less than 8 years. <b>[Medical Control]</b></li> </ol>
<b>Precautions:</b> <b>Pregnancy Cat. C</b>	<ol style="list-style-type: none"> <li>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.</li> <li>2. Extrapyrmidal reactions have been known to occur following the administration of Haloperidol, especially in children. Diphenhydramine should be available.</li> </ol>
<b>Side Effects:</b>	<p><i>CNS:</i> extrapyramidal symptoms, drowsiness, headache, insomnia, restlessness, seizures, vertigo</p> <p><i>CV:</i> hypertension, hypotension, tachycardia</p> <p><i>EENT:</i> blurred vision</p> <p><i>GI:</i> nausea, vomiting, dry mouth, constipation</p>
<b>Administration:</b>	<p><i>Adult:</i> Give 5 mg IM. Contact <b>[Medical Control]</b> for repeat dosing.</p> <p><i>Pediatric:</i> Contact <b>[Medical Control]</b>.</p>
<b>Supply:</b>	Ampule containing 5 mg in 1 mL.
<b>Note:</b>	Haloperidol may be mixed with Midazolam for injection.

**HYDROXOCOBALAMIN (Cyanokit®) (OPTIONAL)****Protocol 6.17**

Scope	EMR	EMT	AEMT	INT	PM
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<b>Generic Name:</b>	<b>Hydroxocobalamin (hye-drox-oh-koe-bal'-a-min)</b>
<b>Trade Name:</b>	Cyanokit®
<b>Chemical Class:</b>	Vitamin B complex
<b>Therapeutic Class:</b>	Hematinic; vitamin
<b>Actions:</b>	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.
<b>Pharmacokinetics:</b>	N/A
<b>Indications:</b>	Known or suspected cyanide poisoning.
<b>Contraindications:</b>	Hypersensitivity to Hydroxocobalamin or Cyanocobalamin
<b>Precautions:</b>	1. Allergic reactions may include anaphylaxis, chest tightness, edema, urticaria, pruritus, dyspnea, and rash.
<b>Pregnancy Cat. C</b>	2. Hypertension.
<b>Side Effects:</b>	<i>CNS:</i> headache <i>CV:</i> increased blood pressure <i>GI:</i> transient chromaturia (abnormal coloration of the urine), nausea <i>SKIN:</i> erythema, rash, injection site reactions
<b>Administration:</b>	<i>Adult:</i> Give 5 g IV infused over 15 minutes. If signs and symptoms persist, a repeat dose can be administered <b>[Medical Control]</b> . The infusion rate for second dose is usually between 15 minutes and 2 hours. <i>Pediatric:</i> Give 70 mg/kg, up to 5 g IV infused over 15 minutes. If signs and symptoms persist, a repeat dose can be administered <b>[Medical Control]</b> . The infusion rate for second dose is usually between 15 minutes and 2 hours.
<b>Supply:</b>	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.
<b>Notes:</b>	<ul style="list-style-type: none"> <li>The drug substance is the hydroxylated active form of Vitamin B12.</li> <li>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 no 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.</li> <li>Incompatible with Diazepam, Dobutamine, Dopamine, Fentanyl, Nitroglycerin, Pentobarbital, Propofol, Thiopental, blood products, Sodium Thiosulfate, Sodium Nitrite, and ascorbic acid. Use separate IV lines.</li> </ul>

<b>Generic Name:</b>	<b>Ipratropium (eye-pra-troep'ee-um) Bromide</b>
<b>Trade Name:</b>	Atrovent®
<b>Chemical Class:</b>	Quaternary ammonium compound
<b>Therapeutic Class:</b>	Bronchodilator
<b>Actions:</b>	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.
<b>Pharmacokinetics:</b>	Onset 5 to 15 minutes. Peak effect 1 to 2 hours. Duration of action 3 to 6 hours.
<b>Indications:</b>	<ol style="list-style-type: none"> <li>1. Bronchoconstriction in COPD, including chronic bronchitis and emphysema as an adjunct to Albuterol.</li> <li>2. Bronchial asthma as an adjunct to Albuterol.</li> </ol>
<b>Contraindications:</b>	1. Hypersensitivity to the drug, or to Atropine and its derivatives.
<b>Precautions:</b> <b>Pregnancy Cat. B</b>	Ipratropium should be used with caution in patients with narrow-angle glaucoma, prostatic hypertrophy, or bladder-neck obstruction.
<b>Side Effects:</b>	<p><i>CNS:</i> anxiety, dizziness, headache, nervousness</p> <p><i>CV:</i> palpitations</p> <p><i>EENT:</i> blurred vision, dry mouth</p> <p><i>GI:</i> nausea, vomiting</p> <p><i>RESP:</i> bronchospasm, cough</p>
<b>Administration:</b>	<p>Using a small volume nebulizer, adjust the oxygen flowmeter to 6 to 10 L/minute to produce a steady, visible mist.</p> <p><i>Adult:</i> Give 0.5 mg in 2.5 mL with a mouthpiece or facemask. Do not repeat.</p> <p><i>Pediatric:</i> Give 0.5 mg in 2.5 mL with a mouthpiece or blow-by. Do not repeat.</p>
<b>Supply:</b>	Unit dose vials containing 0.5 mg in 2.5 mL.
<b>Notes:</b>	<ol style="list-style-type: none"> <li>1. Give only one dose of Ipratropium with the initial Albuterol treatment. Ipratropium is not used as a stand alone drug.</li> <li>2. Ipratropium is not used for anaphylactic respiratory distress.</li> </ol>

<b>Generic Name:</b>	Lidocaine (Iye'doe-kane) Hydrochloride 1% or 2%
<b>Trade Name:</b>	Xylocaine®
<b>Chemical Class:</b>	Amide derivative
<b>Therapeutic Class:</b>	Anesthetic, local
<b>Actions:</b>	Lidocaine stabilizes the neuronal membrane by inhibiting the ionic fluxes required for the initiation and conduction of nerve impulses, thereby effecting local anesthetic action.
<b>Pharmacokinetics:</b>	Onset of anesthesia: 15-30 seconds. Duration 30-60 minutes.
<b>Indication:</b>	Pain associated with infusing fluid under pressure via the EZ-IO system.
<b>Contraindications:</b>	<ol style="list-style-type: none"> <li>1. Hypersensitivity to the drug.</li> <li>2. Stokes-Adams syndrome.</li> <li>3. Wolff-Parkinson-White syndrome.</li> <li>4. Severe degrees of sinoatrial, atrioventricular, or intraventricular block in the absence of an artificial pacemaker.</li> </ol>
<b>Precautions:</b>	Use cautiously in patients with severe liver or kidney disease, hypovolemia, severe congestive heart failure, and shock.
<b>Pregnancy Cat. B</b>	
<b>Side Effects:</b>	<i>CNS:</i> seizures, tremors, twitching, dizziness, unconsciousness <i>CV:</i> bradycardia, edema, heart block, hypotension <i>EENT:</i> blurred or diplopia, tinnitus <i>Other:</i> respiratory depression, nausea, vomiting
<b>Administration</b>	<i>Adult:</i> 20- 40 mg IO. Give slowly in small increments (4 mg/0.2 mL) until pain is resolved. <i>Pediatric:</i> 0.5 mg/kg up to 40 mg IO. Give slowly in small increments (4 mg/0.2 mL) until pain is resolved.
<b>Supply:</b>	Vial contains 40 mg in 2 mL.

<b>Generic Name:</b>	<b>Magnesium Sulfate (mag-nee'see-um sul'fate)</b>
<b>Trade Name:</b>	Magnesium Sulfate Inj. 50%
<b>Chemical Class:</b>	Divalent cation
<b>Therapeutic Class:</b>	Antiarrhythmic, electrolyte
<b>Actions:</b>	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.
<b>Pharmacokinetics:</b>	Onset immediate. Duration 30 minutes.
<b>Indications:</b>	<ol style="list-style-type: none"> <li>1. Torsades de pointes.</li> <li>2. Eclampsia.</li> <li>3. Tricyclic antidepressant toxicity.</li> <li>4. Status asthmaticus non-responsive to standard medications.</li> </ol>
<b>Contraindications:</b>	Third-degree AV block.
<b>Precautions:</b>	<ol style="list-style-type: none"> <li>1. If reflexes disappear in the eclamptic patient, do not repeat the dose.</li> </ol>
<b>Pregnancy Cat. B</b>	<ol style="list-style-type: none"> <li>2. Magnesium Sulfate should be administered slowly to minimize side effects.</li> <li>3. Any patient receiving intravenous Magnesium Sulfate should have continuous cardiac monitoring and frequent monitoring of vital signs.</li> <li>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.</li> </ol>
<b>Side Effects:</b>	<p><i>CNS:</i> coma, depressed reflexes, lethargy, weakness</p> <p><i>CV:</i> heart block, hypotension, bradycardia</p> <p><i>RESP:</i> respiratory depression</p> <p><i>SKIN:</i> flushing, sweating</p>
<b>Interactions:</b>	Magnesium Sulfate can cause cardiac conduction abnormalities if administered in conjunction with Digitalis.
<b>Administration:</b>	<p>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 6 mL of Normal Saline to make a 20% solution.</p> <p><i>Adult:</i> <b>Pulseless:</b> Give 2 g (20% solution) IV over 1 to 2 minutes.</p> <p><b>With Pulse:</b> Give 2 g (20% solution) IV over 5 minutes. Repeat dose if needed.</p> <p><b>Seizure (Eclampsia):</b> 4 g (20% solution) IV over 5 minutes. Repeat dose (if available) in 5 minutes if seizure persists <b>[Medical Control]</b>.</p> <p><i>Pediatric:</i> <b>Pulseless:</b> Give 25 mg/kg up to 2 g IV/IO, for torsades de pointes.</p>
<b>Supply:</b>	Vial containing 1 g in 2 mL.
<b>Notes:</b>	

<b>Drug Names:</b>	<ol style="list-style-type: none"> <li>1. <b>Albuterol</b> (Proventil<sup>®</sup>, Ventolin<sup>®</sup>)</li> <li>2. <b>Metaproterenol</b> (Metaprel<sup>®</sup>, Alupent<sup>®</sup>)</li> <li>3. <b>Isoetharine</b> (Bronchosol<sup>®</sup>, Bronkometer<sup>®</sup>)</li> </ol>
<b>Overview:</b>	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.
<b>Indications:</b>	<ol style="list-style-type: none"> <li>1. Shortness of breath and/or signs and symptoms of difficulty breathing, <i>and</i></li> <li>2. Patient has the medication and the medication is prescribed for the patient.</li> </ol>
<b>Contraindications:</b>	<ol style="list-style-type: none"> <li>1. Patient is unable to use the device (i.e., unresponsive).</li> <li>2. Patient has taken the maximum number of prescribed doses prior to the arrival of EMS.</li> </ol>
<b>Side Effects:</b>	Increased pulse rate, tremors, nervousness
<b>Administration:</b>	<ol style="list-style-type: none"> <li>1. Assure right medication, right patient, right route, and patient is alert enough to use inhaler.</li> <li>2. Check expiration date of the inhaler.</li> <li>3. Check to see if the patient has already taken any doses.</li> <li>4. Assure the inhaler is at room temperature or warmer.</li> <li>5. Shake the inhaler vigorously several times.</li> <li>6. Remove oxygen adjunct from patient.</li> <li>7. Have the patient exhale deeply.</li> <li>8. Have the patient put lips around the opening of the inhaler.</li> <li>9. Have the patient depress the handheld inhaler as he begins to inhale deeply.</li> <li>10. Instruct the patient to breathe a few times and repeat second dose per medical direction.</li> <li>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.</li> <li>12. Record activity and time.</li> </ol>
<b>Supply:</b>	Varies by medication.

<b>Generic Name:</b>	<b>Methylprednisolone (meth-il-pred-niss'oh-lone)</b>
<b>Trade Name:</b>	Solu-Medrol®
<b>Chemical Class:</b>	Glucocorticoid, synthetic
<b>Therapeutic Class:</b>	Corticosteroid, systemic
<b>Actions:</b>	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.
<b>Pharmacokinetics:</b>	Peak 2 hours. $t_{1/2}$ = 3 hours.
<b>Indications:</b>	<ol style="list-style-type: none"> <li>1. Anaphylaxis.</li> <li>2. Respiratory distress from asthma or COPD.</li> <li>3. Respiratory distress due to croup.</li> </ol>
<b>Contraindications:</b>	Hypersensitivity to the drug.
<b>Precautions:</b>	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.
<b>Pregnancy Cat. C</b>	
<b>Side Effects:</b>	<p><b>CNS:</b> seizures, vertigo</p> <p><b>CV:</b> CHF, hypertension, tachycardia</p> <p><b>GI:</b> abdominal distension, diarrhea, GI hemorrhage, increased appetite, nausea</p>
<b>Interactions:</b>	N/A
<b>Administration:</b>	<p><i>Adult:</i> 2 mg/kg up to 125 mg IV over 1 to 2 minutes or IM.</p> <p><i>Pediatric:</i> 2 mg/kg up to 125 mg IV over 1 to 2 minutes or IM.</p>
<b>Supply:</b>	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.
<b>Notes:</b>	<p>To use the Act-O-Vial®:</p> <ol style="list-style-type: none"> <li>1. Press down on plastic activator to force diluent into the lower compartment.</li> <li>2. Gently agitate to effect solution.</li> <li>3. Remove plastic tab covering the center stopper</li> <li>4. Withdraw dose as with a normal vial.</li> </ol>

<b>Generic Name:</b>	<b>Metoprolol (me-toe'pro-lole)</b>
<b>Trade Name:</b>	Lopressor®, Toprol XL®
<b>Chemical Class:</b>	β <sub>1</sub> -adrenergic blocker, cardioselective
<b>Therapeutic Class:</b>	Antianginal, antihypertensive
<b>Actions:</b>	Metoprolol is a β-antagonist that blocks both β <sub>1</sub> - and β <sub>2</sub> -adrenergic receptors, but is selective for β <sub>1</sub> -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.
<b>Pharmacokinetics:</b>	Peak 20 minutes. Duration 5 to 8 hours. t <sub>½</sub> = 3 to 4 hours.
<b>Indications:</b>	<ol style="list-style-type: none"> <li>1. Irregular narrow-complex tachycardia [probable atrial fibrillation or possible atrial flutter or MAT (multifocal atrial tachycardia)].</li> <li>2. Regular narrow-complex tachycardia that does not convert following administration of Adenosine.</li> <li>3. Acute myocardial infarction.</li> <li>4. Stable wide-complex tachycardia <b>[Medical Control]</b>.</li> </ol>
<b>Contraindications:</b>	<ol style="list-style-type: none"> <li>1. Bradycardia (HR less than 60).</li> <li>2. Hypotension (SBP less than 90 mm Hg).</li> <li>3. Bronchial asthma.</li> <li>4. Cardiogenic shock, congestive heart failure.</li> <li>5. Second- or third-degree AV block.</li> </ol>
<b>Precautions:</b> <b>Pregnancy Cat. C</b>	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.
<b>Side Effects:</b>	<p><i>CNS:</i> dizziness, lethargy</p> <p><i>CV:</i> bradycardia, CHF, cold extremities, heart block, hypotension</p> <p><i>RESP:</i> bronchospasm (1%), dyspnea</p>
<b>Interactions:</b>	Administer with caution to patients taking antihypertensive agents or calcium channel blockers.
<b>Administration:</b>	<p><i>Adult:</i> Give 5 mg IV over 2 minutes. Repeat every 5 minutes if needed to a total dose of 15 mg.</p> <p><i>Pediatric:</i> Not indicated.</p>
<b>Supply:</b>	Ampule containing 5 mg in 5 mL.
<b>Notes:</b>	

<b>Generic Name:</b>	Midazolam (mid-az'zoe-lam)	<b>DEA Class:</b> Schedule IV
<b>Trade Name:</b>	Versed®	
<b>Chemical Class:</b>	Benzodiazepine	
<b>Therapeutic Class:</b>	Sedative/hypnotic	
<b>Actions:</b>	Midazolam causes central nervous systems depression via facilitation of inhibitory GABA <sup>1</sup> at benzodiazepine receptor sites (BZ <sub>1</sub> – associated with sleep; BZ <sub>2</sub> – 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.	
<b>Pharmacokinetics:</b>	<i>IM:</i> Onset 15 minutes. Peak 30 to 60 minutes. <i>IV:</i> Onset 3 to 5 minutes. t <sub>½</sub> = 1.2 to 12.3 hours.	
<b>Indications:</b>	<ol style="list-style-type: none"> <li>1. Sedation for cardioversion and transcutaneous pacing.</li> <li>2. Sedation for endotracheal intubation only after the ET tube is inserted.</li> <li>3. Seizures not caused by hypoglycemia, <i>secondary to Diazepam.</i><sup>2</sup></li> <li>4. Severe agitation, tachycardia, or hallucinations caused by alcohol withdrawal, <i>secondary to Diazepam.</i><sup>2</sup></li> <li>5. Behavioral or alcohol related agitation as an adjunct to Haloperidol.</li> <li>6. Sedation for shivering secondary to induced hypothermia.</li> </ol>	
<b>Contraindications:</b>	<ol style="list-style-type: none"> <li>1. Hypersensitivity to the drug.</li> <li>2. Hypotension (SBP less than 90 mm Hg).</li> <li>3. Acute angle closure glaucoma.</li> </ol>	
<b>Precautions:</b> <b>Pregnancy Cat. D</b>	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.	
<b>Side Effects:</b>	<i>CNS:</i> drowsiness, amnesia, altered mental status <i>CV:</i> hypotension, tachycardia, PVCs <i>RESP:</i> bronchospasm, coughing, laryngospasm, respiratory depression, and arrest	
<b>Interactions:</b>	The effects of Midazolam can be accentuated by CNS depressants such as narcotics and alcohol.	
<b>Administration:</b>	<i>Adult:</i> 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. <i>Pediatric:</i> Give 0.1 mg/kg slow IV, titrated to effect. May repeat every 5 minutes as needed <b>[Medical Control]</b> . Midazolam may also be administered 0.1 mg/kg IM if unable to readily establish IV access <b>[Medical Control]</b> .	
<b>Supply:</b>	Vial containing 5 mg in 1 mL.	
<b>Notes:</b>	<ol style="list-style-type: none"> <li>1. GABA – Gammaaminobutyric Acid, the chief inhibitory neurotransmitter in the CNS. GABA hyperpolarizes the membrane of the CNS neurons decreasing their response to stimuli.</li> <li>2. <b>[Medical Control]</b> must authorize administration of Midazolam for sedation secondary to Diazepam.</li> </ol>	

<b>Generic Name:</b>	<b>Morphine (mor'feen) Sulfate</b>	<b>DEA Class:</b> <i>Schedule II</i>
<b>Trade Name:</b>	Astramorph <sup>®</sup> , Duramorph <sup>®</sup> , MS Contin <sup>®</sup> , Roxanol <sup>®</sup>	
<b>Chemical Class:</b>	Natural opium alkaloid, phenanthrene derivative	
<b>Therapeutic Class:</b>	Narcotic analgesic	
<b>Actions:</b>	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.	
<b>Pharmacokinetics:</b>	<i>IM:</i> Onset 10 to 30 minutes. Peak analgesia 30 to 60 minutes. Duration 4.5 hours. <i>IV:</i> Peak analgesia 20 minutes. $t_{1/2}$ = 2.5 to 3 hours.	
<b>Indications:</b>	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 <b>[Medical Control]</b> . 5. Acute abdominal pain <b>[Medical Control]</b> .	
<b>Contraindications:</b>	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.	
<b>Precautions:</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.	
<b>Pregnancy Cat. B</b>		
<b>Side Effects:</b>	<i>CNS:</i> dizziness, drowsiness, headache, sedation <i>CV:</i> hypotension <i>EENT:</i> blurred vision, constricted pupils, diplopia <i>GI:</i> abdominal cramps, constipation, nausea, vomiting <i>RESP:</i> respiratory depression	
<b>Interactions:</b>	The CNS depression associated with Morphine can be enhanced when administered with antihistamines, antiemetics, sedatives, hypnotics, barbiturates, and alcohol.	
<b>Administration:</b>	<i>Adult:</i> <b>Pain with AMI:</b> Give 5 mg IV at 1mg/minute, titrated to effect. If additional dosing is needed, contact <b>[Medical Control]</b> . <b>Other acute pain:</b> 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. <b>Pulmonary edema:</b> Contact <b>[Medical Control]</b> . <i>Pediatric:</i> 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 <b>[Medical Control]</b> .	
<b>Supply:</b>	Vial containing 10 mg in 1 mL.	
<b>Notes:</b>	Discontinue the IV injection if the pain is relieved or a contraindication develops.	

<b>Generic Name:</b>	<b>Naloxone (nal-oks'one)</b>
<b>Trade Name:</b>	Narcan®
<b>Chemical Class:</b>	Thebaine derivative
<b>Therapeutic Class:</b>	Antidote, opiate
<b>Actions:</b>	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.
<b>Pharmacokinetics:</b>	<i>IV:</i> Onset 2 minutes. $t_{1/2}$ = 64 minutes.
<b>Indications:</b>	1. Respiratory depression caused by narcotics. 2. Coma unknown etiology.
<b>Contraindications:</b>	Hypersensitivity to the drug.
<b>Precautions:</b> <b>Pregnancy Cat. B</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).
<b>Side Effects:</b>	<i>CNS:</i> seizures, tremulousness <i>CV:</i> hypertension, hypotension, tachycardia, ventricular dysrhythmia <i>GI:</i> nausea, vomiting
<b>Interactions:</b>	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.
<b>Administration:</b>	<i>Adult:</i> <i>IV:</i> Give 2 mg IV at 0.4 mg/minute. <i>IM:</i> Give two 0.8 mg injections. If no response to initial dose of Naloxone, contact <b>[Medical Control]</b> . <i>Pediatric:</i> <i>IV:</i> Give 0.1 mg/kg up to 2 mg IV at 0.4 mg/minute. <i>IM:</i> Give 0.1 mg/kg up to 1.6 mg IM. If no response to initial dose of Naloxone, contact <b>[Medical Control]</b> .
<b>Supply:</b>	Vial containing 4 mg in 10 mL.
<b>Notes:</b>	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®.

<b>Generic Name:</b>	<b>Nitroglycerin (nye-troe-gli'ser-in)</b>
<b>Trade Name:</b>	Nitrolingual®, Nitroquick®, Nitrostat®, Nitr-bid®, Nitrol®
<b>Chemical Class:</b>	Nitrate, organic
<b>Therapeutic Class:</b>	Antianginal, vasodilator
<b>Actions:</b>	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.
<b>Pharmacokinetics:</b>	<i>SL:</i> Onset 1 to 3 minutes. Peak 5 minutes. Duration at least 25 minutes. $t_{1/2}$ = 2 to 3 minutes. <i>TOP:</i> Onset 15 to 60 minutes. Peak 30 to 120 minutes. Duration 2 to 12 hours.
<b>Indications:</b>	<ol style="list-style-type: none"> <li>1. Chest pain suspected to be cardiac in origin.</li> <li>2. Cardiogenic pulmonary edema.</li> </ol>
<b>Contraindications:</b>	<ol style="list-style-type: none"> <li>1. Hypotension (SBP less than 90 mm Hg).</li> <li>2. Bradycardia (HR less than 60).</li> <li>3. Increased intracranial pressure (i.e., CVA, head injury).</li> <li>4. Hypersensitivity to the drug.</li> <li>5. Patient on Sildenafil (Viagra®) or other anti-impotence agent.</li> </ol>
<b>Precautions:</b> <b>Pregnancy Cat. C</b>	<ol style="list-style-type: none"> <li>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.</li> <li>2. Patients taking the drug routinely may develop a tolerance and require an increased dose.</li> <li>3. Postural syncope sometimes occurs following the administration of Nitroglycerin; it should be anticipated and the patient kept supine when possible.</li> <li>4. Careful clinical or hemodynamic monitoring must be used because of the possibility of hypotension and tachycardia.</li> </ol>
<b>Side Effects:</b>	<p><i>CNS:</i> dizziness, headache, weakness</p> <p><i>CV:</i> dysrhythmias, palpitations, postural hypotension, tachycardia</p> <p><i>GI:</i> nausea, vomiting</p> <p><i>SKIN:</i> diaphoresis, flushing, pallor, rash</p>
<b>Interactions:</b>	<ol style="list-style-type: none"> <li>1. Severe hypotension is possible when administered to patients who have recently ingested alcohol.</li> <li>2. Orthostatic hypotension is possible when used in conjunction with <math>\beta</math>-adrenergic antagonists.</li> <li>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.</li> </ol>

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<b>Administration:</b>	An IV or INT must be established prior to administering Nitroglycerin unless the patient has taken nitroglycerin before without complications.
<b>Sublingual</b>	<p><i>Adult:</i> <b>Chest Pain:</b> Give 0.4 mg SL. Repeat every 5 minutes, if needed, up to 3 doses.</p> <p><b>Pulmonary Edema (SBP 90 mm Hg or higher):</b> Give 1 tablet, 0.4 mg SL. Repeat 1 tablet every 5 minutes if needed.</p> <p><i>Pediatric:</i> Not indicated.</p> <p><i>Notes:</i></p> <ol style="list-style-type: none"> <li>1. Alternate the sublingual site (right to left side of tongue) when repeating Nitroglycerin tablets.</li> <li>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.</li> </ol>
<b>Topical</b>	<p><i>Adult:</i> <b>Chest Pain:</b> If pain persists following administration of Nitroglycerin SL, apply 1 inch of Nitroglycerin Paste topically.</p> <p><b>Pulmonary Edema (SBP 90 mm Hg or higher):</b> Apply 1 inch of Nitroglycerin Paste topically.</p> <p><i>Pediatric:</i> Not indicated.</p> <p><i>Notes:</i></p> <ol style="list-style-type: none"> <li>1. Apply Nitroglycerin Paste to the chest or upper arm.</li> <li>2. Do not rub the paste into the skin.</li> <li>3. If contraindications develop when Nitroglycerin Paste is applied, remove the paste.</li> <li>4. Wear gloves for application and/or removal of Nitroglycerin Paste.</li> </ol>
<b>Supply:</b>	<p><i>Tablet:</i> Bottle containing 0.4 mg (1/150 grain) tablets.</p> <p><i>Paste:</i> Packets containing 1 g (1 inch) or tubes containing 30 to 60 grams.</p>
<b>Notes:</b>	Nitroglycerin should be kept in the original glass container, tightly capped.

<b>Drug Names:</b>	<b>Nitroglycerin</b> (Nitrolingual®, Nitroquick®, Nitrostat®)
<b>Overview:</b>	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.
<b>Indications:</b>	<ol style="list-style-type: none"> <li>1. Patient complains of chest pain, <i>and</i></li> <li>2. Patient has a history of cardiac problems, <i>and</i></li> <li>3. Patient's physician has prescribed Nitroglycerin, <i>and</i></li> <li>4. Patient has the medication and the medication is prescribed for the patient.</li> </ol>
<b>Contraindications:</b>	<ol style="list-style-type: none"> <li>1. Hypotension (SBP less than 90 mm Hg).</li> <li>2. Bradycardia (HR less than 60).</li> <li>3. Increased intracranial pressure (i.e., CVA, head injury).</li> <li>4. Hypersensitivity to the drug.</li> <li>5. Patient on Sildenafil (Viagra®) or other anti-impotence agent.</li> <li>6. Infants and children.</li> <li>7. Patient has already met maximum prescribed dose prior to EMS arrival.</li> </ol>
<b>Side Effects:</b>	<ol style="list-style-type: none"> <li>1. Hypotension.</li> <li>2. Headache.</li> <li>3. Pulse rate changes.</li> </ol>
<b>Administration:</b>	<ol style="list-style-type: none"> <li>1. Assure right medication, right patient, right route, and patient is alert.</li> <li>2. Check expiration date of Nitroglycerin.</li> <li>3. Question patient on last dose administration, effects, and assure understanding of route of administration.</li> <li>4. Ensure patient has not taken any anti-impotence agents (i.e. Viagra) within the past 24 hours.</li> <li>5. Ask patient to lift tongue and place the tablet under the tongue (while wearing gloves) or have patient place tablet under the tongue.</li> <li>6. Have patient keep mouth closed with the tablet under the tongue (without swallowing) until dissolved and absorbed.</li> <li>7. Recheck blood pressure within 2 minutes.</li> <li>8. Record activity and time.</li> </ol>
<b>Supply:</b>	Bottle containing 0.4 mg (1/150 grain) tablets

<b>Generic Name:</b>	Ondansetron (on-dan-she'tron)
<b>Trade Name:</b>	Zofran®
<b>Chemical Class:</b>	Carbazole derivative
<b>Therapeutic Class:</b>	Antiemetic
<b>Actions:</b>	Ondansetron is a selective 5-HT <sub>3</sub> 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 <sub>3</sub> type, present both peripherally on vagal nerve terminals and centrally in the chemoreceptor trigger zone of the area postrema.
<b>Pharmacokinetics:</b>	<i>IV</i> : Peak immediate. <i>IM</i> : N/A
<b>Indications:</b>	1. Severe vomiting or nausea. 2. Vertigo.
<b>Contraindications:</b>	Hypersensitivity to the drug.
<b>Precautions:</b> <b>Pregnancy Cat. B</b>	Rarely, transient ECG changes including QT interval prolongation have been reported.
<b>Side Effects:</b>	<i>CNS</i> : headache, lightheadedness, seizures <i>CV</i> : angina, bradycardia, syncope, tachycardia <i>EENT</i> : blurred vision <i>GI</i> : constipation, diarrhea <i>RESP</i> : bronchospasm <i>SKIN</i> : rash
<b>Interactions:</b>	N/A
<b>Administration:</b>	<i>IV</i> : Give 0.1 mg/kg up to 4 mg over 2 to 5 minutes. May repeat once in 5 minutes if needed. <i>IM</i> : Give 0.1 mg/kg up to 4 mg IM. Do not repeat.
<b>Supply:</b>	Vial containing 4 mg in 2 mL

<b>Drug Names:</b>	Dextrose (Glucose®, Insta-Glucose®)
<b>Overview:</b>	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.
<b>Indications:</b>	Patient with altered mental status and a known history of diabetes controlled by medication.
<b>Contraindications:</b>	<ol style="list-style-type: none"> <li>1. Unresponsive.</li> <li>2. Unable to swallow.</li> </ol>
<b>Side Effects:</b>	None when given properly. May be aspirated by the patient without a gag reflex.
<b>Administration:</b>	<ol style="list-style-type: none"> <li>1. Assure signs and symptoms of altered mental status with a known history of diabetes.</li> <li>2. Assure patient is conscious and can swallow and protect the airway.</li> <li>3. Administer glucose:             <ol style="list-style-type: none"> <li>a. Between cheek and gum.</li> <li>b. Place on tongue depressor between cheek and gum.</li> </ol> </li> </ol>
<b>Supply:</b>	Tube contains 12.5 g, 15 g, or 25 g (varies per manufacturer).

# SODIUM BICARBONATE

Protocol 6.31

Scope **EMR** **EMT** **AEMT** **INT** **PM**

<b>Generic Name:</b>	<b>Sodium Bicarbonate (so'dee-um bye-kar'boe-nate)</b>
<b>Trade Name:</b>	N/A
<b>Chemical Class:</b>	Monosodium salt of carbonic acid
<b>Therapeutic Class:</b>	Alkalinizing agent; electrolyte supplement
<b>Actions:</b>	Sodium Bicarbonate is an alkalinizing 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 <sub>2</sub> and H <sub>2</sub> O. 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.
<b>Pharmacokinetics:</b>	Onset in seconds. Peak 1 to 2 minutes. Duration 10 minutes.
<b>Indications:</b>	<ol style="list-style-type: none"><li>1. Prolonged cardiac arrest.</li><li>2. Known metabolic acidosis.</li><li>3. Cardiac arrest in a dialysis patient (hyperkalemia). Should be an early treatment consideration.</li><li>4. Tricyclic antidepressant (TCA) overdose.</li><li>5. Crush syndrome <b>[Medical Control]</b>.</li></ol>
<b>Contraindications:</b>	Hypokalemia.
<b>Precautions:</b>	Sodium Bicarbonate can cause metabolic alkalosis when administered in large quantities. It is important to calculate the dosage based on patient weight and size.
<b>Pregnancy Cat. C</b>	
<b>Side Effects:</b>	<ol style="list-style-type: none"><li>1. Metabolic alkalosis.</li><li>2. Hyponatremia.</li><li>3. Hypokalemia.</li></ol>
<b>Interactions:</b>	<ol style="list-style-type: none"><li>1. Most catecholamines and vasopressor (e.g., Dopamine and Epinephrine) can be deactivated by alkaline solutions such as Sodium Bicarbonate; assure these drugs are not administered simultaneously.</li><li>2. Sodium Bicarbonate should not be administered in conjunction with Calcium Chloride. A precipitate can form and block the IV line.</li></ol>
<b>Administration:</b>	<i>Adult:</i> <b>Cardiac arrest:</b> Give 1 mEq/kg IV up to 100 mEq. <b>TCA overdose:</b> Give 50 mEq IV over 2 minutes. Repeat in 15 minutes if needed. <b>Crush Syndrome:</b> Mix 1 mEq/kg in 1 liter of Normal Saline. <b>[Medical Control]</b> <i>Pediatric:</i> Contact <b>[Medical Control]</b> .
<b>Supply:</b>	Prefilled syringe containing 50 mEq in 50 mL (8.4% solution).
<b>Notes:</b>	

**VASOPRESSIN (Pitressin®)**

Protocol 6.32

Scope **EMR** **EMT** **AEMT** **INT** **PM**

<b>Generic Name:</b>	Vasopressin (vay-soe-press'in)
<b>Trade Name:</b>	Pitressin®
<b>Chemical Class:</b>	Arginine vasopressin
<b>Therapeutic Class:</b>	Antidiuretic; hemostatic
<b>Actions:</b>	When given in large doses, vasopressin causes non-adrenergic vasoconstriction. In cardiac arrest this has been shown to increase effectiveness of CPR and myocardial blood flow.
<b>Pharmacokinetics:</b>	t <sub>1/2</sub> = 15 minutes.
<b>Indications:</b>	Adult cardiac arrest.
<b>Contraindications:</b>	Hypersensitivity to the drug.
<b>Precautions:</b>	No precautions when used for indicated conditions.
<b>Pregnancy Cat. C</b>	
<b>Side Effects:</b>	<i>CV:</i> hypertension, dysrhythmias, pallor <i>GI:</i> nausea, vomiting, abdominal cramping <i>RESP:</i> bronchial constriction <i>SKIN:</i> sweating, urticaria
<b>Interactions:</b>	None
<b>Administration:</b>	<i>Adult:</i> Give 40 units IV. Do not repeat the dose. <i>Pediatric:</i> Not indicated.
<b>Supply:</b>	Vial containing 20 units in 1 mL.
<b>Notes:</b>	May give to replace first or second dose of <a href="#">EPINEPHRINE 1:10,000</a> .

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	electroencephelogram
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 <sub>2</sub>
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	intramuscular
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 apparant 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
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)
T-SPINE	thoracic spine

**CONTINUED ON NEXT PAGE**

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)
$\bar{a}$	before
$\bar{p}$	after
$\bar{c}$	with
$\bar{s}$	without
$\Delta$	change
↓	lower (decreased)
1°	primary
2°	secondary

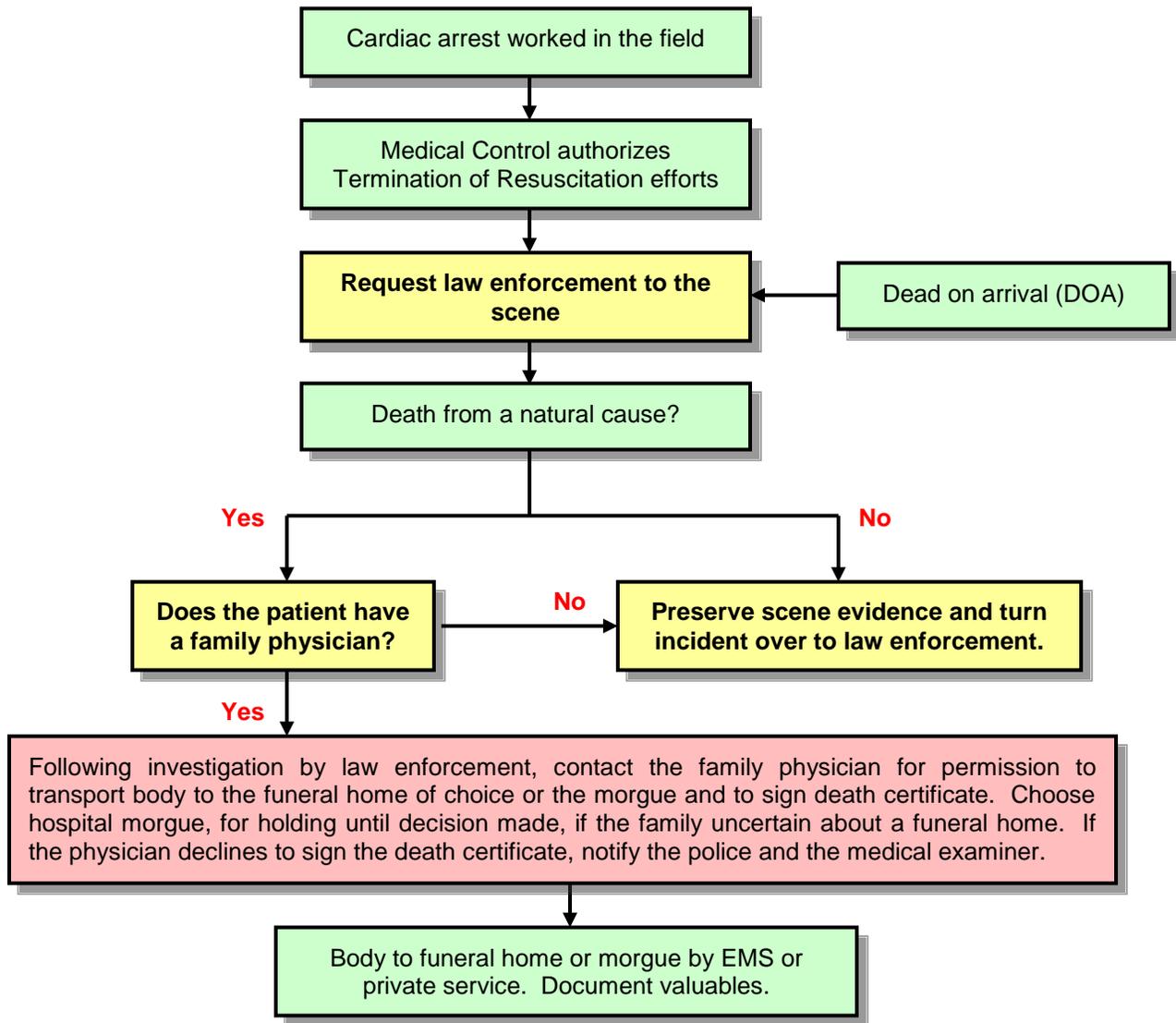
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**Dangerous abbreviations and dosage designations – DO NOT USE**

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

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

<b>Problem Term</b>	<b>Intended meaning</b>	<b>Reason for Problem(s)</b>	<b>Suggested remedy</b>
<b>per os</b>	By mouth; 1/2	Not understood or misunderstood	Use "by mouth", "orally", or "PO"
<b>q hs</b>	once daily at bedtime, each day	Read as every hour	Use "HS" or "at bedtime"
<b>q.n.</b>	every night	Read as every hour	Write "once daily at night"
<b>QD</b>	once daily	Read or interpreted as q.i.d. (four times daily)	Write "once daily"
<b>QOD</b>	every other day	Interpreted as meaning "every once a day" or read as q.i.d. (four times daily)	Write "every other day"
<b>Roman numerals</b>	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.)
<b>sq or sub q</b>	subcutaneous	The q is read as every	Use "subcut"
<b>ss</b>	sliding scale or 1/2 in the Apothecary system	Read as the number 55	Spell out "sliding scale" or "1/2"
<b>T.I.W.</b>	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"
<b>T/d</b>	one per day	read as t.i.d. (three times daily)	Use "once daily"
<b>Trailing zeros; 1.0 mg</b>	1 mg	Decimal point is not seen; read as 10 mg causing a tenfold overdose	Omit the zero; write 1 mg
<b>U</b>	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 report.
- 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	10 kg	20 kg	30 kg	40 kg	50 kg	60 kg	70 kg	80 kg	90 kg	100 kg
	11 lb	22 lb	44 lb	66 lb	88 lb	110 lb	132 lb	154 lb	176 lb	198 lb	220 lb
ADENOSINE (0.1 mg/kg)	0.5 mg	1 mg	2 mg	3 mg	4 mg	5 mg	6 mg				
ADENOSINE (0.2 mg/kg)	1 mg	2 mg	4 mg	6 mg	8 mg	10 mg	12 mg				
ALBUTEROL	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				
ASPIRIN	-	-	-	-	-	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
DEXTROSE 25% (1 g/kg)	5 g	10 g	-	-	-	-	-	-	-	-	-
DEXTROSE 50%	-	-	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
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 <sup>1</sup> (5 mcg/kg/min)	2	4	8	11	15	19	23	26	30	34	38
DOPAMINE <sup>1</sup> (10 mcg/kg/min)	4	8	15	23	30	38	45	53	60	68	75
DOPAMINE <sup>1</sup> (20 mcg/kg/min)	8	15	30	45	60	75	90	105	120	135	150
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					
EPINEPHRINE 1:10,000 (0.01 mg/kg)	0.05 mg	0.1 mg	0.2 mg	0.3 mg	0.4 mg	-	-	-	-	-	-
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
GLUCAGON	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					
LIDOCAINE(0.5 mcg/kg)	2.5 mg	5 mg	10 mg	20 mg	30 mg	40 mg	40 mg	40 mg	40 mg	40 mg	40 mg
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					
METOPROLOL	-	-	-	-	-	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					
NITROPASTE 2% OINTMENT	-	-	-	-	-	1-2"	1-2"	1-2"	1-2"	1-2"	1-2"
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
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
VASOPRESSIN	-	-	-	-	-	40 units					

<sup>1</sup> Values listed for Dopamine are in drops/minute and assume an 800 mcg/mL concentration.

**Glasgow Coma Scale**

<b>Eye Opening</b>		Spontaneous	4	
		To Verbal Stimulation	3	
		To Painful Stimulation	2	
		None	1	
<hr/>				
<b>Verbal</b>	Over 5 years	Oriented/Appropriate	5	
		Confused	4	
		Inappropriate Words	3	
		Non-specific sounds	2	
		None	1	
	2 to 5 years	Appropriate Words	5	
		Inappropriate Words	4	
		Cries and/or Screams	3	
		Grunts	2	
		None	1	
	0 to 23 months	Smiles/Coos/Cries Appropriately	5	
		Cries/Inconsolable	4	
		Inappropriate Cry	3	
		Persistent Cry/Grunting	2	
		None	1	
<hr/>				
<b>Motor</b>	Over 5 years	Obeys Commands	6	
		Localization of Pain	5	
		Withdrawal (pain)	4	
		Flexor Posturing (pain)	3	
		Extensor Posturing (pain)	2	
		None	1	
	Up to 5 years	Spontaneous	6	
		Localization of Pain	5	
		Withdrawal (pain)	4	
		Flexor Posturing (pain)	3	
		Extensor Posturing (pain)	2	
		None	1	
		<b>TOTAL GLASGOW COMA SCALE</b>		<b>3 – 15</b>

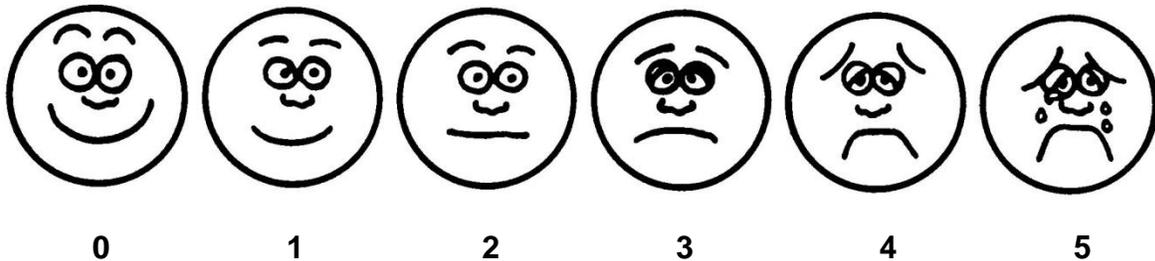
mL/hour ↓	Drip Set		
	10 drops/min	15 drops/min	60 drops/min
25	4	6	25
50	8	13	50
100	17	25	100
150	25	38	150
200	33	50	200
250	42	63	250
300	50	75	300
350	58	88	350
400	67	100	400
450	75	113	450
500	83	125	500
600	100	150	600
700	117	175	700
800	133	200	800
900	150	225	900
1000	167	250	1,000

**Table 7.5.1 Pediatric Vital Signs**

<b>Age</b>	<b>Heart Rate</b>	<b>Respiratory Rate</b>	<b>Minimum Systolic BP</b>
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**

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

**Wong-Baker FACES Pain Rating Scale**

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.

**POUNDS-TO-KILOGRAMS CONVERSION TABLE**

**Protocol 7.7**

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

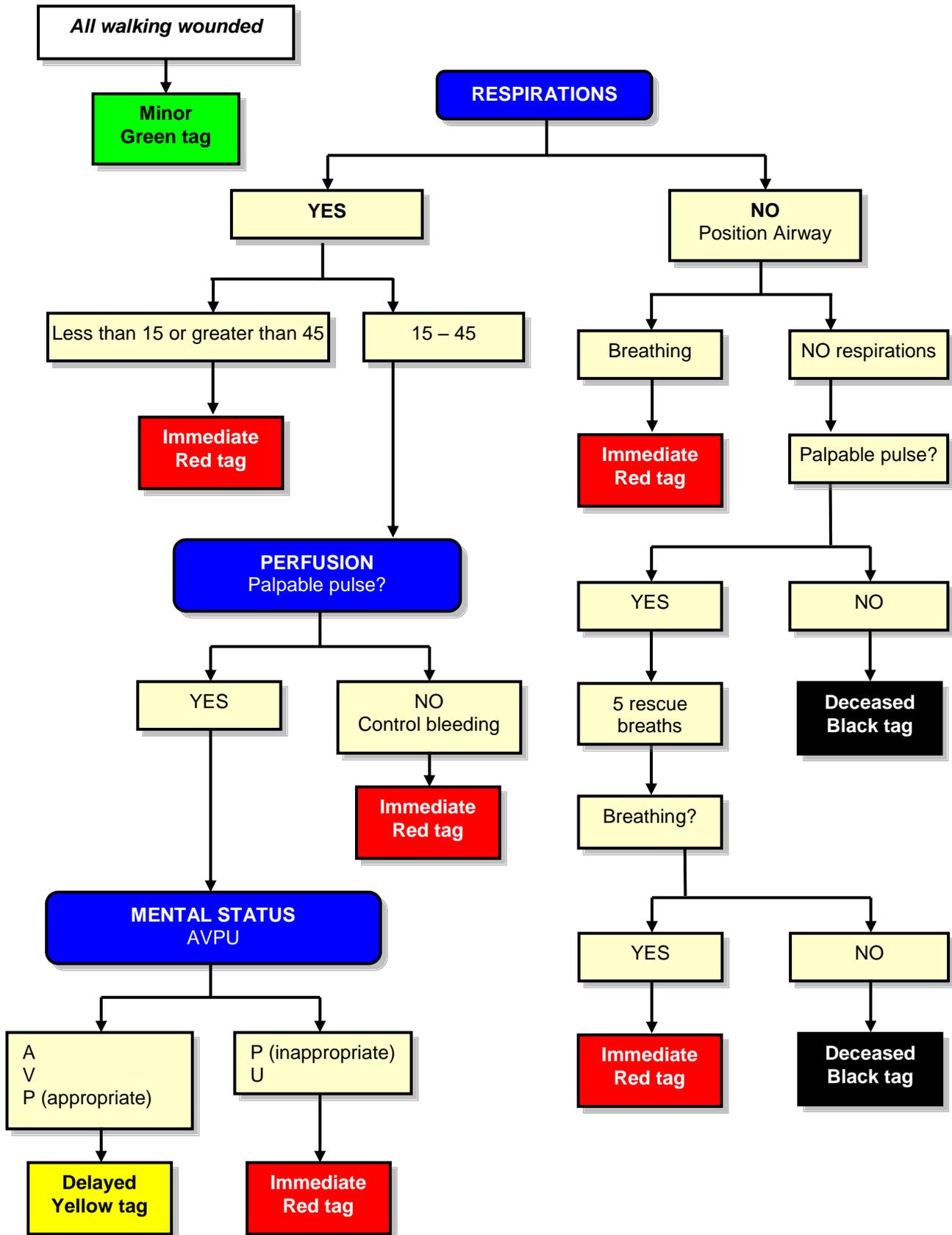
<b>HOSPITALS</b>	<b>Telephone #</b>	<b>Fax #</b>
City Hospital – Martinsburg, WV Physical Address – 2500 Hospital Drive	304-264-1357	304-264-3742
Hampshire Memorial Hospital – Romney, WV Physical Address – 363 Sunrise Boulevard	304-822-4927	304-822-4951
INOVA Fairfax Hospital – Fairfax, VA Physical Address – 3300 Gallows Road	703-776-3111	703-776-3400
INOVA Loudoun Hospital (Cornwall) – Leesburg, VA Physical Address – 224 Cornwall Street	703-737-7520	703-737-7520
INOVA Loudoun Hospital (Lansdowne) – Leesburg, VA Physical Address – 44045 Riverside Parkway	703-858-6040	703-858-6040
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	540-843-4565	540-743-1512
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	540-459-1165	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 – 1000 North Shenandoah Avenue	540-636-3272	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

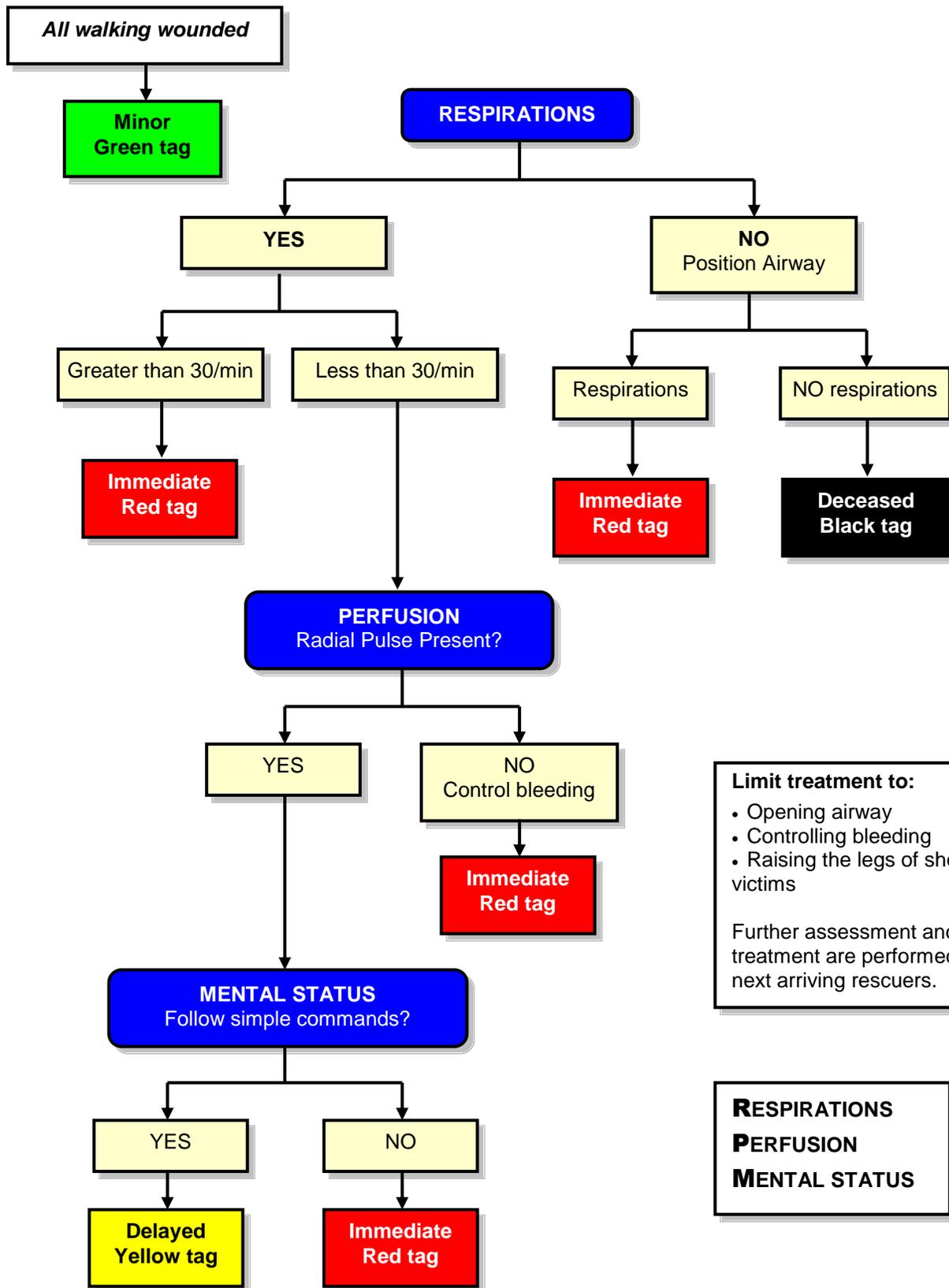
<b>AIR MEDICAL TRANSPORT</b>	<b>Telephone #</b>	<b>Fax #</b>
Carilion Life-Guard 10 – Roanoke, VA	540-344-4357	540-344-5674
Fairfax County Police – Fairfax, VA	703-691-2131	
HealthNet 8 – Martinsburg, WV	800-255-2146	
LifeEvac – Fredericksburg, VA	877-902-7779	540-720-8885
MedSTAR – Washington, DC	800-824-6814	
Pegasus – Charlottesville, VA	800-552-1826	804-434-1137
PHI AirCare 1 – Manassas, VA	<i>AirCare Dispatch</i> 800-258-8181	703-393-7379
PHI AirCare 2 – Fredericksburg, VA		540-368-9709
PHI AirCare 3 – Leesburg, VA		703-737-7712
PHI AirCare 4 – Front Royal, VA		540-635-1344
PHI AirCare 5 – Weyers Cave, VA		540-453-2000
		703-393-7974
		540-368-9241
		703-737-7785
		540-635-1373
		540-453-2004

<b>HELICOPTER RESCUE</b>	<b>Telephone #</b>	<b>Fax #</b>
Coast Guard	757-398-6390	
Maryland State Police	410-706-8080	
U. S. Park Police	202-610-7500	

<b><i>EMERGENCY COMMUNICATIONS CENTERS</i></b>	<b>Telephone #</b>	<b>Fax #</b>
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	540-662-1111	540-542-1312

<b><i>OTHER</i></b>	<b>Telephone #</b>	<b>Fax #</b>
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	





**Limit treatment to:**

- Opening airway
- Controlling bleeding
- Raising the legs of shock victims

Further assessment and treatment are performed by the next arriving rescuers.

**RESPIRATIONS**  
**PERFUSION**  
**MENTAL STATUS**

## INDEX

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### 1

12-LEAD ECG, 94

### A

ABBREVIATIONS, 163  
ABBREVIATIONS, DANGEROUS, 168  
ADENOCARD, 130  
ADENOSINE, 130  
ADRENALIN, 140, 141  
AEIOU-TIPS, 35  
AEMT, 6  
AIR MEDICAL TRANSPORT, 176  
ALBUTEROL, 131  
ALLERGIC REACTION, MILD, 36  
ALTERED MENTAL STATUS, 35  
AMIODARONE, 132  
ANAPHYLAXIS, 36  
ASPIRIN, 133  
ASTHMA, 63  
ASYSTOLE / PEA – ADULT, 15  
ASYSTOLE / PEA – PEDIATRIC, 26  
ATROPINE, 134  
ATROVENT, 147

### B

BASIC LIFE SUPPORT – ADULT, 13  
BASIC LIFE SUPPORT – ALL AGES, 14  
BENADRYL, 138  
BLEEDING, CONTROL OF, 89  
BLS MANEUVERS FOR INFANTS, CHILDREN, AND ADULTS, 14  
BRADYCARDIA – ADULT, 18  
BRADYCARDIA – PEDIATRIC, 29  
BURN UNIT REFERRAL CRITERIA, 38  
BURNS, 37  
    DRY CHEMICAL BURNS, 37  
    DRY LIME, 39  
    ELECTRICAL INJURIES, 39  
    LIQUID CHEMICAL BURNS, 37  
    MACE, 39  
    PHENOL, 39  
    RIOT CONTROL AGENTS, 39  
    SODIUM, 39  
    THERMAL BURNS, 37

### C

CALCIUM CHLORIDE, 135  
CAPNOGRAPHY, 100  
CARDIAC ARREST (GENERAL), 17  
CARDIAC ARREST (GENERAL) – PEDIATRIC, 28  
CARDIAC ARREST, TRAUMA, 92  
CARDIOGENIC SHOCK, 72  
CHEMICAL RESTRAINT, 43  
CHEST DECOMPRESSION, 123  
CHEST PAIN (NON-TRAUMATIC), 41

CHF, 66  
CINCINNATI PRE-HOSPITAL STROKE SCALE, 79  
COMBATIVE PATIENT (NON-TRAUMATIC), 43  
COMBIVENT, 131  
CONTINUOUS POSITIVE AIRWAY PRESSURE, 97  
COPD, 63  
CORDARONE, 132  
CPAP, 97  
CRICOTHYROTOMY, SURGICAL, 98  
CROUP, 65  
CRUSH SYNDROME, 90  
CVA, 78  
CYANOKIT, 146

### D

DEATH DETERMINATION, 23  
DECEASED PATIENT GUIDELINES, 170  
DEFIBRILLATION, MANUAL, 99  
DELIRIUM TREMENS, 81  
DEXTROSE, 136  
DIAZEPAM, 137  
DIPHENHYDRAMINE, 138  
DOPAMINE, 139  
DRUG BY WEIGHT CHART, 171

### E

EASY CAP, 102  
ECLAMPSIA, 68  
EMERGENCY COMMUNICATIONS CENTERS, 177  
EMR, 6  
EMT, 6  
ENDOTRACHEAL TUBE INTRODUCER, 104  
END-TIDAL CO<sub>2</sub> DETECTION / MONITORING, CAPNOGRAPHY, 100  
END-TIDAL CO<sub>2</sub> DETECTION, COLORIMETRIC, 102  
EPIGLOTTITIS, 65  
EPINEPHRINE 1:1,000, 140  
EPINEPHRINE 1:10,000, 141  
EPINEPHRINE NEBULIZER, 65  
EPIPEN, 142  
EPIPEN JR., 142  
EXTRICATION VEST, 74  
EZ-IO, 107

### F

FBAO  
    CONSCIOUS PATIENT ≥ 1 YEAR OF AGE, 61  
    CONSCIOUS PATIENT LESS THAN 1 YEAR OF AGE, 61  
    UNCONSCIOUS PATIENT ≥ 1 YEAR OF AGE, 62  
    UNCONSCIOUS PATIENT LESS THAN 1 YEAR OF AGE, 62  
FENTANYL, 143  
FOCUSED PHYSICAL EXAMINATION, 10

## G

GASTRIC DECOMPRESSION, 105  
GLASGOW COMA SCALE, 172  
GLUCAGEN, 144  
GLUCAGON, 144  
GLUCOMETRY, 106  
GLUCOSE, 136  
GLUTOSE, 160  
GUM BOUGIE, 104

## H

HALDOL, 145  
HALOPERIDOL, 145  
HEAT CRAMPS, 44  
HEAT EXHAUSTION, 44  
HEAT STROKE, 44  
HELICOPTER RESCUE, 176  
HOSPITALS, 176  
HYDROXOCOBALAMIN, 146  
HYPERGLYCEMIA, 49  
HYPERTHERMIA, 44  
HYPOGLYCEMIA, 50  
HYPOTHERMIA, 46  
HYPOVOLEMIA, 70

## I

INDUCED HYPOTHERMIA, 60  
INSTA-GLUCOSE, 160  
INT, 6  
INTRAOSSEOUS INSERTION, EZ-IO, 107  
INTROPIN, 139  
INTUBATION, OROTRACHEAL, 112  
IPRATROPIUM, 147  
IV FLOW RATE CALCULATION, 129  
IV INFUSION CHART, 173

## K

KING LARYNGOTRACHEAL AIRWAY, 115

## L

LEAD LOCATIONS, 95  
LIDOCAINE, 148  
LONG BACKBOARD, 74  
LOPRESSOR, 152

## M

MAGNESIUM SULFATE, 149  
MECONIUM, 119  
MEDICAL EXAMINER, 170  
METERED DOSE INHALER, 150  
METHYLPREDNISOLONE, 151  
METOPROLOL, 152  
MIDAZOLAM, 153  
MORPHINE, 154

## N

NALOXONE, 155  
NARCAN, 155  
NARROW QRS TACHYCARDIA, 20  
NARROW QRS TACHYCARDIA – PEDIATRIC, 31,  
32  
NAUSEA, 51  
NEBULIZER, EPINEPHRINE, 65  
NEONATAL RESUSCITATION, 55  
NITROGLYCERIN, 156  
NITROGLYCERIN, ASSISTED, 158  
NITROSTAT, 156

## O

OBSTETRICS  
BREECH PRESENTATION, 58  
LIMB PRESENTATION, 59  
POSTPARTUM HEMORRHAGE, 53  
PROLAPSED UMBILICAL CORD, 58  
OBSTETRICS, 52  
NORMAL DELIVERY, 52  
OBSTETRICS  
CARE OF THE NEWBORN, 54  
OBSTETRICS  
APGAR SCORE, 54  
OBSTETRICS  
NEWBORN / NEONATAL RESUSCITATION, 55  
OBSTETRICS  
TARGETED PREDUCTAL SPO2 AFTER BIRTH,  
57  
ONDANSETRON, 159  
OPQRST-ASPN, 10  
ORAL GLUCOSE, 160

## P

PEDIATRIC REFERENCES  
AIRWAY MANAGEMENT SUPPLIES, 174  
PEDIATRIC VITAL SIGNS, 174  
WONG-BAKER FACES PAIN RATING SCALE,  
175  
PEDIATRIC REFERENCES, 174  
PEDI-CAP, 102  
PEPPER SPRAY, 39  
PITRESSIN, 162  
PM, 6  
POISON CONTROL, 177  
POISONING, 80  
POST CARDIAC ARREST CARE – ADULT, 22  
POST-ROSC INDUCED HYPOTHERMIA, 60  
PRIMARY SURVEY, 8  
PROVENTIL, 131  
PULMONARY EDEMA, 66  
PULSELESS V-TACH – PEDIATRIC, 27

## R

RAPID EXTRICATION PROCEDURE, 74  
RAPID MEDICAL ASSESSMENT, 10  
RAPID TAKEDOWN, 74  
RAPID TRAUMA ASSESSMENT, 10

REASSESSMENT, 11  
REFERENCES, 183  
RESPIRATORY DISTRESS – AIRWAY  
  OBSTRUCTION, 61  
RESPIRATORY DISTRESS – ASTHMA/COPD, 63  
RESPIRATORY DISTRESS – PULMONARY  
  EDEMA, 66  
RULE OF NINES, 40

## S

SAMPLE, 9  
SCENE SIZE-UP, 7  
SECONDARY SURVEY, 9  
SEIZURES, 68  
SELECTIVE SPINAL IMMOBILIZATION, 75  
SHOCK – HYPOVOLEMIA, 70  
SHOCK – NON-HYPOVOLEMIA, 72  
SLUDGE, 84  
SNAKE BITE, 48  
SODIUM BICARBONATE, 161  
SOLU-MEDROL, 151  
SPINAL IMMOBILIZATION, 74  
ST-ELEVATION MYOCARDIAL INFARCTION  
  (STEMI) TRIAGE, 76  
STEMI TRIAGE, 76  
STROKE, 78, 79  
STROKE TRIAGE, 78  
SUBLIMAZE, 143  
SUCTIONING, ADULT / PEDIATRIC, 118  
SUCTIONING, MECONIUM, 119  
SUCTIONING, TRACHEOBRONCHIAL, 120  
SYMBOLS, 163  
SYNCHRONIZED CARDIOVERSION, 121

## T

TACHYCARDIA – ADULT, 20  
TELEPHONE NUMBERS, 176, 177  
THORACENTESIS, NEEDLE, 123  
TOPROL XL, 152  
TORSADES DE POINTES, 17  
TOURNIQUET, 124  
TOXICOLOGY, 80  
TOXICOLOGY – POISONING / OVERDOSE  
  ABSORBED POISONS, 80  
  ALCHOL WITHDRAWAL, 81

BETA BLOCKERS, 86  
CALCIUM CHANNEL BLOCKERS, 85  
CHOLINERGICS, 84  
CYANIDE, 88  
INGESTED POISONS, 80  
INHALED POISONS, 80  
INJECTED POISONS, 80  
NARCOTICS/OPIATES, 82  
ORAL HYPOGLYCEMIC AGENTS, 82  
STIMULANTS, 87  
TRICYCLIC ANTIDEPRESSANTS, 83  
TRACHEOSTOMY OBSTRUCTION, 125  
TRANSCUTANEOUS PACING, 126  
TRAUMA TRIAGE  
  FIELD TRAUMA TRIAGE DECISION SCHEME,  
    91  
  LANDING ZONES, 92  
  SCENE TRANSFER CRITERIA, 92  
TRAUMA TRIAGE, 91  
TRIAGE, JUMPSTART (CHILDREN), 178  
TRIAGE, START (ADULT), 179

## V

VALIUM, 137  
VASOPRESSIN, 162  
VEIN CANNULATION, EXTERNAL JUGULAR, 127  
VEIN CANNULATION, PERIPHERAL, 128  
VERSED, 153  
V-FIB - PEDIATRIC, 27  
V-FIB / PULSELESS V-TACH – PEDIATRIC, 27  
VOMITING, 51

## W

WIDE QRS TACHYCARDIA, 20  
WIDE QRS TACHYCARDIA – PEDIATRIC, 33  
WONG-BAKER FACES PAIN RATING SCALE, 175

## X

XYLOCAINE, 148

## Z

ZOFRAN, 159

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