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INTRODUCTION

The purpose of protocols in the Central Shenandoah EMS Council is to establish guidelines between EMS administration, the EMS provider and medical direction for the management, treatment, and transport of specific medical 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 prehospital care for patients. The following protocols are not intended to provide a solution to every problem which may arise.

Prehospital care is a shared responsibility between the physician and the EMS provider. 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 Central Shenandoah 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 level of EMS certification is recognized in the Central Shenandoah 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).

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The Central Shenandoah EMS Council Prehospital Standard Patient Treatment Protocols are developed by the CSEMS Medical Control Review Committee (MCRC). The mission of the MCRC, a standing CSEMS committee, is to delineate medical practice standards for emergency medical services in the Central Shenandoah EMS Council region. The committee provides regular review and revision of those standards. Activities and actions by the committee are reported to the Central Shenandoah EMS Council Board of Directors for their information.

Each agency Operational Medical Director (OMD) must approve the protocols and has the authority to limit or expand implementation of protocols within their agency. Virginia Emergency Medical Services Regulations 12VAC5-31-1890, Responsibilities of operational medical directors, grant authority to establish and enforce protocols, policies and procedures. All prehospital medical care is carried out with the express written authority of the Operational Medical Directors and under their supervision. Virginia Emergency Medical Services Regulations 12VAC 5-31-1040, Operational medical director authorization to practice, states, “EMS personnel may only provide emergency medical care while acting under authority of the operational medical director for the EMS agency for which they are affiliated and within the scope of the EMS agency license.”

Drugs may be administered by an emergency medical technician upon an oral or written order or standing protocol of an authorized medical practitioner in accordance with §54.1-3408 of the Code of Virginia. Oral orders shall be reduced to writing by the technician and shall be signed by a medical practitioner.

The following CSEMS Operational Medical Directors approve the use of the Central Shenandoah EMS Council Prehospital Standard Patient Treatment Protocols by his/her respective EMS agencies for which he serves as an OMD.

________________________________________________________________________________________
Asher Brand, MD, Regional Medical Director

Date

________________________________________________________________________________________
J. Scott Just, MD

Date

________________________________________________________________________________________
Kent R. Folsom, MD

Date

________________________________________________________________________________________
Nazir Adam, MD

Date

________________________________________________________________________________________
John Sheridan, DO

Date
Regional EMS providers are responsible for the standard care of patients in their charge. They are, therefore, personally responsible – legally, morally and ethically – for the safe and effective administration of medications. The following general guidelines are expected of all EMS providers while administering drugs in the Central Shenandoah EMS Council region.

- Know the precautions and contraindications for all medications administered.
- Practice proper techniques.
- Know how to observe and document drug effects.
- Maintain current knowledge in pharmacology.
- Establish and maintain professional relationships with other health care providers.
- Understand the pharmacokinetics and pharmacodynamics of all drugs administered.
- Have current medication references available.
- Take careful drug histories including:
  - Name, strength and daily dose of prescribed drugs.
  - Over-the-counter drugs.
  - Vitamins.
  - Herbal medications.
  - Folk-medicine or folk-remedies.
  - Allergies.
- Evaluate the compliance, dosage and adverse reactions.
- Consult with medical direction when appropriate.

Specifically, regional EMS providers are expected to adhere to PROTOCOL 7.11 – MEDICATION ADMINISTRATION. The medication administration protocol provides EMS providers with verification guidelines to follow prior to administering any medication to a patient during an EMS event. The protocol is intended to decrease the chance that EMS providers make a medication administration error during an EMS event.
The Central Shenandoah EMS Council Local Protocol Program provides instruction to EMS providers in the region on specific local protocols that differ from the Virginia EMS Education Standards (VEMSES) and the National EMS Education Standards for the Emergency Medical Responder and Emergency Medical Technician levels.

*Regional EMT level providers are required to complete all of the modules of the local protocol training program before being released to practice as an attendant-in-charge.*

Students attending a Local Protocol program shall be certified as Emergency Medical Technician (EMT) or Emergency Medical Responder (EMR). Regional EMT level providers are required to complete all of the modules of the local protocol training program before being released to practice as an attendant-in-charge.

*Annual provider renewal/update is required.* A provider may complete a standard local protocol course or may complete a renewal/update course. Renewing providers must complete the update on the CSEMS learning management system and complete competency verification on the minimum required skills at an instructor-led skills competency session. The annual renewal/update is required during the calendar year. However, updates may contain time-sensitive education/training, such as protocol updates, to be completed by a specific deadline.

Local training is the responsibility of each EMS agency in the CSEMS Council region and should be provided by the local instructor.

For more information on the BLS Local Protocol Program, visit the following website.

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.

- Scene time should not exceed ten minutes for high priority trauma and medical patients. Shorter scene times are desirable for trauma 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

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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 (i.e. only gasping), see CARDIAC ARREST (BLS) – ADULT.

   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/min.
      ii. Consider oxygen with a nasal cannula at 2 to 6 L/min.

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.


8. Identify the priority of the patient based on assessment findings.

Key Points: – GENERAL – UNIVERSAL PATIENT CARE – PRIMARY SURVEY

- Consider neck injury while evaluating the airway in the following patients:
  - All deceleration injuries (vehicle accidents, falls).
  - All trauma victims who complain of neck pain.
  - All trauma victims with neck tenderness or deformity.
  - All non-alert patients with possible trauma.
  - In drowning, if there is no spontaneous breathing remove patient from the water immediately and begin resuscitation. Minimize in-water resuscitation.

- While evaluating breathing and circulation, expose the thorax, assess for and manage life-threatening signs and symptoms:
  - Assure bilateral breath sounds.
  - Assess for jugular vein distention.
  - Assess for tracheal deviation.
  - Seal sucking wounds with gloved hand, then an occlusive dressing.
  - Splint flail segments with gloved hand, then a heavy bulky dressing.
  - For tension pneumothorax, follow THORACENTESIS, NEEDLE protocol.

Protocol 1.4 – GENERAL – UNIVERSAL PATIENT CARE
SECONDARY SURVEY

1. Obtain vital signs, including, at minimum:
   - a. Respiration
   - b. Pulse
   - c. Blood pressure
   - d. Skin color, temperature, and moisture

2. Obtain chief complaint.

3. Obtain history of present illness and past medical history including:
   - a. S = signs and symptoms
   - b. A = allergies (medications, food and environmental)
   - c. M = medications (prescription, over-the-counter, vitamins, herbal, birth control, erectile dysfunction)
   - d. P = past medical history (medical, surgical, and trauma)
   - e. L = last oral intake (solid or liquid)
   - f. E = events leading to the injury or illness
Protocol 1.4 – GENERAL – UNIVERSAL PATIENT CARE (Cont.)

SECONDARY SURVEY

4. OPQRST-ASPN history.
   a. O = Onset – time the signs or symptoms started
   b. P = Provocative, palliative, and positioning
   c. Q = Quality of the discomfort
   d. R = Radiation
   e. S = Severity – rate pain on 0 to 10 scale.
   f. T = Time - relating to onset, however, more definitive in regards to initial onset in the history.
   g. AS = Associated symptoms.
   h. PN = Pertinent negatives.

5. Conduct a physical examination (head-to-toe assessment)
   b. Trauma (significant MOI): perform rapid trauma assessment to determine life-threatening injuries. Perform a detailed physical examination en route to the hospital or at landing zone only after life-saving assessments and interventions are completed.
   c. Other (medical and trauma): perform focused physical examination to assess specific body areas that relate to the patient’s illness or injury.

6. Other assessment techniques.
   a. Lung sounds
   b. Cardiac rhythm monitoring
   c. Obtain 12-lead ECG (notify receiving hospital with a transmission or the machine’s interpretation)
   d. Pulse oximetry
   e. Capnography

7. Record examination findings.
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.


7. Reassess and record vital signs.

8. Repeat focused assessment regarding patient complaint or injuries.

   a. Assess response to management.
   b. Maintain or modify management plan.
Cardiocerebral resuscitation (CCR) is an approach to patients with out-of-hospital cardiac arrest that has been shown to improve rates of neurologically intact survival, when compared to a cardiopulmonary resuscitation (CPR) approach, in with certain presentations of cardiac arrest. This algorithm is for use by all EMS providers to outline the initial management of a patient in cardiac arrest and determine which resuscitation method to employ – CCR or CPR.

Unresponsive victim

Look for no breathing or only gasping and check pulse (simultaneously)

**DEFINITE** pulse within 5-10 seconds?

Provide rescue breathing: 1 breath every 5-6 seconds, or 10-12 breaths/min.

- Continue rescue breathing; check pulse about every 2 minutes. If no pulse, begin chest compressions.

No pulse

Begin CHEST COMPRESSIONS ONLY for 2 min

- Rate of 100 to 120/min.
- Compression depth at least 2 inches.
- Allow complete chest recoil after each compression.
- Minimize interruptions in chest compressions.
- Attach AED [EMT,AEMT] or monitor/defibrillator [INT,PM] and shock, if indicated.

Assess for history/etiology of the arrest

For arrests with the following etiologies, manage using traditional CPR.

- Respiratory/hypoxia
- Overdose
- Drowning
- Hypothermia
- Foreign body airway obstruction

If the history/etiology is unknown or in question, perform CCR.

PERFORM SIMULTANEOUSLY

Make decision on resuscitation approach based on history/etiology of arrest.

CCR

Continue management of arrest using Protocol 2.1.2 – Cardiocerebral Resuscitation (CCR).

CPR

Continue management of arrest using Protocol 2.1.3 – Cardiopulmonary Resuscitation (CPR).
CARDIOCEREBRAL RESUSCITATION (CCR) – ADULTS ONLY

Protocol 2.1.2

Scope

EMR
EMT
AEMT
INT
PM

Continued from…

Protocol 2.1.1 – Cardiac Arrest (Adult)

Continue CHEST COMPRESSIONS ONLY

- Rate of 100-120/min.
- Compression depth at least 2 inches.
- Allow complete chest recoil after each compression.
- Minimize interruptions in chest compressions.
- Manage airway (see below)

Check rhythm

Shockable rhythm?

Give 1 shock

Resume chest compressions immediately for 2 minutes

Not Shockable

Resume chest compressions immediately for 2 minutes

Perform 3 cycles of chest compression only CCR (6 minutes total)

- Analyze/check rhythm every 2 minutes – shock as indicated.
- Minimize interruptions in chest compressions (<5 seconds)
- Push hard (≥ 2 inches) and fast (100-120/min)
- Allow complete chest recoil

Establish and maintain an open airway and passively administer oxygen.

OPTION 1 (Preferred)

- Insert an I-GEL O2 SUPRAGLOTTIC AIRWAY, connect an oxygen tube to the oxygen port and set the oxygen flow rate to 4-6 lpm.
- Manually support the head in a sniffing position. DO NOT perform positive pressure ventilation.

OPTION 2

- Insert an appropriately sized oropharyngeal airway
- Manually maintain an open airway (e.g. head-tilt, chin-lift; jaw thrust, etc.)
- Administer oxygen via non-rebreather AND nasal cannula. Set flow rates for both devices at maximum (≥15 lpm)
- DO NOT perform positive pressure ventilation

[INT,PM] Give epinephrine 1:10,000 1 mg (as soon as possible) every 3-5 min. Do not interrupt chest compressions.

After 3 cycles of CCR, switch to traditional CPR

Protocol 2.1.3 – Cardiopulmonary Resuscitation

[ALS] Establish IV or IO access only if procedure can be performed WITHOUT interrupting chest compressions.


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CARDIOPULMONARY RESUSCITATION (CPR)  Protocol 2.1.3

Scope

EMR  EMT  AEMT  INT  PM

Continued from…
Protocol 2.1.1 – Cardiac Arrest (Adult)
or
Protocol 2.1.2 – Cardiocerebral Resuscitation

Continue CPR…
Give 5 cycles of 30 COMPRESSIONS and 2 BREATHS (2 minutes)
Push hard and fast (100-120/min) and release completely
Minimize interruptions in compressions

Check rhythm
Shockable rhythm?

Shockable
Give 1 shock¹
Resume CPR immediately
for 2 minutes

Not Shockable
Resume CPR immediately
for 2 minutes
Check rhythm every 2 minutes;
continue until ALS providers take over or victim starts to move.

[EMT²,AEMT] Continue BVM ventilations. Secure airway with a supraglottic airway (minimize CPR disruption).
Once a supraglottic airway is in place, perform asynchronous chest compressions and ventilation.
Ventilate at one breath every 10 seconds \(\text{MAX} = 6 \text{ breaths/min}\)

[AEMT] Establish IV or IO access

Consider termination of resuscitation if no return of pulse after 15 minutes of effort. [Medical Control]

¹Shock delivered at 200 J after first 5 cycles

1 For biphasic defibrillators, use the manufacturer's recommended energy dose (120 to 200 J). If the manufacturer's recommended dose is not known, deliver shocks at the maximal energy dose. If a monophasic defibrillator is used, providers should deliver an initial shock of 360 J and use that dose for subsequent shocks.

2 Only EMT providers that have successfully completed local protocol training on a supraglottic airway are authorized to utilize the device.

CARDIAC ARREST – SPECIAL RESUSCITATION CIRCUMSTANCES
See Addendum for treatment guidelines for special resuscitation situations in cardiac arrest.

Key Points: GENERAL - CARDIAC ARREST

- The foundation of ALS care is good BLS care, beginning with prompt high-quality chest compressions and, for VF/pVT, attempted defibrillation within minutes of collapse as soon as it can be accomplished.

- The most critical interventions during the first minutes of VF or pVT are immediate chest compressions, with minimal interruption in chest compressions, and defibrillation.

- Use the defibrillator as soon as it is available for all cardiac arrests. Do not delay use of an AED, initial rhythm analysis or defibrillation to provide a period of chest compressions for patients in cardiac arrest.

- When a rhythm check reveals VF/pVT, chest compressions should be provided while the defibrillator charges (when possible), until it is time to “clear” the victim for shock delivery. Give the shock as quickly as possible. Immediately after shock delivery, resume chest compressions without delay and continue for 2 minutes and then check the rhythm.

- Minimize the frequency and duration of interruptions in compressions to maximize the number of compressions delivered per minute (not more than 5 seconds).

- When providing ventilator support, it is critical that ventilations be slow, gentle and not given with a lot of pressure. Six ventilations per minute is adequate while compression are ongoing.

- “Effective” chest compressions are essential for providing blood flow during resuscitation. To give “effective” chest compressions, “push hard and push fast.” Compress the adult chest at a rate of 100 to 120 compressions per minute, with a compression depth of 2 inches (approximately 5 cm). Avoid excessive chest compression depths (greater than 2.4 inches [6 cm]). Allow the chest to recoil completely after each compression, and allow approximately equal compression and relaxation times.

- Priorities for the pregnant woman in cardiac arrest are provision of high-quality CPR and relief of aortocaval compression. If the fundus height is at or above the level of the umbilicus, manual left uterine displacement can be beneficial in relieving aortocaval compression during chest compressions.

- Resuscitation may be terminated by BLS or ALS providers under the direction of [Medical Control].
Table 2.1.1. Summary of Key BLS/CPR Components for Adults, Children and Infants

Refer to Protocol 2.1.2 – Cardiocerebral Resuscitation (CCR) for modifications to the BLS/CPR guidelines for CCR candidate patients.

<table>
<thead>
<tr>
<th>Maneuver</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Component</strong></td>
<td></td>
</tr>
<tr>
<td>Recognition</td>
<td>Check for responsiveness</td>
</tr>
<tr>
<td></td>
<td>No breathing or only gasping (i.e., no normal breathing)</td>
</tr>
<tr>
<td></td>
<td>No definite pulse felt within 10 seconds</td>
</tr>
<tr>
<td></td>
<td>(Breathing and pulse check can be performed simultaneously in less than 10 seconds)</td>
</tr>
<tr>
<td>Compression-ventilation ratio without advanced airway</td>
<td>1 or 2 rescuers → 30:2</td>
</tr>
<tr>
<td></td>
<td>1 rescuer → 30:2</td>
</tr>
<tr>
<td></td>
<td>2 or more rescuers → 15:2</td>
</tr>
<tr>
<td>Compression-ventilation ratio with advanced airway</td>
<td>Continuous compressions at a rate of 100-120/min</td>
</tr>
<tr>
<td></td>
<td>Give 1 breath every 10 seconds (6 breaths/min)</td>
</tr>
<tr>
<td>Compression rate</td>
<td>100-120/min</td>
</tr>
<tr>
<td>Compression depth</td>
<td>At least 2 inches (5 cm)*</td>
</tr>
<tr>
<td></td>
<td>At least ⅓ AP diameter About 2 inches (5 cm)</td>
</tr>
<tr>
<td></td>
<td>At least ⅓ AP diameter About 1½ inches (4 cm)</td>
</tr>
<tr>
<td>Hand Placement</td>
<td>2 hands on the lower half of the breastbone (sternum)</td>
</tr>
<tr>
<td></td>
<td>2 hands or 1 hand (optional for very small child) on the lower half of the breastbone (sternum)</td>
</tr>
<tr>
<td></td>
<td>1 rescuer 2 fingers in the center of the chest, just below the nipple line</td>
</tr>
<tr>
<td></td>
<td>2 or more rescuers 2 thumb-encircling hands in the center of the chest, just below the nipple line</td>
</tr>
<tr>
<td>Chest wall recoil</td>
<td>Allow full recoil of chest after each compression; do not lean on the chest after each compression.</td>
</tr>
<tr>
<td></td>
<td>Rotate compressor every 2 minutes or sooner if fatigued.</td>
</tr>
<tr>
<td>Minimizing Interruptions</td>
<td>Minimize interruptions in chest compressions</td>
</tr>
<tr>
<td></td>
<td>Attempt to limit interruptions to &lt;5 seconds</td>
</tr>
<tr>
<td>Defibrillation</td>
<td>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.</td>
</tr>
</tbody>
</table>

* Compression depth should be no more than 2.4 inches (6 cm).
**CARDIAC ARREST – ASYSTOLE / PEA (ADULT)**

**Protocol 2.2**

Scope: **EMR** | **EMT** | **AEMT** | **INT** | **PM**

---

1. **Start CCR/CPR**
   - Give oxygen
   - Attach monitor/defibrillator

2. **Rhythm shockable?**
   - **YES**: Go to **VF/pVT**
   - **NO**: **Asystole / PEA**

3. **CCR/CPR 2 min**
   - IV/IO access
   - **Epinephrine** every 3-5 min (ASAP if using CCR)
   - Consider advanced airway, capnography when performing CPR

4. **Rhythm shockable?**
   - **YES**: Go to **VF/pVT**
   - **NO**: **CCR/CPR 2 min**
     - Treat reversible causes

5. **Rhythm shockable?**
   - **YES**: Go to **VF/pVT**
   - **NO**: **CCR/CPR 2 min**
     - Treat reversible causes

6. **If no signs of return of spontaneous circulation (ROSC), go to 3 or 4**
   - **If ROSC, go to Post-Cardiac Arrest Care**

---

**Chest Compression Quality**
- Push hard (≥2 inches) and fast (100-120/min), allow complete chest recoil
- Minimize interruptions in compressions
- Rotate compressor every 2 minutes

**Cardiocerebral Resuscitation (CCR)**
- Perform 3 cycles of chest compression only CCR (6 minutes total)
- Check rhythm every 2 minutes
- Establish and maintain an open airway and passively administer oxygen.
  - Insert an OPA
  - Manually maintain an open airway (e.g. head-tilt, chin-lift; jaw thrust, etc.)
  - Administer oxygen via NRB mask AND NC. Set flow rates at max (≥15 lpm)
  - DO NOT perform PPV

After 3 cycles of CCR, switch to traditional CPR

**CPR Quality**
- Avoid excessive ventilation
- If no advanced airway, 30:2 compression-ventilation ratio
- Quantitative waveform capnography
  - If ETCO₂ <10 mm Hg, attempt to improve CPR quality

**Return of Spontaneous Circulation (ROSC)**
- Pulse and blood pressure
- Abrupt sustained increase in ETCO₂ (typically ≥40 mm Hg)

**Drug Therapy**
- **Epinephrine** IV/IO Dose:
  - 1 mg every 3-5 min (ASAP if using CCR)

**Advanced Airway**
- **During CCR:**
  - *i-gel O₂ ONLY!*
  - **King LT Airway and ET tube contraindicated during CCR.**
- Endotracheal intubation or supraglottic airway
- Waveform capnography required to confirm and monitor ET tube placement
- **During CPR**, ventilate one breath every 10 seconds (**MAX = 6 breaths/min**) with continuous chest compressions

---


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

Protocol 2.3

Scope

EMR  EMT  AEMT  INT  PM

Start CPR/CCR

• Give oxygen
• Attach monitor/defibrillator

Rhythm shockable?

NO

YES

VF/pVT

Shock

CPR/CCR 2 min

• IV/IO access

Rhythm shockable?

NO

YES

CPR/CCR 2 min

• Epinephrine every 3-5 min (ASAP if using CCR)
• Consider advanced airway, capnography

Rhythm shockable?

NO

YES

CPR/CCR 2 min

• Amiodarone

Rhythm shockable?

NO

YES

CPR/CCR 2 min

• Amiodarone

• Treat reversible causes

Consult [Medical Control] to consider termination of or continuation of resuscitative efforts.

Chest Compression Quality

• Push hard (≥2 inches) and fast (100-120/min), allow complete chest recoil
• Minimize interruptions in compressions
  o Rotate compressor every 2 minutes

Cardiocerebral Resuscitation (CCR)

• Perform 3 cycles of chest compression only CCR (6 minutes total)
• Check rhythm every 2 minutes
Establish and maintain an open airway and passively administer oxygen.
• Insert an OPA
• Manually maintain an open airway (e.g. head-tilt, chin-lift; jaw thrust, etc.)
• Administer oxygen via NRB mask AND NC. Set flow rates at max (≥15 lpm)
• DO NOT perform PPV

After 3 cycles of CCR, switch to traditional CPR

Shock Energy

• Biphasic: Manufacturer recommendation (120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
• Monophasic: 360 J

CPR Quality

• Avoid excessive ventilation
• If no advanced airway, 30:2 compression-ventilation ratio
• Quantitative waveform capnography

If ETCO₂ <10 mm Hg, attempt to improve CPR quality

Return of Spontaneous Circulation (ROSC)

• Pulse and blood pressure
• Abrupt sustained increase in ETCO₂ (typically ≥40 mm Hg)

Drug Therapy

• Epinephrine IV/IO Dose:
  1 mg every 3-5 minutes

• Amiodarone IV/IO Dose:
  1st dose: 300 mg bolus; 2nd dose: 150 mg

Advanced Airway

• During CCR:
  o i-gel O₂ ONLY!
  o King LT and ET tube contraindicated during CCR.
• Endotracheal intubation or supraglottic airway
• Waveform capnography required to confirm and monitor ET tube placement
• During CPR, ventilate one breath every 10 seconds (MAX = 6 breaths/min) with continuous chest compressions

If no signs of ROSC, go to Asystole/PEA.
If ROSC, go to Post-Cardiac Arrest Care
CARDIAC ARREST (GENERAL) – ADULT

Key Points: CARDIAC ARREST (GENERAL) – ADULT

- **Use the defibrillator as soon as it is available for all cardiac arrests.** Do not delay use of an AED, initial rhythm analysis or defibrillation to provide a period of chest compressions for patients in cardiac arrest.

- Venous access during cardiac arrest is best accomplished using proximal IV sites (i.e. external jugular or antecubital fossa). If traditional vascular access techniques are not possible, intraosseous access is recommended. Humeral IO access is preferred.

- When VF/pVT 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 pVT are immediate chest compressions, 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 6 breaths/minute. Check rhythm every 2 minutes.

- When a rhythm check reveals VF/pVT, CPR should be provided while the defibrillator charges (when possible), until it is time to “clear” the victim for shock delivery. Give the shock as quickly as possible. Immediately after shock delivery, resume chest compressions without delay for 2 minutes and then check the rhythm.

- Minimize the frequency and duration of interruptions in compressions to maximize the number of compressions delivered per minute.

- When providing ventilator support, it is critical that ventilations be slow, gentle and not given with a lot of pressure. Six ventilations per minute is adequate while compression are ongoing.

- “Effective” chest compressions are essential for providing blood flow during CPR. To give “effective” chest compressions, “push hard and push fast.” Compress the adult chest at a rate of 100-120 compressions per minute, with a compression depth of 2 inches (5 cm). Avoid excessive chest compression depths (greater than 2.4 inches [6 cm]). Allow the chest to recoil completely after each compression, and allow approximately equal compression and relaxation times.

- Continuous waveform capnography is **required** 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. Consider in patients with dialysis catheter or fistula.

- The routine use of cricoid pressure in cardiac arrest is not recommended.

- For asystole: If the arrest is sudden, witnessed and follows a perfusing rhythm, begin immediate transcutaneous pacing.

- 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 ETCO₂ <10 mm Hg, consider trying to improve CPR quality by optimizing chest compression parameters. If ETCO₂ 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 ≥170, perform immediate synchronized cardioversion in addition to other indicated procedures.

- After conversion from **shock refractory** VF/pVT to a perfusing rhythm, consider a slow infusion of **AMIODARONE** at 1 mg/min IV.

- If patient converts from **shock refractory** VF/pVT 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/min.

Search for and treat reversible causes.

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary
MEDICAL – BRADYCARDIA (ADULT)  Protocol 2.4

Assess appropriateness for clinical condition.
Heart rate typically <50/min if bradyarrhythmia.

**Identify and treat underlying cause**
- Maintain patent airway; assist breathing as necessary
- Oxygen (if hypoxemic)
- Cardiac monitor to identify rhythm; monitor blood pressure and oximetry
- IV access
- 12-lead ECG if available; do not delay therapy

**Observe / Monitor**

- No

**Persistent bradyarrhythmia causing:**
- Hypotension?
- Acutely altered mental status?
- Signs of shock?
- Ischemic chest discomfort?
- Acute heart failure?

**ATROPINE**
First dose: 0.5 mg bolus
Repeat every 3-5 minutes
Maximum: 3 mg

If atropine ineffective:
- **TRANSCUTANEOUS PACING**
  OR
- **EPINEPHRINE INFUSION**
  2-10 mcg per minute

**Yes**
MEDICAL – BRADYCARDIA (ADULT)

Protocol 2.4

Key Points: MEDICAL - BRADYCARDIA

- Immediate pacing might be considered in unstable patients with high-degree AV block when IV access is not available.

- When bradycardia is the cause of symptoms, the rate is generally <50 beats per minute. A slow heart rate may be physiologically normal for some patients, whereas a heart rate of >50 beats per minute may be inadequate for others. Focus on management of clinically significant bradycardia (i.e., bradycardia that is inappropriate for the clinical condition).

- If pulseless arrest develops, go to the appropriate pulseless arrest algorithm.

- Because hypoxemia is a common cause of bradycardia, initial evaluation of any patient with bradycardia should focus on signs of increased work of breathing and oxyhemoglobin saturation as determined by pulse oximetry.

- While initiating treatment, evaluate the patient's clinical status and identify potentially reversible causes.

- If a toxicological etiology is identified as the cause of bradycardia, follow the appropriate toxicology protocol.

- If sedation is required, give MIDAZOLAM 2.5 mg slow IVP or 0.25 mg/kg up to 5 mg IN 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.

- Contact [Medical Control] before using atropine in the setting of an acute myocardial infarction.

- Atropine may be used for nausea in a severely symptomatic bradycardic patient.
MEDICAL – SUPRAVENTRICULAR TACHYCARDIA (ADULT)
MEDICAL – VENTRICULAR TACHYCARDIA W/PULSE (ADULT)

Protocol 2.5

Scope: EMR EMT AEMT INT PM

Assess appropriateness for clinical condition.
Heart rate typically >150/min if tachyarrhythmia.

Identify and treat underlying cause
- Maintain patent airway; assist breathing as necessary
- Oxygen (if hypoxemic)
- Cardiac monitor to identify rhythm; monitor blood pressure and oximetry

Persistent tachyarrhythmia causing:
- Hypotension?
- Acutely altered mental status?
- Signs of shock?
- Ischemic chest discomfort?
- Acute heart failure?

If torsades de pointes, give
- MAGNESIUM 2 g over 5 min.
  Do not give AMIODARONE

Synchronized cardioversion
- Consider sedation
- If regular narrow complex, consider adenosine

Yes

No

Wide QRS?
≥0.12 second

No

Yes

Yes

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

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

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

Metoprolol IV Dose:
- First dose: 5 mg slow IV push. Repeat every 5 minutes to a maximum total dose of 15 mg.

Stable: Transport and monitor
- Contact [Medical Control] for direction

- IV access and 12-lead ECG if available
- Vagal maneuvers
- Regular rhythm
  - Give ADENOSINE
  - Irregular rhythm or adenosine does not convert
  - Control rate with METOPROLOL
  - Consider [Medical Control]

- IV access and 12-lead ECG if available
- Consider ADENOSINE only if regular and monomorphic
- Consider AMIODARONE IV infusion
- Consider [Medical Control]


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MEDICAL – SUPRAVENTRICULAR TACHYCARDIA (ADULT)
MEDICAL – VENTRICULAR TACHYCARDIA W/PULSE (ADULT)
Protocol 2.5

Scope: EMR | EMT | AEMT | INT | PM

Key Points: TACHYCARDIA – ADULT

- Give adenosine rapidly over 1 to 3 seconds through a large (e.g., antecubital) vein followed by a 10 mL saline flush and elevation of the arm.
- If possible, establish IV access before cardioversion and give MIDAZOLAM 2.5 mg slow IV push or 0.25 mg/kg up to 5 mg IN, titrated to effect, if the patient is conscious. May repeat every 5 minutes as needed. 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, consider a slow infusion of AMIODARONE at 1 mg/min 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/min. AMIODARONE is contraindicated if SBP <90.
- To perform synchronized cardioversion, provide an initial shock at the recommended energy dose. If there is no response to the first shock, increase the dose in a stepwise fashion (e.g., 100 J, 200 J, 300 J, 360 J). Providers should use the device-specific doses for synchronized cardioversion, as recommended by the monitor manufacturer. Following are the AHA recommendations.
- Atrial Fibrillation - Recommended initial biphasic energy dose for cardioversion is 120 to 200 J. If the initial shock fails, increase the dose in a stepwise fashion.
- SVT & 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. Press the “SYNC” button again if another synchronized shock is needed.
- If the 360 J shock does not convert a dysrhythmia, contact [Medical Control] for direction.
CARDIAC ARREST – POST RESUSCITATION CARE (ADULT)  Protocol 2.6

**Return of Spontaneous Circulation (ROSC)**

**Optimize ventilation and oxygenation**
- Reduce oxygen flow and maintain oxygen saturation ≥94%
- Consider advanced airway and waveform capnography
- Do not hyperventilate

**Treat hypotension (SBP <90 mm Hg)**
- IV/IO bolus
- Vasopressor infusion
- Consider treatable causes
- Acquire 12-lead ECG

**Transport to closest appropriate hospital, preferably a PCI-capable hospital. Consider helicopter EMS.**

**Ventilation/Oxygenation**
- Start at 10-12 breaths/min and titrate to target ETCO₂ of 35-40 mm Hg. Avoid excessive ventilation.
- Titrate oxygen to minimum necessary to achieve SpO₂ ≥94%.
  - Start with 100% oxygen during the CPR phase
  - After ROSC, rapidly reduce oxygen flow to the BVM until at room air or SpO₂ ≥94%.

**IV Bolus for hypotension**
20 mL/kg normal saline.

**Dopamine Infusion**
5-20 mcg/kg per minute

**Epinephrine Infusion**
0.1 to 0.5 mcg/kg/min

**Reversible Causes**
- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary
DEATH DETERMINATION – ALL AGES

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-tinged discoloration of the skin, often accompanied by cold extremities.
  - Decapitation.
  - Incineration of the torso and/or head.
  - Massive crush injury and/or penetrating injury with evisceration of the heart, and/or brain.
  - Gross dismemberment of the trunk.

Procedure: When it is determined the patient is not 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 is any disagreement, resuscitation is immediately initiated.

Once the death determination has been made, see DECEASED PATIENT GUIDELINES.
<table>
<thead>
<tr>
<th>ETIOLOGY</th>
<th>INTERVENTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anaphylaxis</strong></td>
<td><strong>Cardiac Arrest (BLS):</strong> Immediate use of an epinephrine auto-injector is recommended.  &lt;br&gt;<strong>Cardiac Arrest (ALS):</strong> Standard ACLS approach. Administer epinephrine as soon as possible. Adjuvant use of antihistamines, inhaled β-adrenergic agents, and IV corticosteroids has been successful in management of the patient with anaphylaxis and may be considered in cardiac arrest due to anaphylaxis. (Class IIb, LOE C)  &lt;br&gt;<strong>Post-Resuscitation:</strong> IV infusion of epinephrine is a reasonable alternative to IV boluses for treatment of anaphylaxis in post-arrest management. (Class IIb, LOE C).</td>
</tr>
<tr>
<td><strong>Asthma</strong></td>
<td><strong>Cardiac Arrest:</strong> Standard BLS and ALS algorithms with the following considerations.  &lt;br&gt;1) A ventilation strategy of low respiratory rate and tidal volume is reasonable.  &lt;br&gt;2) Consider 20 mL/kg normal saline bolus.</td>
</tr>
<tr>
<td><strong>Benzodiazepines</strong></td>
<td><strong>Cardiac Arrest:</strong> Standard BLS and ALS algorithms (antidotes are not indicated).</td>
</tr>
<tr>
<td><strong>Beta-Blockers</strong></td>
<td><strong>Cardiac Arrest:</strong> Standard BLS and ALS algorithms (antidotes are not indicated).  &lt;br&gt;<strong>Post-Resuscitation:</strong> For symptomatic presentation, follow the BRADYCARDIA protocol. Other therapeutic options include: GLUCAGON or CALCIUM CHLORIDE.</td>
</tr>
<tr>
<td><strong>Calcium Channel Blockers</strong></td>
<td><strong>Cardiac Arrest:</strong> Standard BLS and ALS algorithms (antidotes are not indicated).  &lt;br&gt;<strong>Post-Resuscitation:</strong> For symptomatic presentation, follow the CALCIUM CHANNEL BLOCKER OVERDOSE protocol.</td>
</tr>
<tr>
<td><strong>Cardiac Arrest Associated with Trauma</strong></td>
<td>Reserved for future consideration.</td>
</tr>
<tr>
<td><strong>Cocaine</strong></td>
<td><strong>Cardiac Arrest:</strong> Standard BLS and ALS algorithms (antidotes are not indicated).  &lt;br&gt;<strong>Post-Resuscitation:</strong> For symptomatic presentation, follow the STIMULANT OVERDOSE protocol.</td>
</tr>
<tr>
<td><strong>Cyanide/Smoke Inhalation</strong></td>
<td><strong>Cardiac Arrest:</strong> Administration of HYDROXOCOBALAMIN and is recommended.</td>
</tr>
<tr>
<td><strong>Cyclic Antidepressants</strong></td>
<td><strong>Cardiac Arrest:</strong> Administration of SODIUM BICARBONATE may be considered.  &lt;br&gt;<strong>Post-Resuscitation:</strong> For symptomatic presentation, follow the TRICYCLIC ANTIDEPRESSANTS OVERDOSE protocol.</td>
</tr>
</tbody>
</table>
### CARDIAC ARREST – SPECIAL RESUSCITATION CIRCUMSTANCES

<table>
<thead>
<tr>
<th>ETIOLOGY</th>
<th>INTERVENTION</th>
</tr>
</thead>
</table>
| **Drowning**                    | **Cardiac Arrest:** CPR for drowning victims should use the traditional A-B-C approach in view of the hypoxic nature of the arrest and standard ALS algorithm. **DO NOT** use abdominal thrusts or the Heimlich maneuver for drowning victims.  
**Post-Resuscitation:** All victims of drowning who require any form of resuscitation (including rescue breathing alone) should be transported to the hospital for evaluation and monitoring, even if they appear to be alert and demonstrate effective cardiorespiratory function at the scene. |
| **Hyperkalemia, Suspected**     | **Cardiac Arrest:** Standard BLS and ALS algorithms. Additionally, consider administration of **CALCIUM CHLORIDE** to stabilize myocardial cell membrane and **SODIUM BICARBONATE** to shift potassium into the cells. |
| **Hypoglycemia**                | **Cardiac Arrest:** Standard BLS and ALS algorithms. **DEXTROSE** should only be administered in the following circumstances.  
1) Neonatal resuscitation (see algorithm).  
2) Pediatric cardiac arrest (see algorithm).  
**Note:** Assessment of venous or capillary blood glucose is unreliable during cardiac arrest.  
**Post-Resuscitation:** Consider titrating **DEXTROSE** to achieve the specific therapeutic goals of restoring normal blood sugar levels. Avoid hyperglycemia. |
| **Opioids**                     | **Cardiac Arrest:** Standard BLS and ALS algorithms (**naloxone** is not indicated).  
**Post-Resuscitation:** Consider **NALOXONE** to achieve the specific therapeutic goals of reversing the effects of long-acting opioids. |
| **Pregnancy** (Second half of term) | **Cardiac Arrest:** Perform high-quality CPR. If the fundus height is at or above the level of the umbilicus, manual lateral uterine displacement can be beneficial in relieving aortocaval compression during chest compressions. Consider transport to the hospital at four (4) minutes after either the onset of provider-witnessed cardiac arrest or the start of resuscitative efforts (for unwitnessed arrest) if there is no ROSC. |
**GENERAL - CARDIAC ARREST (PEDIATRIC) Protocol 3.1**

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

**Unresponsive victim**

**Look for no breathing or only gasping and check pulse (simultaneously)**
- **Definite pulse**
- **No pulse**

**1 Rescuer:** Begin cycles of 30 COMPRESSIONS and 2 BREATHS

**2 Rescuers:** Give cycles of 15 COMPRESSIONS and 2 BREATHS

**Check rhythm** as soon as AED/monitor is available.
- **Shockable rhythm?**
  - **Give 1 shock**
  - **Resume CPR immediately**
  - For 2 minutes
  - Check rhythm every 2 min
  - [AEMT] Establish IV or IO access

- **Not Shockable**
  - Resume CPR immediately
  - For 2 minutes
  - Check rhythm every 2 min

**[EMT, AEMT]** Continue BVM ventilations. Secure airway with a supraglottic airway is an appropriate size is available (minimize CPR disruption).
- Once a supraglottic airway is in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions.

**Definite pulse**

**Provide rescue breathing:** 1 breath every 3-5 seconds, or 12-20 breaths/min.
- Add chest compressions if pulse remains ≤60/min with signs of poor perfusion.
- Continue rescue breathing; check pulse about every 2 minutes. If no pulse, begin chest compressions.

**Shockable rhythm?**

**High-Quality CPR**
- Compression depth to at least \( \frac{1}{3} \) anterior-posterior diameter of chest, about 1 ½ inches (4 cm) in infants and 2 inches (5 cm) in children
- Allow complete chest recoil after each compression
- Minimize interruptions in chest compressions
- Avoid excessive ventilation

---

1 Only EMT providers that have successfully completed local protocol training on a supraglottic airway are authorized to utilize the device.
CARDBIAC ARREST – SPECIAL RESUSCITATION CIRCUMSTANCES

See Addendum for treatment guidelines for special resuscitation situations in cardiac arrest.

Key Points: GENERAL - CARDIAC ARREST (PEDIATRIC)

- The most critical interventions during the first minutes of VF or pVT are immediate CPR, with minimal interruption in chest compressions, and defibrillation.
- Attempt defibrillation immediately. The earlier you attempt defibrillation, the more likely the attempt will be successful.
- Provide CPR until the defibrillator is ready to deliver a shock. Resume CPR, beginning with chest compressions, immediately after shock delivery.
- Minimize the number of times that chest compressions are interrupted.
- “Effective” chest compressions are essential for providing blood flow during CPR. Good chest compressions require an adequate compression rate (100-120 compressions per minute), an adequate compression depth (about one third to one-half of the anterior-posterior diameter), full recoil of the chest after each compression, and minimal interruptions in compressions.
- Use of an AED for infants: For infants, 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.
CARDIAC ARREST – ASYSTOLE / PEA (PEDIATRIC)  Protocol 3.2

Scope  EMR  EMT  AEMT  INT  PM

1

Start CPR
- Give oxygen
- Attach monitor/defibrillator

2

Rhythm shockable?

Go to VF/pVT

NO

Asystole / PEA

CPR 2 min
- IV/IO access
- Epinephrine every 3-5 min
- Consider supraglottic airway, capnography

Rhythm shockable?

NO

Go to VF/pVT

YES

CPR 2 min
- Treat reversible causes

Rhythm shockable?

NO

Go to VF/pVT

YES

Asystole/PEA → 3 or 4
- Organized rhythm → check pulse
- Pulse present (ROSC) → post-cardiac arrest care

Consider termination of resuscitation after all drugs and interventions have been performed or if no response within 15 minutes [Medical Control].

CPR Quality
- Push hard (≥1/3 of anterior-posterior diameter of chest) and fast (100-120/min) and allow complete chest recoil
- Minimize interruptions in compressions
- Avoid excessive ventilation
- Rotate compressor every 2 minutes
- If no advanced airway, 15:2 compression-ventilation ratio.

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
- Supraglottic airway
- Waveform capnography recommended to confirm and monitor airway placement
- Once advanced airway in place give 1 breath every 6 seconds (10 breaths per minute)
CARDIAC ARREST – V-FIB/PULSELESS V-TACH (PEDIATRIC)  Protocol 3.3

Scope  EMR  EMT  AEMT  INT  PM

1  Start CPR
   • Give oxygen
   • Attach monitor/defibrillator

Rhythm shockable?  NO

2  VF/pVT

Shock  3)

Rhythm shockable?  NO

4  CPR 2 min
   • IV/IO access

Rhythm shockable?  NO

5  Shock

6  CPR 2 min
   • Epinephrine every 3-5 min
   • Consider advanced airway, capnography

Rhythm shockable?  NO

7  Shock

8  CPR 2 min
   • Amiodarone
   • Treat reversible causes

CPR Quality
   • Push hard (>1/3 of anterior-posterior diameter of chest) and fast (100-120/min) 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

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

Drug Therapy
   • Epinephrine 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 VF/pVT.

Advanced Airway
   • Supraglottic airway
   • Waveform capnography recommended to confirm and monitor airway placement
   • Once advanced airway in place give 1 breath every 6 seconds (10 breaths per minute)

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

If no signs of ROSC, go to Asystole/PEA.
Organized rhythm→ check pulse
Pulse present (ROSC)→ post-cardiac arrest care

Consider termination of resuscitation after all drugs and interventions have been performed or if no response within 15 minutes [Medical Control].
CARDIAC ARREST (GENERAL) – PEDIATRIC

Key Points: CARDIAC ARREST – PEDIATRIC

- Consider MAGNESIUM 25 mg/kg IV/IO, max 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 pVT are immediate CPR, with minimal interruption in chest compressions, and defibrillation.**

- Attempt defibrillation immediately. The earlier you attempt defibrillation, the more likely the attempt will be successful.

- Provide CPR until the defibrillator is ready to deliver a shock. Resume CPR, beginning with chest compressions, immediately after shock delivery.

- **Minimize the number of times that chest compressions are interrupted.**

- Rhythm checks should be brief, and pulse checks should generally be performed only if an organized rhythm is observed.

- Pediatric advanced life support techniques are useless without effective circulation, which is supported by good chest compressions during cardiac arrest. Good chest compressions require an adequate compression rate (100-120 compressions per minute), an adequate compression depth (about one third to one-half of the anterior-posterior diameter), full recoil of the chest after each compression, and minimal interruptions in compressions.

- Search for and treat reversible causes.
  - Hypovolemia
  - Hypoxia
  - Hydrogen ion (acidosis)
  - Hypo-/hyperkalemia
  - Hypothermia
  - Hypoglycemia
  - Tension pneumothorax
  - Tamponade, cardiac
  - Toxins
  - Thrombosis, pulmonary
  - Thrombosis, coronary
MEDICAL – BRADYCARDIA (PEDIATRIC)

Protocol 3.4

Scope

Identify and treat underlying cause
- Maintain patent airway; assist breathing as needed
- Oxygen
- Cardiac monitor to identify rhythm; monitor blood pressure and oximetry
- IO/IV access
- 12-lead ECG if available; do not delay therapy

Cardiopulmonary compromise continues?

Yes

CPR if HR <60/min
with poor perfusion despite oxygenation and ventilation

No

Bradycardia persists?

Yes

- Epinephrine
- Atropine for increased vagal tone or primary AV block
- Consider cardiac pacing
- Treat underlying causes

No

- Support ABCs
- Give oxygen
- Observe

If pulseless arrest develops, go to appropriate pulseless arrest algorithm

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.
MEDICAL – BRADYCARDIA (PEDIATRIC)  
Protocol 3.4

**Key Points: BRADYCARDIA – PEDIATRIC**

- 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.
MEDICAL – SUPRAVENTRICULAR TACHYCARDIA (PEDIATRIC)  Protocol 3.5

Scope

Identify and treat underlying cause
- Maintain patent airway; assist breathing as necessary
- Oxygen
- Cardiac monitor to identify rhythm; monitor blood pressure and oximetry
- IO/IV access
- 12-lead ECG if available; do not delay therapy
  - Children: rate usually greater than or equal to 180/min, QRS ≤0.09 sec
  - Infants: rate usually greater than or equal to 220/min, QRS ≤0.09 sec

Cardiopulmonary compromise?
- Hypotension
- Acutely altered mental status
- Signs of shock

Good perfusion
- Support ABCs; give oxygen as needed
- Observe

Consider vagal maneuvers (no delays)

Poor perfusion

Perform synchronized cardioversion [Medical Control]

Unstable

- If IV/IO is readily available:
  - Give ADENOSINE 0.1 mg/kg (maximum first dose 6 mg) by rapid bolus [Medical Control]
  - If no response after 1 min, Give ADENOSINE 0.2 mg/kg (maximum second dose 12 mg) by rapid bolus [Medical Control]
- If no response to Adenosine, or if the rhythm is irregular, perform synchronized cardioversion [Medical Control]
MEDICAL – SUPRAVENTRICULAR TACHYCARDIA (PEDIATRIC)  Protocol 3.5

Scope  EMR  EMT  AEMT  INT  PM

Key Points: NARROW QRS TACHYCARDIA - PEDIATRIC

- Evaluation of the ECG and the patient’s clinical presentation and history should help you differentiate probable sinus tachycardia from probable supraventricular tachycardia (SVT). If the rhythm is sinus tachycardia, search for and treat reversible causes.

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

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

- If hypovolemia is suspected, give IV fluids according to the **SHOCK-HYPOVOLEMIC** protocol.

- Give adenosine rapidly over 1 to 3 seconds through a large (e.g., antecubital) vein or IO site, followed by a 5 mL 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. Press the “SYNC” button again if another synchronized shock is needed.
MEDICAL – VENTRICULAR TACHYCARDIA W/PULSE (PEDIATRIC) Protocol 3.6

Scope: EMR | EMT | AEMT | INT | PM

**Identify and treat underlying cause**

- Maintain patent airway; assist breathing as necessary
- Oxygen
- Cardiac monitor to identify rhythm; monitor blood pressure and oximetry
- IO/IV access
- 12-lead ECG if available; do not delay therapy
- QRS duration >0.09 seconds

**Cardiopulmonary compromise?**

- Hypotension
- Acutely altered mental status
- Signs of shock

**Good perfusion**

- Support ABCs; give oxygen as needed
- Observe

**Perform immediate synchronized cardioversion**

**Unstable**

- Consider ADENOSINE if rhythm is regular and QRS is monomorphic [Medical Control]
  - First Dose: 0.1 mg/kg (maximum dose 6 mg) by rapid bolus
  - Second Dose: 0.2 mg/kg (maximum dose 12 mg) by rapid bolus
- Consider AMIODARONE 5 mg/kg over 20 min [Medical Control]

**Poor perfusion**
MEDICAL – VENTRICULAR TACHYCARDIA W/PULSE (PEDIATRIC) Protocol 3.6

Key Points: WIDE QRS TACHYCARDIA - PEDIATRIC

- Generally, unstable wide complex tachycardia should be treated with synchronized electrical cardioversion.
- If it does not delay cardioversion, try a dose of adenosine first to determine if the rhythm is SVT with aberrant conduction.
- If a second shock (2 J/kg) is unsuccessful or if the tachycardia recurs quickly, consider amiodarone before a third shock. [Medical Control]
- Give adenosine rapidly over 1 to 3 seconds through a large (e.g., antecubital) vein or IO site, followed by a 5 mL 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. Press the “SYNCH” button again if another synchronized shock is needed.
- Give amiodarone by mixing the appropriate dose in 100 mL D5W. Infuse over 20 minutes at 75 drops/min (15 drop infusion set).
Protocol 4.1
MEDICAL – ALTERED MENTAL STATUS

1. Perform general patient management (SECTION 1).
3. Assess for signs of trauma. Provide spinal immobilization as necessary.
4. Administer oxygen 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.

Key Points: ALTERED MENTAL STATUS

- The unconscious patient is one of the most difficult patient management problems in prehospital 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 prehospital 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 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.**  
6. **Give **EPINEPHRINE 1:1,000** 0.01 mg/kg IM (Maximum adult dose = 0.5 mg, maximum child dose = 0.3 mg). 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 experiencing respiratory distress with wheezing, give **ALBUTEROL** 2.5 mg (0.083% solution) small volume nebulizer.**  
10. **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 SpO₂), slow the IV to KVO.**  
11. **If the patient is in severe distress or symptoms persist, give **METHYLPREDNISOLONE** 2 mg/kg up to 125 mg IV over 1 to 2 minutes.**  
12. **Perform reassessment as indicated.**

### Key Points: ALLERGIC REACTION/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

1. Stop the burning process
   a. **Thermal burns**: Stop the burning process. Do not attempt to wipe off semisolids (grease, tar, wax, etc.). Do not apply ice.
   b. **Dry chemical burns**: Brush off dry powder, then lavage with copious amounts of tepid water (sterile, if possible) for 20 minutes. Continue en route to the hospital.
   c. **Liquid chemical burns**: Lavage the burned area with copious amounts of tepid water (sterile, if possible) for 20 minutes. Continue en route to the hospital.

2. Perform general patient management (SECTION 1).
4. Administer oxygen as necessary. High flow oxygen recommended for inhalation injury.
5. If the patient is in critical respiratory distress, consider placement of an advanced airway.
6. Dry the body and follow the HYPOTHERMIA protocol as needed. Remove clothing from around burned area, but do not remove/peel off skin or tissue. Remove and secure all jewelry and tight fitting clothing.
7. Assess the extent of the burn using the **Rule of Nines** and the degree of burn severity.
8. Cover the burned area with a clean, dry dressing. **Do not use a wet dressing for any burn injury.**
9. If a **partial or full thickness burn** involves more than 20% BSA, establish an IV of normal saline. Infuse fluid based on the table. If the patient develops signs and symptoms of fluid overload respiratory distress (dyspnea, crackles, rhonchi, decreasing SpO2), slow the IV to KVO.

<table>
<thead>
<tr>
<th>Age</th>
<th>Infusion Rate</th>
<th>Drip Rate (15 drop set)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 years or younger</td>
<td>125 mL/hour</td>
<td>31 drops per minute</td>
</tr>
<tr>
<td>6–13 years</td>
<td>250 mL/hour</td>
<td>63 drops per minute</td>
</tr>
<tr>
<td>14 year or older</td>
<td>500 mL/hour</td>
<td>125 drops per minute</td>
</tr>
</tbody>
</table>

10. For pain control, give **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. Do not exceed 3 mcg/kg.
11. Consider **KETAMINE** 0.15 mg/kg IM if pain persists after second dose of fentanyl. May repeat as needed every 20 minutes to a maximum of three doses. Contact [Medical Control] for additional dosing.
12. Perform reassessment as indicated.
## 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.
Protocol 4.3 – INJURY – BURNS

<table>
<thead>
<tr>
<th>Key Points – BURNS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Burns</strong> 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.</td>
</tr>
<tr>
<td><strong>Thermal Burns:</strong></td>
</tr>
<tr>
<td>o Cool water immersion of minor localized burns may be effective if accomplished in the first few minutes after a burn.</td>
</tr>
<tr>
<td>o 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.</td>
</tr>
<tr>
<td>o Use soft, non-adherent dressings between areas of full thickness burns, as between the fingers and toes, to prevent adhesion.</td>
</tr>
<tr>
<td>o Be cautious and conservative when administering fluids to the burn patient with inhalation injury.</td>
</tr>
<tr>
<td><strong>Electrical Injuries:</strong></td>
</tr>
<tr>
<td>o Assess for multiple entrance and exit wounds.</td>
</tr>
<tr>
<td>o Perform ECG monitoring for possible cardiac disturbances. Electrical current may induce dysrhythmias such as bradycardias, tachycardias, ventricular fibrillation and asystole.</td>
</tr>
<tr>
<td>o For serious electrical burn injuries, establish large bore IVs and administer IV fluid in accordance with the SHOCK- HYPOVOLEMIA protocol.</td>
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<tr>
<td><strong>Chemical Burns:</strong></td>
</tr>
<tr>
<td>o 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.</td>
</tr>
<tr>
<td>o 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.</td>
</tr>
<tr>
<td>o 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.</td>
</tr>
<tr>
<td>o 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.</td>
</tr>
</tbody>
</table>
Figure 4.2.1 Rule of Nines

Adult

Child

Protocol 4.4
MEDICAL – CARDIAC CHEST PAIN

1. Perform general patient management (SECTION 1).
3. Treat dysrhythmias. Be prepared to initiate CPR and defibrillation, if necessary.
4. Administer oxygen to patients experiencing respiratory distress or titrate oxygen to minimum necessary to achieve SpO₂ ≥ 94%.
5. Obtain patient history. Reassure the patient.
6. Transport as soon as feasible.
7. Place patient on cardiac monitor.
   a. Obtain a 12 Lead ECG in accordance with 12-LEAD ECG ACQUISITION. NOTE: 12-lead ECG should be acquired within 10 minutes of patient contact.
   b. Consider ALS rendezvous, especially when the 12-lead indicates the patient is experiencing an acute myocardial infarction; apply defibrillation electrodes; be prepared to defibrillate if needed.
   c. When a 12 lead ECG indicates “ACUTE MI” or “…INFARCT, ACUTE,” notify [Medical Control] immediately and, if able, transmit 12 lead ECG to hospital. Consider air medical support if the transport time to the cardiac catheterization facility is greater than 30 minutes.
   d. Follow the ST–ELEVATION MYOCARDIAL INFARCTION (STEMI) TRIAGE guidelines.
8. Give ASPIRIN 324 mg PO.
9. Establish an INT or IV of normal saline at KVO.
10. Give NITROGLYCERIN.
    a. Assist patient with PRESCRIBED NITROGLYCERIN.
    b. Give nitroglycerin 0.4 mg SL. If the pain persists, repeat nitroglycerin 0.4 mg SL in 3 to 5 minutes (up to total of three SL doses).
11. If pain persists following administration of nitroglycerin SL, apply one (1) inch of nitroglycerin paste.
12. If pain persists following administration of a minimum of two SL (2) nitroglycerin, consider FENTANYL 50 mcg IV, repeat every 5 minutes (up to 150 mcg).
13. Perform reassessment as indicated.
Protocol 4.4 – MEDICAL – CARDIAC CHEST PAIN

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 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.

- If the patient has taken nitroglycerin before without problems, nitroglycerin may be administered sublingually before an INT or IV is established. If the patient has never taken nitroglycerin, an IV must be initiated prior to nitroglycerin administration.

- 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 100 mmHg, chest pain relief is warranted as specified in this protocol. Avoid use of nitroglycerin.

- Avoid nitroglycerin with hypotension (SBP less than 100 ALS) (SBP less than 120 BLS) or bradycardia (less than 60/min.).

- 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.

- Diagnostic ST elevation in the absence of left ventricular (LV) hypertrophy or left bundle-branch block (LBBB) is defined by the European Society of Cardiology/ACCF/AHA/World Heart Federation Task Force for the Universal Definition of Myocardial Infarction as new ST elevation at the J point in at least 2 contiguous leads of ≥2 mm (0.2 mV) in men or ≥1.5 mm (0.15 mV) in women in leads V2–V3 and/or of ≥1 mm (0.1 mV) in other contiguous chest leads or the limb leads.

- Transport performing interventions en route. Time is muscle!
Protocol 4.5
GENERAL – BEHAVIORAL/PATIENT RESTRAINT (NON-TRAUMATIC)

1. Assure scene safety. Do not engage patient unless risk of harm is minimized by law enforcement.
2. Perform general patient management (SECTION 1).
4. Administer oxygen as necessary.
5. For altered mental status, perform rapid glucose determination.
6. Control environmental factors; attempt to move patient to a private area free of family and bystanders. MAINTAIN ESCAPE ROUTE.
7. Attempt de-escalation, utilize an empathetic approach. Ensure patient safety and comfort. AVOID CONFRONTATION.
8. Ensure patient competency. If patient is competent, consent is required. If patient is incompetent consent is not required.
9. Physical restraint: Must be performed under the direction of law enforcement at the scene. See key points.
10. Chemical Restraint:
   a. If chemical agitation (i.e. stimulants) is suspected, refer to the TOXICOLOGY–STIMULANTS protocol
   b. If agitation from alcohol withdrawal is suspected, refer to the TOXICOLOGY–ALCOHOL WITHDRAWAL protocol.

If psychotic/behavioral agitation is suspected, give HALOPERIDAL 5 mg IM and MIDAZOLAM 2.5 mg IM. Contact [Medical Control] for repeat dosing.
   c. Give DIPHENHYDRAMINE 25 mg IM if patient experiences a dystonic reaction and extrapyramidal effects following haloperidol.
11. Transport as soon as possible.

### Key Points: COMBATIE PATIENT

- Patients may present with a psycho-social condition exhibiting extreme anxiety and/or combative/violent behavior. If the patient presents a substantial risk of bodily harm or injury to themselves, others, or emergency personnel; consider involving law enforcement whenever possible. Dystonic side effects following the administration of haloperidol may be treated with diphenhydramine.
- Administer midazolam cautiously when alcohol intoxication is suspected.
- Considerations when performing physical restraint include:
  - Restrain in the supine or left lateral recumbent position. DO NOT “hobble”, “hog-tie” or “sandwich” between backboards.
  - Ensure method of restraint does not affect breathing or circulation and move to chemical restraint as soon as possible.
Protocol 4.6
ENVIRONMENTAL – HEAT EXPOSURE

1. Perform general patient management (SECTION 1).
3. Remove the patient from the hot environment to a cool environment.
4. Administer oxygen 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 may 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 SpO₂), slow the IV to KVO.
   c. Place on cardiac monitor.
7. **Heat Stroke:** Defined as hyperthermia with altered mental status. Other symptoms may be increased body temperature, 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 SpO₂), slow the IV to KVO.
   f. Place on cardiac monitor.
Protocol 4.6 (continued)

ENVIRONMENTAL – HEAT EXPOSURE

8. **Exertional Heat Exhaustion/Stroke:** Signs and symptoms are very similar to environmental (traditional) heat stroke but occur in an individual who has been involved in an athletic event. These individuals may be sweating profusely and include pallor, orthostatic hypotension, headache, weakness, fatigue and thirst. Exertional Heat Stroke can be differentiated from heat exhaustion because it will also include these two features: an elevated core body temperature > 104 (as measured by rectal thermometer - no other temperature device is reliable) and/or altered level of consciousness (confusion, combative, sluggish responses).
   a. Remove excess clothing.
   b. If equipment is available: Initiate aggressive cooling measures: ice bath immersion; cold bath immersion; hosing down with cold water and applying ice packs to axilla; applying/rotation/re-applying ice towels on as much surface area as possible; cold water shower.
   c. Delay transport only if equipment is available until initial cooling efforts have been done – 10 minutes or until rectal temperature is below 102. If a rectal thermometer is not available, then no other temperature device should be used and transport should occur after 10 minutes of cooling.
   d. If a Certified Athletic Trainer is on site and providing initial care/cooling techniques, assist the ATC and assess that proper cooling is being performed.
   e. Continue cooling efforts during transport: applying/rotating/re-applying ice towels; ice on and around patient and move ice towels constantly.
   f. En route, notify the receiving emergency department and advise them of an Exertional Heat Stroke and to prepare for rapid cooling.
   g. 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 SpO₂), slow the IV to KVO.
   h. Depending on cooling measures, place on cardiac monitor if able.

9. Perform reassessment as indicated.
Protocol 4.6 – ENVIRONMENTAL – HYPERTERMIA

Key Points: ENVIRONMENTAL – HEAT EXPOSURE

- Hyperthermia should be considered in any patient presenting with an altered level of consciousness who has been exposed to environmental heat. Hyperthermia is more likely in a humid environment. Children and the elderly are at increased risk. Blood pressure medications make people more vulnerable to heat. The prehospital goal is to reduce body temperature by transferring the patient to a cool environment and initiating cooling measures as indicated. Altered mental status is the hallmark of heat stroke. Any patient who develops altered mental status in a hot environment may have heat stroke.

- For Exertional Heat Illnesses (exhaustion/stroke) - the source of the excess heat is from both the inside and the outside (environment).

- Exertional Heat Exhaustion and Exertional Heat Stroke present with similar symptoms, and may include: confusion, altered mental status, dry or sweaty skin, headache, weakness, fatigue, dizziness, orthostatic vitals, nausea.

- Exertional Heat Stroke differs from environmental hyperthermia in that there is internal heat generation from the extreme exertion on the part of the athlete. Only core temperature measurements are sufficient to make clinical decisions.

- Ice bath emersion cooling is effective with exertional hyperthermia. This process may take up to 10-15 minutes as the body continues to generate internal heat for some time.

- Reflex vasoconstriction and shivering are not commonly seen in response to active and aggressive cooling measures for exertional heat illness.

- During cooling efforts for Exertional Heat Exhaustion/Stroke, transport should be delayed to perform active cooling since it cannot be done effectively during transport (except in the presence of an unmanageable airway).

- Rapid cooling is vital for the victim of heat stroke. If the victim’s body temperature is not quickly lowered, permanent brain damage may result.

- Thermometers are typically not used by EMS, however, they may be present where patients are being treated by Certified Athletic Trainers.

- Assess for hypoglycemia in all patients with altered mental status.
## Protocol 4.7

### ENVIRONMENTAL – HYPOTHERMIA

1. Perform general patient management (SECTION 1).


3. Administer oxygen as necessary.

4. **Hypothermia WITH a perfusing rhythm (pulse).**
   - a. Prevent additional evaporative heat loss by removing wet garments and insulating the victim from further environmental exposures.
   - b. Initiate passive rewarming with blankets, hypothermia kit¹ and a warm environment.
   - c. Perform procedures gently. These patients are prone to develop ventricular fibrillation.

5. **Hypothermia WITHOUT a perfusing rhythm (pulse).**
   - a. Initiate rewarming procedures as noted in step #3 above.
   - b. If no signs of life, begin CPR without delay.
   - c. If not breathing, start rescue breathing immediately. If possible, administer warmed, humidified oxygen.
   - d. Assess cardiac rhythm:
     - i. Attach AED. Defibrillation should be attempted. It may be reasonable to perform further defibrillation attempts according to the standard BLS algorithm.
     - ii. Attach cardiac monitor. Defibrillation should be attempted. It may be reasonable to perform further defibrillation attempts according to the standard BLS algorithm.
   - e. Secure airway with an endotracheal tube [INT, PM] or a supraglottic airway as recommended in the standard arrest algorithms.
   - f. Establish an IV of normal saline.
   - g. Administer epinephrine as recommended in the standard arrest algorithms.
   - h. Continue CPR and transport immediately.

6. Perform reassessment as indicated.
Protocol 4.7 – ENVIRONMENTAL – HYPOTHERMIA

Key Points: ENVIRONMENTAL – HYPOTHERMIA

- Severe hypothermia (body temperature less than 30°C [86°F]) is associated with marked depression of critical body functions that may make the victim appear clinically dead during the initial assessment. But in some cases hypothermia may exert a protective effect on the brain and organs in cardiac arrest. Intact neurologic recovery may be possible after hypothermic cardiac arrest. Lifesaving procedures should not be withheld on the basis of clinical presentation. Victims should be transported as soon as possible to a center where monitored rewarming is possible. Perform procedures gently. Hypothermic patients are prone to develop ventricular fibrillation.

- 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 compression is 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.

1 HYPOTHERMIA KITS

Hypothermia kits are used for the prevention of hypothermia during patient care. The typical kit provides a reinforced heat reflective shell to provide thermal insulation. The ideal shell provides access to the patient with minimal exposure to the elements and has a built-in hood. The kit should include a heat-generating shell liner designed for extended, continuous dry heat (no external power supply).
Protocol 4.8
INJURY – BITES AND ENVENOMATION – LAND

1. Perform general patient management (SECTION 1).


3. Administer oxygen as necessary.


5. Locate the fang marks and clean the site with soap and water. Note: There may be only one fang mark.

6. Remove any rings, bracelets, or other constricting items on the bitten extremity.

7. Keep any bitten extremities immobilized – the application of a splint will help. Keep the bite at the level of the heart. When not possible, keep the bite below the level of the heart.

8. **DO NOT** apply light constricting bands above and below the wound.

9. Every 15 minutes, use a pen to mark the border of the advancing edema and document the time.

10. Consult [Medical Control]. For serious envenomation, the patient may need to be transported or evacuated to a hospital with the appropriate antivenin.

11. If the snake is dead at the scene, transport it in a sealed container in the same vehicle as the patient. If the snake is live and captured, arrange for transport to the hospital in a separate vehicle. Do not transport a live snake in the ambulance.

12. Start an INT or IV of normal saline at KVO.

13. For signs and symptoms of shock, follow the SHOCK – HYPOVOLEMIA protocol.

14. Perform reassessment as indicated.

**Key Points: INJURY – BITES AND ENVENOMATION – LAND**

- 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 prehospital 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, and vomiting
  - Paresthesia (numbness, tingling)
  - Shock
Protocol 4.9
MEDICAL - HYPERGLYCEMIA

1. Perform general patient management (SECTION 1).
3. Assess for signs of trauma. Provide spinal immobilization as necessary.
4. Administer oxygen 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.

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 prehospital 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. Capnography in conjunction with clinical assessment may be predictive of DKA.
## Protocol 4.10

### MEDICAL – HYPOGLYCEMIA

1. Perform general patient management ([SECTION 1](#)).
   - **EMR**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **EMT**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **AEMT**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **INT**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **PM**: ⬤ ⬤ ⬤ ⬤ ⬤

   - **EMR**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **EMT**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **AEMT**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **INT**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **PM**: ⬤ ⬤ ⬤ ⬤ ⬤

3. Assess for signs of trauma. Provide spinal immobilization as necessary.
   - **EMR**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **EMT**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **AEMT**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **INT**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **PM**: ⬤ ⬤ ⬤ ⬤ ⬤

4. Administer oxygen as necessary.
   - **EMR**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **EMT**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **AEMT**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **INT**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **PM**: ⬤ ⬤ ⬤ ⬤ ⬤

5. For altered mental status or clinical signs/symptoms suggestive of hypoglycemia, perform rapid glucose determination.
   - **EMR**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **EMT**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **AEMT**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **INT**: ⬤ ⬤ ⬤ ⬤ ⬤
   - **PM**: ⬤ ⬤ ⬤ ⬤ ⬤

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** 15 grams. Repeat in 15 minutes if necessary.

7. If glucose less than 60 mg/dL or clinical signs and symptoms indicate hypoglycemia and oral glucose is contraindicated:
   a. Establish an IV of normal saline at KVO.
   b. **Patient > 5 years old**: Give **DEXTROSE** 50% 1 g/kg up to 25 g IV. Repeat once in 2 minutes if altered mental status persists.
   c. **Child < 5 years old**: Give **DEXTROSE** 25% 0.5 g/kg up to 25 g IV. Repeat once in 2 minutes if altered mental status persists.
   d. **Neonate (< 28 days old)**: Give **DEXTROSE** 10% 0.5 g/kg (5 mL/kg).

8. If glucose less than 60 mg/dL or clinical signs and symptoms indicate hypoglycemia and an IV is not available, give **GLUCAGON** 1 mg IM.

9. For signs and symptoms of hypovolemic shock or dehydration, follow the [SHOCK – HYPOVOLEMIA](#) protocol

10. Place on cardiac monitor.

11. Transport as soon as possible.

12. Perform reassessment as indicated.

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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 prehospital 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. Local protocol course training is required for an EMT to administer glucagon. Glucagon may be obtained from the STT box (or CT box if STT box not available).

- Glucometer reminders:
  - Use antiseptic 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).
3. Administer oxygen 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 or 4 mg ODT/SL tablet (may repeat in 10 minutes if needed).
8. Perform reassessment as indicated.

Key Points: NAUSEA – VOMITING

- Nausea and vomiting are frequently associated with many conditions including obstruction and distention of the stomach and intestines, motility disorders, irritation and inflammation of the peritoneum, drug overdose, acute myocardial infarction, increased ICP, as well as many other conditions including motion sickness related to flying. Never give promethazine if there is a concern for altered mental status.
Protocol 4.12

OB/GYN – CHILDBIRTH/LABOR/DELIVERY

1. Perform general patient management (SECTION 1).
2. Administer oxygen 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 30 seconds in term and preterm infants not requiring resuscitation. Apply the first clamp approximately 4 inches from newborn and the second clamp approximately 6 inches from the newborn.
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.
Key Points: OB/GYN – CHILDBIRTH/LABOR/DELIVERY

- Normal labor and delivery should pose no problems for the prehospital provider. The prehospital 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

OBSTETRICS – CARE OF THE NEWBORN

1. If the newborn does not cry, rub the back and begin drying.
2. **Ensure preservation of newborn warmth.**
3. If newborn does not cry, has central cyanosis or heart rate less than 100, see [OBSTETRICS – NEWBORN/NEONATAL RESUSCITATION](#).
4. Complete drying of the newborn, wrap in a dry towel and apply head cover. Keep the newborn warm.
5. Record the newborn’s APGAR scores at 1 and 5 minutes after delivery.
6. Check the umbilical cord for bleeding. If necessary, place an additional clamp.
7. Breastfeeding may begin. Keep the newborn warm.
8. Resume transport as soon as feasible.

### THE APGAR SCORE

<table>
<thead>
<tr>
<th>Element</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance (Skin color)</td>
<td>Body and extremities blue, pale</td>
<td>Body pink, extremities blue</td>
<td>Completely pink</td>
</tr>
<tr>
<td>Pulse rate</td>
<td>Absent</td>
<td>Below 100/min</td>
<td>100/min or above</td>
</tr>
<tr>
<td>Grimace (Irritability)</td>
<td>No response</td>
<td>Grimace</td>
<td>Cough, sneeze, cry</td>
</tr>
<tr>
<td>Activity (Muscle tone)</td>
<td>Limp</td>
<td>Some flexion of extremities</td>
<td>Active motion</td>
</tr>
<tr>
<td>Respiratory effort</td>
<td>Absent</td>
<td>Slow and irregular</td>
<td>Strong cry</td>
</tr>
</tbody>
</table>

**Total Score =**
Protocol 4.14
MEDICAL – NEWBORN/NEONATAL RESUSCITATION

1. Rub the newborn’s back vigorously. Simultaneously begin drying and warming measures. 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. For newborns born through meconium-stained amniotic fluid presenting with poor muscle tone and inadequate breathing efforts, positive pressure ventilation (PPV) should be initiated if the infant is not breathing or the heart rate is less than 100/min after the initial steps are completed.

   NOTE: Intubation for tracheal suctioning (meconium aspiration) is no longer permitted.

3. KEEP THE NEWBORN WARM AND DRY.

4. Evaluate respirations, heart rate (apical pulse or pulse at the base of the umbilical cord), skin color and oxygen saturation.

5. If HR less than 100 bpm, gasping or apnea:
   a. Properly position newborn; do not hyperextend the neck. Initiate PPV with room air or blended oxygen. Titrate the oxygen concentration to achieve a SpO₂ in the target range listed in Table 4.14.1, Targeted preductal SpO₂ after birth.
   b. Deliver 40 to 60 breaths per minute. Use only enough volume to make the newborn’s chest rise.
   c. Reassess of ventilatory interventions if HR remains less than 100 bpm.

6. If labored breathing or persistent cyanosis:
   a. Properly position newborn; do not hyperextend the neck. Clear the airway.
   b. Initiate resuscitation with room air or blended oxygen by blow-by. Titrate the oxygen concentration to achieve a SpO₂ in the target range listed in Table 4.14.1, Targeted preductal SpO₂ after birth.

7. If HR less than 60 bpm after 30 seconds of positive-pressure ventilation:
   a. Initiate chest compressions at a rate of 120/min 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 a supraglottic airway if available.

CONTINUED ON NEXT PAGE
Protocol 4.14 - MEDICAL – NEWBORN/NEONATAL RESUSCITATION

8. If HR remains less than 60 bpm despite positive-pressure ventilation and chest compressions:
   a. Establish IV/IO access.
   b. Give **EPINEPHRINE 1:10,000** 0.01 mg/kg IV/IO (0.1 mL/kg).
   c. Repeat epinephrine every 3 to 5 minutes if HR remains less than 60 bpm.
   d. Consider **DEXTROSE 10%** 0.5 g/kg (5 mL/kg).
   e. Consider 10 mL/kg normal saline. Administer fluid bolus using a syringe and a three-way stopcock.

<table>
<thead>
<tr>
<th>EMR</th>
<th>EMT</th>
<th>AEMT</th>
<th>INT</th>
<th>PM</th>
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**Key Points: MEDICAL – NEWBORN/NEONATAL RESUSCITATION**

- 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 10% and adjust accordingly.

- If a diaphragmatic hernia is suspected, place an orogastric tube and apply low, intermittent suction.
Protocol 4.14 – MEDICAL – NEWBORN/NEONATAL RESUSCITATION

Term gestation? Breathing or crying? Good tone?

- Yes, stay with mother
- No

Warm, clear airway if necessary, dry, stimulate

HR below 100, gasping or apnea?

- Yes
- No

Positive pressure ventilation (PPV), SpO₂ monitoring

HR below 100?

- Yes
- No

Take ventilation corrective steps

HR below 60?

- Yes
- No

Consider supraglottic airway
Chest compressions
Coordinate with PPV

Consider:
- Hypovolemia
- Pneumothorax

Take ventilation corrective steps

HR below 60?

- Yes
- No

IV epinephrine

Routine care
- Provide warmth
- Clear airway if necessary
- Dry
- Ongoing evaluation

Labored breathing or persistent cyanosis?

- Yes
- No

Clear airway SpO₂ monitoring

Postresuscitation care

Targeted preductal SpO₂ after birth

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>SpO₂ (%)</th>
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<tbody>
<tr>
<td>1</td>
<td>60-65%</td>
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<tr>
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<td>75-80%</td>
</tr>
<tr>
<td>5</td>
<td>80-85%</td>
</tr>
<tr>
<td>10</td>
<td>85-95%</td>
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</table>
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.
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.

Key Points: OB/GYN – PREGNANCY RELATED EMERGENCIES

- **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 prehospital setting. Rapid transport is essential to the baby’s survival.
Protocol 4.16

GENERAL – PAIN CONTROL

1. Perform general patient management (SECTION 1).


3. Administer oxygen as necessary.

4. For pain associated with a specific protocol (i.e. Medical - Chest Pain, Injury Burns, Injury – Crush Syndrome, Intraosseous Insertion – EZ-IO®), refer to the appropriate protocol.

5. Assess pain severity. Use a combination of a pain scale, circumstances of the event, mechanism of injury and the severity of the injury or illness.

6. Place patient in position of comfort. Employ non-pharmacological interventions such as splinting or cold therapy for joint/isolated trauma.

7. Establish an INT or IV of normal saline at KVO.


9. Give FENTANYL 1 mcg/kg up to 100 mcg IM or IV over 1 to 2 minutes. Titrate to effect. If needed, repeat every 5 minutes. Do not exceed 3 mcg/kg.

   • [Age >65 years] 0.5 mcg/kg up to 50 mcg IM or IV over 1 to 2 minutes. Titrate to effect. If needed, repeat every 5 minutes. Do not exceed 3 mcg/kg.

   • [Intranasal] 1.5 mcg/kg up to 100 mcg IN (½ volume in each nostril). Repeat every 10 minutes. Do not exceed 3 mcg/kg.

10. Consider cardiac monitor.

11. NOTE: Consider ondansetron as a prophylactic adjunct to prevent nausea and vomiting when administering narcotic analgesics.

   Give ONDANSETRON 0.1 mg/kg IV up to 4 mg over 2 to 5 minutes. May repeat once in 5 minutes if needed. IV: Give 0.1 mg/kg up to 4 mg over 2 to 5 minutes. May repeat once in 5 minutes if needed.

   • [IM] Give 0.1 mg/kg up to 4 mg IM. Do not repeat.

   • [ODT/SL] Give 4 mg tablet ODT/SL. May repeat once in 10 minutes if needed.

12. Consider KETAMINE for pain augmentation (if pain persists after second dose of first line analgesic is given): Give 0.15 mg/kg IM. May repeat as needed every 20 to 30 minutes to a maximum of three doses. Contact [Medical Control] for additional dosing.
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.

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.

Key Points: AIRWAY – OBSTRUCTION/FOREIGN BODY

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.

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.

Key Points: AIRWAY – OBSTRUCTION/FOREIGN BODY
• BLS providers should request ALS assistance if BLS maneuvers do not clear the airway.
Protocol 4.18
RESPIRATORY DISTRESS – ASTHMA/COPD

1. Perform general patient management (SECTION 1).
3. Administer oxygen. Titrate oxygen to minimum necessary to achieve \(\text{SpO}_2 \geq 94\%\).
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 \([\text{INT, PM}]\) or a supraglottic airway.

For patients in respiratory distress:
9. Give ALBUTEROL 2.5 mg and IPRATROPIUM 500 mcg 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 every 10 minutes 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 or if symptoms persist, give METHYLprednisolone 2 mg/kg up to 125 mg IV over 1 to 2 minutes or IM.
12. Administer CPAP with 5-10 cmH2O PEEP (do not use for ASTHMA patient).
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 0.5 mg (adult) or up to 0.3 mg (child) IM in the patient with a known history of asthma.
14. Place on cardiac monitor.
15. Perform reassessment as indicated.
Protocol 4.18 – RESPIRATORY DISTRESS – ASTHMA/COPD

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 prehospital 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 prehospital 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.

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).
3. Administer humidified oxygen as necessary.
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 child 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\(^1\) (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.

\(^1\) The preferred dose is 3 mg; however, only 2 mg is available in a STT box.

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Key Points: RESPIRATORY DISTRESS – COPD

- 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.
Protocol 4.20
MEDICAL – PULMONARY EDEMA / CHF

Pulmonary edema with SBP greater than or equal to 100 mmHg
If SBP less than 100 mmHg, see SHOCK – NON-HYPOVOLEMIA protocol.

1. Perform general patient management (SECTION 1).
3. Administer oxygen as necessary. Consider supporting respirations with a BVM.
4. Transport the patient immediately positioned in an upright position.
5. Monitor pulse oximetry.
6. Monitor capnography, if available.
7. Place patient on cardiac monitor.
8. Establish an INT or IV of normal saline at KVO.
   a. SBP greater than 180: Give NITROGLYCERIN, 2 tablets, 0.4 mg SL and 2 inches of NITROPASTE 2%. If respiratory distress persists and SPB greater than 180 and HR greater than or equal to 60 bpm, repeat nitroglycerin, 2 tablets SL every 3 minutes.
   b. SBP 100 – 180: Give NITROGLYCERIN, 1 tablet, 0.4 mg SL and 1 inch of NITROPASTE 2%. If respiratory distress persists and SPB greater than or equal to 100 and HR greater than or equal to 60 bpm, repeat nitroglycerin, 1 tablet SL every 5 minutes.
10. Administer CPAP with 5-10 cmH₂O PEEP.
11. Perform reassessment as indicated.
Protocol 4.20 – MEDICAL – PULMONARY EDEMA / CHF

Key Points: MEDICAL – 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 prehospital goal is to maintain proper patient positioning, oxygenation, provide assisted ventilation if necessary and initiate drug therapy to reduce the amount of fluid in the lungs and improve gas exchange and heart function.

- BLS providers should consider 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 – SEIZURE

1. Perform general patient management (SECTION 1).

   a. Suction the oro- and nasopharynx as necessary.
   b. Place a nasopharyngeal airway as necessary.

3. Administer oxygen 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 MIDAZOLAM 5 mg slow IV push. Repeat dose in 5 minutes if seizure persists. Alternatively, midazolam may be given as follows.
   a. 0.25 mg/kg up to 5 mg IN, titrated to effect.
   b. 5 mg IM. Repeat dose in 5 minutes if seizure persists.

8. Place patient on cardiac monitor (sometime life-threatening dysrhythmias can cause seizure-like activity).

9. Consider placing the patient in the recovery position during the postictal period.

10. Perform reassessment as indicated.

For seizures due to THIRD TRIMESTER ECLAMPSIA:

11. Perform steps 1 through 5.

12. Place the patient on left side and transport.

13. Establish an INT or IV of normal saline at KVO.


15. If seizure persists, give MAGNESIUM SULFATE 4 g [20% solution 20 mL] IV over 4 minutes.
   a. Repeat dose (if available) in 5 minutes if seizure persists [Medical Control].

16. Perform reassessment as indicated.
Protocol 4.21 – SEIZURES

**Key Points: MEDICAL – SEIZURE**

- 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 prehospital 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 benzodiazepines.
Protocol 4.22

SHOCK – HYPOVOLEMIA

1. Perform general patient management (SECTION 1).


3. Initiate **BLEEDING / HEMORRHAGE CONTROL**.

4. Assess for signs of shock including, but not limited to:
   - Restlessness, altered mental status, hypoperfusion (cool, pale, moist skin), tachypnea (rapid breathing), rapid, weak pulse, orthostatic hypotension (blood pressure suddenly drops on standing up), nausea and thirst.

5. Administer oxygen via non-rebreather mask at 10-15 L/min. as necessary. **Oxygen administration should not be determined by oxygen saturation.** Support respirations as necessary with a BVM.

6. Transport as soon as possible.

7. Place patient in a supine position unless head injury is suspected. If pregnant (uterine fundus above umbilicus), place the patient on her left side.

8. **Remove all clothing. Maintain body temperature by protecting the patient from the environment, removing wet clothing and covering the patient with a blanket or utilizing a hypothermia kit.**

9. Establish an IV or IO of normal saline.
   a. Adults: 14 or 16 gauge IV catheter.
   b. Children: 18 or 20 gauge IV catheter.
   c. **Do not delay transport to establish vascular access.**

10. Give fluid amounts as listed below. While administering a fluid bolus, **frequently reassess perfusion for improvement.** If perfusion improves, slow the IV to KVO and monitor closely. If patient develops fluid overload respiratory distress (dyspnea, crackles, rhonchi, decreasing SpO₂), slow the IV to KVO.
   a. **ADULTS**: Give a 20 mL/kg bolus. If no improvement after one 20 mL/kg bolus, contact [Medical Control] for direction.
   b. **CHILDREN**: Give a 20 mL/kg bolus. If no improvement after one 20 mL/kg bolus, contact [Medical Control] for direction.
   c. **NEONATES**: Give a 10 mL/kg bolus. If no improvement after one 10 mL/kg bolus, contact [Medical Control] for direction.

11. If severe bleeding is suspected, but the patient is not presenting with signs of shock, start an IV of normal saline and contact [Medical Control] for an IV flow rate.

12. Perform reassessment as indicated.
Protocol 4.22 – SHOCK – HYPOVOLEMIA

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 prehospital 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).
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 100 mmHg), and lowered oxygen saturation on pulse oximetry.
4. Administer oxygen as necessary. Support respirations as necessary with a BVM.
5. Transport as soon as possible.
6. Place patient in a supine position if respiratory effort is not compromised.
7. Start an IV of normal saline.
8. If breath sounds are clear, heart rate is between 60–150, SBP less than 90, 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 SpO2), slow the IV to KVO.
9. If perfusion does not improve with fluid boluses or if pulmonary edema is present prohibiting administration of fluid and SBP less than 90:
   a. Give a DOPAMINE infusion at 5–20 mcg/kg/min IV. Titrate to SBP = 100.
10. Perform reassessment as indicated.
Protocol 4.23 – SHOCK – NON-HYPOVOLEMIA (CARDIOGENIC)

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 prehospital 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 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 100 mmHg, see the RESPIRATORY DISTRESS – PULMONARY EDEMA (CHF) protocol.
Protocol 4.24
SEPTIC SHOCK

1. Perform general patient management (SECTION 1).


3. Administer oxygen via non-rebreather mask at 10-15 L/min. as necessary. Consider supporting respirations with a BVM.

4. Transport the patient in semifowler's or other appropriate position.

5. Monitor vital signs.

6. Obtain 12-lead ECG and transmit to receiving facility if capable.

7. Monitor capnography.

8. Notify Emergency Department of “SEPSIS ALERT.”

9. Start an IV of normal saline.

10. For hypotension with a MAP <65 mmHg, infuse 20 mL/kg. If MAP is < 65 mmHg after one bolus, contact [Medical Control] for direction on additional fluid boluses.
   a. [Advanced EMT] For hypotension with SBP < 100 mmHg, infuse 20 mL/kg. If SBP is < 100 mmHg after one bolus, contact [Medical Control] for direction on additional fluid boluses.

11. Perform reassessment as indicated.

Key Points: MEDICAL – SEPTIC SHOCK

- Septic shock is tissue hypoperfusion caused by proliferation of bacteria and other infectious particles in the blood. The immune response to the infection induces vasodilation, increased capillary permeability, and intravascular coagulation, which result in hypotension, metabolic acidosis (increased serum lactate > 2.0 mmol/L), and multi-organ dysfunction.

- Suspect septic shock in any patient with suspected infection and any of the following:
  o Altered mental status
  o Tachypnea (Respiratory rate >20 breaths/min)
  o Heart rate >90 beats/min or age specific tachycardia
  o Hypotension with MAP < 65
  o ETCO₂ <25 mmHg
  o Fever >100.4°F (38.0°C) or hypothermia <96.8°F (36.0°C)

- If SEPTIC SHOCK is suspect, immediately notify receiving facility of “SEPSIS ALERT.”

- Sepsis may lead to acute respiratory distress syndrome (ARDS), which is inflammation and permeability of the alveolar capillary membrane. ARDS is a cause of pulmonary edema and respiratory failure. Positive End Expiratory Pressure (PEEP) can be used FOR ARDS patients to improve ventilation and oxygenation. PEEP is administered via Protocol 5.2 - CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) and properly equipped BVMs. PEEP is contraindicated if systolic BP is <100 mmHg.

- Early and aggressive isotonic crystalloid fluid resuscitation is critical in septic shock management. Titrate fluids to maintain MAP ≥65 mmHg (I / P) or SBP > 100 mmHg (AEMT).
Protocol 4.25

INJURY – SPINAL CORD INJURY

1. Perform general patient management (SECTION 1).
2. Provide manual in-line stabilization of the head and neck.
3. Apply the Selective Spinal Immobilization procedure. If spinal immobilization is indicated, proceed to step 4.
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.

* Spinal immobilization may be performed by an Emergency Medical Responder if the provider has received specific training on the procedure and authorization from the agency operational medical director.
Protocol 4.25 – GENERAL – SPINAL IMMOBILIZATION/CLEARANCE

EMS providers may withhold spinal immobilization if the following algorithm is applied and the end-point is “Consider no immobilization.”

**Potential for unstable spinal injury**

**ASSESS ALL THREE CRITERIA:**

1) **Reliable patient?**
   - A reliable patient provides trustworthy answers during an assessment and examination
   
   **AND**

2) **Normal spine exam?**
   - Palpate vertebral column thoroughly for pain or tenderness
   
   **AND**

3) **Normal motor/sensory exam?**
   - Wrist or finger extension (both hands)
   - Plantarflexion (both feet)
   - Dorsiflexion (both feet)
   - Check gross sensation in all extremities
   - Check for abnormal sensations to extremities (e.g. paresthesia)

**NO for one or more criteria**

**YES for all three criteria**

**IMMOBILIZE Patient**

**NO immobilization**

**Key Points: SPINAL IMMOBILIZATION**

- If the immobilization process is initiated prior to assessment, STOP and perform spine injury assessment to determine best course of action.
- Studies show that immobilizing trauma victims may cause more harm than good to the patient. Penetrating trauma victims benefit most from rapid assessment and transport to a trauma center without spinal immobilization.

**Penetrating trauma:**

Victims of penetrating trauma (stabbings, gunshot wounds) to the head, neck, and/or torso **SHOULD NOT** receive spinal immobilization in favor of rapid transport, hemorrhage control, airway management, ventilatory support, prevention of hypothermia, etc.
Protocol 4.26
MEDICAL – ST ELEVATION MYOCARDIAL INFARCTION (STEMI)

1. Perform general patient management (SECTION 1).


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 mmHg, 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. Apply defibrillation electrodes 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.
Protocol 4.26 – MEDICAL – ST ELEVATION MYOCARDIAL INFARCTION (STEMI)

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 prehospital 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 4.27
MEDICAL – STROKE/TIA

1. Perform general patient management (SECTION 1).


3. Administer oxygen for patients experiencing respiratory distress or titrate oxygen to minimum necessary to achieve SpO₂ ≥94%.

4. Determine time last seen normal AND time of onset of signs and symptoms. (See key points)

5. Perform Cincinnati Prehospital Stroke Scale evaluation. If positive, perform VAN Stroke Assessment.

6. Perform rapid glucose determination. If glucose less than 60 mg/dL or clinical signs and symptoms indicate hypoglycemia, refer to the HYPOGLYCEMIA protocol.

7. Position patient with head elevated 30° unless the patient shows signs or symptoms of hypoperfusion.

8. *Report “Stoke Alert” to the receiving hospital as early as possible.* Ensure hospital is notified of the time last seen normal AND time of onset of signs and symptoms. Scene time should be less than 10 minutes.

9. Establish an INT or IV of normal saline at KVO. Unless the patient is hypotensive (SBP <90 mm Hg), intervention for blood pressure is not recommended. It is preferred to establish bilateral INT or IV when possible but do not delay transport.

10. Place patient on cardiac monitor.

11. Transport to closest appropriate facility (i.e. Comprehensive Stroke Center, Primary Stroke Center or a stroke-ready hospital that employs the use of telemedicine).

12. If the VAN Stroke Assessment is positive and if the transport time is greater than 30 minutes, consider rendezvous with air medical support. Do not delay patient transport.

13. IMPORTANT: Ensure that a witness accompanies the patient to the hospital/LZ or a contact telephone number for the witness is secured for the hospital. *Record the time last seen normal and witness telephone number on the patient’s forearm.*

14. Perform reassessment as indicated.
## Cincinnati Prehospital Stroke Scale / FAST exam

<p>| | |</p>
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</table>
| **F**-(face) | **FACIAL DROOP:** Have patient smile or show teeth. (Look for asymmetry)  
**Normal:** Both sides of the face move equally or not at all.  
**Abnormal:** One side of the patient's face droops. |
| **A**-(arm) | **MOTOR WEAKNESS:** Arm drift (close eyes, extend arms, palms up)  
**Normal:** Remain extended equally, drifts equally, or does not move at all.  
**Abnormal:** One arm drifts down when compared with the other. |
| **S**-(speech) | **"You can't teach an old dog new tricks."** (repeat phrase)  
**Normal:** Phrase is repeated clearly and correctly.  
**Abnormal:** Words are slurred (dysarthria) or abnormal (aphasia) or none. |
| **T**-Time | Time **last seen normal:** ___________________________  
Time of **Symptom onset:** ___________________________  
*If any Cincinnati criteria are positive, perform VAN assessment* |

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### VAN Assessment

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### VISION

Provider holds up 2 fingers to the right and 1 finger to left while patient stares at provider’s nose. *(Left and Right Visual Fields)*

<table>
<thead>
<tr>
<th>Can patient correctly identify number of fingers on both sides?</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
</table>

Ask the patient to look to the left and right one or more times. *(Double Vision - equal eye movement)*

<table>
<thead>
<tr>
<th>Do both eyes move at the same speed and same direction?</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
</table>

### APHASIA

Show patient 2 commons objects (i.e. pen, clothing) and ask patient to verbally identify objects. *(Produce Language)*

<table>
<thead>
<tr>
<th>Can patient verbally and correctly identify both objects?</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
</table>

*Ignore slurred speech*

Ask the patient to follow 2 simple commands (i.e. blink and make a fist). *(Comprehend Language)*

<table>
<thead>
<tr>
<th>Can patient follow both commands?</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
</table>

### NEGLECT

Ask patient to follow your finger with only their eyes from far left to far right. *(Forced Gaze / Inability to Track to One Side)*

<table>
<thead>
<tr>
<th>Can patient track your finger?</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
</table>

Ask the patient to close their eyes with arms by their side. Begin brushing patient’s forearms simultaneously down towards their hands with your fingers and ask, “Which arm am I touching?” *(Equal Arm Sensation)*

<table>
<thead>
<tr>
<th>Can patient feel both arms at same time?</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
</table>

Observe if the gazes or turns to only one side or does not react to stimuli on one side (i.e. does not turn to face someone or does not seem to hear from one side). *(Ignoring One Side)*

| Can patient freely look, move, and react to stimuli on both sides? | YES | NO |

*If “NO” to any one of the above: Notify receiving facility of “stroke alert with positive VAN test.”*
Key Points: MEDICAL – STROKE/TIA

- The VAN Stroke Assessment evaluates for large vessel occlusions (LVO) by identifying visual disturbance, aphasia, and/or neglect. LVO strokes should be suspected when any of these symptoms as well as arm drift are present. Current guidelines propose that LVO strokes are best managed at Comprehensive Stroke Centers with 6 hours of symptom onset. Primary Stroke Centers and “stroke-ready” hospitals still render critical treatment and diagnostic tests and are the appropriate destination if the transport time is within 30 minutes. Recognizing and reporting a positive VAN Assessment and an accurate time of symptom onset to the receiving facility can expedite the patient receiving optimal definitive care and is the most important part of prehospital stroke management.

- The Attendant-In-Charge should provide their contact information to the receiving facility for any follow-up needed following transfer of care.

- Record time of onset of symptoms **on the patient**. Consider recording information on tape and affixing to patient’s forearm.

- If patient woke up with stroke symptoms, report a “wake-up stroke,” to the receiving facility ASAP and obtain accurate times that the patient went to sleep and woke up.

Local variance: In some circumstances, transporting to a “stroke-ready” hospital may be appropriate. Hospital should conduct telemedicine and administer Alplatase/tPa.
4.28.1
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).


4. Administer oxygen 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.

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:
  - 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 rescuer and patient; appropriate scene management and decontamination are critical.
4.28.2

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, give MIDAZOLAM 5 mg slow IV push. Repeat dose in 5 minutes if seizure persists. Alternatively, midazolam may be given as follows.
   a. 0.25 mg/kg up to 5 mg IN, titrated to effect.
   b. 5 mg IM. Repeat dose in 5 minutes if seizure persists.

7. Perform reassessment as indicated.

Key Points: ALCOHOL INTOXICATION / WITHDRAWAL

- Emergencies involving alcohol can range from acute intoxication to alcohol withdrawal and delirium tremens (DT's).
- Acute intoxication causes behavioral changes and can cause respiratory depression, particularly if other sedative drugs are involved.
- The possibility of another illness (diabetes/hypoglycemia) or injury (head injury) must always be considered.
- Alcohol withdrawal symptoms can range from tremor and nervousness, sweating, tachycardia and hypertension, to hallucinations, bizarre or violent behavior and seizures. The timing of symptoms usually peaks about 48 hours after the last drink, but vary widely, and symptoms can occur with some alcohol in the patient's bloodstream.
- True alcohol withdrawal can represent a medical emergency, particularly in patients with other illnesses.
4.28.3 MEDICAL – OVERDOSE/POISONING/TOXIC INGESTION
NARCOTICS / OPIATES

1. Perform general patient management (SECTION 1).


3. Administer 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, give NALOXONE:
   a. 0.1 mg/kg up to 2 mg IV at 0.4 mg/min. Halt the IV injection if respiratory effort improves or agitation occurs, or
   b. 0.1 mg/kg up to 2 mg IN (½ volume in each nostril), or
   c. 0.1 mg/kg up to 2 mg IM.
   d. [EMT] 2 mg IM for patient weighing 20 kg or more.

7. For signs and symptoms of shock, follow the SHOCK – HYPOVOLEMIA protocol.

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

1. Perform general patient management (SECTION 1).


3. Administer oxygen as necessary. Support respirations as necessary with a BVM.

4. Follow HYPOGLYCEMIA protocol for administration of dextrose.

Key Points: ORAL HYPOGLYCEMIC AGENTS

- Oral hypoglycemic agents include: acarbose (Prandase, Precose), acetohexamide (Dymelor), chlorpropamide (Diabinese), glimepiride (Amaryl), glipizide (Glucotrol, Glucotrol XL), glyburide or glibenclamide (DiaBeta, Glynase, Micronase), metformin (Glucophage), miglitol (Glyset), phenformin, pioglitazone (Actos), rosiglitazone (Avandia), repaglinide (Prandin), tolazamide (Tolinase), tolbutamide (Orinase), troglitazone (Rezulin).
4.28.5
MEDICAL – OVERDOSE/POISONING/TOXIC INGESTION
TRICYCLIC ANTIDEPRESSANTS

1. Perform general patient management (SECTION 1).
3. Administer oxygen 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 SpO2), 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.

Key Points: TRICYCLIC ANTIDEPRESSANT

- Tricyclic antidepressants include: amitriptyline (Elavil), amoxapine (Asendin), clomipramine (Anafranil), doxepin (Sinequan, Adepin), imipramine (Tofranil) and nortriptyline (Aventyl, Pamelor).
4.28.6

EXPOSURE – NERVE AGENTS

CHOLINERGICS

1. Ensure personal safety before attempting to provide patient care.
2. Perform general patient management (SECTION 1).
4. Administer oxygen 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. Give ATROPINE 2 mg IV. Repeat every 5 minutes if needed.

Key Points: CHOLINERGICS

- Pesticides (organophosphates, carbamates) and nerve gas agents (sarin, soman) are the most common exposures.

<table>
<thead>
<tr>
<th>Key Points</th>
<th>EMR</th>
<th>EMT</th>
<th>AEMT</th>
<th>INT</th>
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<tbody>
<tr>
<td>S – Salivation</td>
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<tr>
<td>L – Lacrimation</td>
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<td>U – Urination</td>
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<tr>
<td>D – Defecation</td>
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<tr>
<td>G – Gastrointestinal cramping</td>
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<tr>
<td>E – Emesis</td>
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4.28.7
MEDICAL – OVERDOSE/POISONING/TOXIC INGESTION
CALCIUM CHANNEL BLOCKERS

1. Perform general patient management (SECTION 1).
3. Administer oxygen 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, slurred speech, nausea/vomiting):
4. Give ATROPINE 1 mg IV.
5. If no response to the initial atropine dose, consider CALCIUM CHLORIDE 8 mg/kg of 10% solution IV over 5 minutes [Medical Control].
   a. If no response, repeat calcium chloride dose in 10 minutes [Medical Control].

Key Points: CALCIUM CHANNEL BLOCKERS

- Calcium channel blockers include: verapamil (Calan, Isoptin), nifedipine (Procardia, Procardia XL, Adalat, Adalat CC), nicardipine (Cardene, Carden SR), nimodipine (Nimotop), nitrendipine, isradipine (DynaCirc, DynaCirc SR), amlodipine (Norvase), felodipine (Plendil), and nisoldipine (Sular), diltiazem (Cardizem, Cardizem CD, Cardizem SR, Dilacor XR, Tiamate, Teczem, and Tiazac), bepridil (Vascor).
4.28.8

MEDICAL – OVERDOSE/POISONING/TOXIC INGESTION

STIMULANTS

1. Perform general patient management (SECTION 1).
3. Administer oxygen as necessary. Support respirations as necessary with a BVM.

**Serious signs and symptoms** (seizures; tachycardia with hypertension)

4. For seizures, follow the **SEIZURE** protocol.
5. For tachycardia with HR greater than 120 bpm AND MAP greater than 120 mmHg, give **MIDAZOLAM** 5 mg slow IV push. Repeat dose in 5 minutes if symptoms persists. Alternatively, midazolam may be given as follows.
   a. 0.25 mg/kg up to 5 mg IN, titrated to effect.
   b. 5 mg IM. Repeat dose in 5 minutes if symptoms persists.

---

**Key Points: COCAINE / METHAMPHETAMINE**

- **Common stimulant drugs may include:**
  - Amphetamine (Biphetamine, Dexedrine, black beauties, crosses, hearts)
  - Cocaine (coke, crack, flake, rocks, snow)
  - Methamphetamine (Desoxyn, crank, glass, ice, speed)
  - Methylphenidate (Ritalin)
  - Methylenedioxyamphetamine (MDA, Adam)
  - Methylenediooxymethamphetamine (MDMA, Eve, Ecstasy)
  - Methylenedioxypyrovalerone (bath salts, Ivory Wave, Ivory Coast, purple wave, vanilla sky)
4.28.9

EXPOSURE - CYANIDE

1. Perform general patient management (SECTION 1).


3. Administer oxygen 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. Give Cyanokit® 5 g of HYDROXOCOBALAMIN IV, infused over 15 minutes. Note: Pediatric dose is 70 mg/kg.

5. 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.

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**Key Points: CYANIDE POISONING / CYANOKIT®**

- Signs and symptoms of cyanide poisoning include headache, confusion, dyspnea, chest tightness, nausea, altered mental status, seizures, coma, mydriasis, hypertension (early), hypotension (late), tachypnea (early), bradypnea (late), cardiovascular collapse and vomiting.

- Preparation and Administration Instructions
  1. **Reconstitute:** Place the vial in an upright position. Add 200 mL of 0.9% Sodium Chloride (not included) to the vial using the transfer spike. Fill to the line.
  2. **Mix:** The vial should be repeatedly inverted or rocked, not shaken, for at least 60 seconds prior to infusion. CYANOKIT solutions should be visually inspected for particulate matter and color prior to administration. Discard solution if particulate matter is present or solution is not dark red.
  3. **Infuse Vial:** Use vented intravenous tubing, hang and infuse over 15 minutes.

- 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 4.29
INJURY – BLEEDING / HEMORRHAGE CONTROL

1. Perform general patient management (SECTION 1).
2. Administer oxygen as necessary. Oxygen administration should not be determined by oxygen saturation. Support respirations as necessary with a BVM.

PATIENTS WITH EXTERNAL HEMORRHAGE:
3. STOP MAJOR HEMORRHAGE IMMEDIATELY! Go directly to a tourniquet if needed.
4. With a gloved hand, apply direct pressure with a dressing to the site of bleeding.
5. If bleeding, expose the wound and place digital pressure with a gloved hand on the site of bleeding.
6. If bleeding persists, consider application of a TOURNIQUET or the use of a HEMOSTATIC DRESSING.

7. Once bleeding is controlled, bandage the dressing in place, maintaining pressure on the wound.

PATIENTS WITH SUSPECTED INTERNAL HEMORRHAGE:
8. For suspected internal hemorrhage with signs of shock, consider administration of TRANEXAMIC ACID. See the Tranexamic Acid formulary for indications, contraindications, and directions for administration.

ALL PATIENTS WITH HEMORRHAGE:
9. Assess for signs of shock. If shock is suspected, follow the SHOCK – HYPOVOLEMIA protocol.
10. Perform reassessment as indicated.

Key Points: INJURY – BLEEDING / HEMORRHAGE CONTROL
- 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.
- Chitosan is a polysaccharide that aggregates red blood cells via an electrostatic charge. The source is shrimp shells, but shellfish allergy IS NOT a contraindication. This dressing can be very helpful if the patient is on blood thinning drugs like Coumadin.

Recommended Product: EMERGENCY BANDAGE
- The Emergency Bandage (a.k.a. Israeli Bandage), manufactured by First Care Products, Ltd., is a MCRC-recommended bandage for treating both minor and major wounds. The Emergency Bandage incorporates a pressure applicator and closure bar for immediate and effective control of blood loss. The Emergency Bandage may be used in conjunction with hemostatic gauze.
- This product is not a tourniquet and should not be applied tightly as it might create a venous tourniquet which is harmful. It should only be applied to wounds with controlled or minor bleeding.
Protocol 4.30
INJURY – CRUSH SYNDROME

1. Perform general patient management (SECTION 1).


3. 5. Administer oxygen via non-rebreather mask at 10-15 L/min. as necessary. Oxygen administration should not be determined by oxygen saturation. Support respirations as necessary with a BVM.

4. Consider activation of a specialty physician, technical rescue team and medical helicopter.

5. Follow the HYPOTHERMIA protocol as needed.


7. 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)

8. Transport as soon as possible.

9. 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,. Do not exceed 3 mcg/kg.

10. Give KETAMINE 0.15 mg/kg IM if pain persists after second dose of fentanyl. May repeat as needed every 20 minutes to a maximum of three doses. Contact [Medical Control] for additional dosing.

11. 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.

12. Perform reassessment as indicated.

Key Points: INJURY – CRUSH SYNDROME

- Crush syndrome is a life-threatening condition caused by prolonged compression or immobilization. Remember that the greater the body area compressed and the longer the time of entrapment, the greater the risk of crush syndrome. Signs and symptoms appear after the patient is released from the crushing mechanism or immobilization. Shock and possible metabolic acidosis occur as a result of release of toxins and end products of anaerobic metabolism.
- Sodium bicarbonate 1 mEq/kg IV may be mixed in 1 liter of normal saline.
- 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 4.31 – TRAUMA – TRAUMA TRIAGE & MANAGEMENT

Field Trauma Triage Decision Scheme

1. Measure vital signs and level of consciousness

- Glasgow Coma Scale \( \leq 13 \)
- Systolic blood pressure \(< 90 \text{ mmHg} \) \(< 100 \text{ mmHg for patients } > 65 \text{ years} \)
- Respiratory rate \(< 10 \text{ or } > 29 \text{ breaths/minute} \) \(< 20 \text{ in infant } < 1 \text{ year} \)

   - **YES**
   - **NO**

2. Assess anatomy of injury

   - All penetrating injuries to head, neck, torso, & extremities proximal to elbow or knee
   - Chest wall instability or deformity (e.g., flail chest)
   - Two or more proximal long-bone fractures
   - Crushed, degloved, mangled, or pulseless extremity
   - Amputation proximal to wrist or ankle
   - Open or depressed skull fracture
   - Paralysis
   - Severe head, neck, chest, pelvic, abdominal and/or back pain.

   - **YES**
   - **NO**

3. Assess mechanism of injury and evidence of high-energy impact

   - **Falls**
     - Adults: \( > 20 \text{ ft.} \) (one story is equal to 10 ft.)
     - Children: \( > 10 \text{ ft.} \) or 2-3 times the height of the child
   - **High-Risk Auto Crash**
     - Intrusion, including roof: \( > 12 \text{ in.} \) occupant site; \( > 18 \text{ in.} \) any site
     - Ejection (partial or complete) from automobile
     - Death in same passenger compartment
     - Vehicle telemetry data consistent with high risk of injury
     - Complex extrication by fire / rescue
   - **Auto v. Pedestrian/Bicyclist Thrown, Run Over, or with Significant (> 20 mph) Impact**
   - **Motorcycle Crash > 20 mph**

   - **YES**
   - **NO**

4. Assess special patient or system considerations

   - **Age**
     - Older Adults: Risk of injury death increases after age 55 years
     - Older Adults: Low-impact mechanisms (e.g., ground-level falls) might result in severe injury
     - Children: Should be triaged preferentially to pediatric-capable trauma centers
   - **Anticoagulation and Bleeding Disorders**
     - Patients with head injury are at high risk for rapid deterioration
   - **Significant burns**
   - **Pregnancy > 20 Weeks** [Palpable uterus at or above umbilicus]
   - **EMS Provider Judgment**

   - **YES**
   - **NO**

*Transport according to protocol*

**Take to a trauma center.** Steps 1 and 2 attempt to identify the most seriously injured patients. These patients should be transported preferentially to the highest level of care within the trauma system. Early dispatch of aeromedical evacuation provider to the scene may be the most reliable and expedient means for attaining direct transfer of these patients to the trauma center.

**Take to a trauma center.** Steps 1 and 2 attempt to identify the most seriously injured patients. These patients should be transported preferentially to the highest level of care within the trauma system. Early dispatch of aeromedical evacuation provider to the scene may be the most reliable and expedient means for attaining direct transfer of these patients to the trauma center.

**Consider transport directly to a trauma center or contact medical control to discuss patient disposition.**

**Consider transport directly to a trauma center or contact medical control to discuss patient disposition.**

**When in doubt, transport to a trauma center.** Injured patients in cardiac arrest with CPR in progress should be transported to the closest hospital.

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.

* American Burn Association guidelines.
Protocol 4.31 – TRAUMA – TRAUMA TRIAGE & MANAGEMENT

Hypothermia in trauma has been associated with a significantly increased mortality compared to patients with the same body temperature from environmental exposure alone. Even mild hypothermia in a trauma patient can result in devastating physiologic consequences. Strict attention must be paid to the prevention of hypothermia in the trauma patient.

“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:
   b. Suctioning.
   c. Control of life-threatening hemorrhage.
   d. C-spine control and spinal immobilization.
   e. Follow the HYPOTHERMIA protocol as needed.

3. Move the patient rapidly to the ambulance. All procedures, with the exception of those listed above, should be performed during transport, not on the scene. Brief stops are acceptable at the attendant in charge’s discretion to facilitate lifesaving procedures.

4. The emergency communications center or on-scene command should notify the closest hospital as early as possible. If the incident is in close proximity to the hospital, provide notification to the hospital prior to arrival on the scene if there are reported priority patients.

5. EMS personnel are not to delay transport to wait on higher trained personnel. If ALS support is en route for a rendezvous, do not wait on the ALS personnel.

ENTRAPPED “PRIORITY” PATIENTS

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

CARDIAC ARREST IN TRAUMA PATIENTS:

1. Adult and pediatric patients found dead at the scene of a trauma are not to be resuscitated unless they have a viable ECG rhythm (INT, PM), are hypothermic, recently drowned, or electrocuted. BLS airway and ventilation procedures may be attempted at the provider’s discretion. If spontaneous respiration or circulation is not detected within one minute, resuscitative efforts should be ceased. Protocol 2.7, DEATH DETERMINATION – ALL AGES, is to be followed when determining death.

2. Patients who lose vital signs while care is being administered are to be resuscitated. Prompt consultation with Medical Control is mandatory.

LANDING ZONES

Pre-designed 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.

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 communication 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.
## 12 LEAD ECG

### Scope

<table>
<thead>
<tr>
<th>EMR</th>
<th>EMT</th>
<th>AEMT</th>
<th>INT</th>
<th>PM</th>
</tr>
</thead>
</table>

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

### PRECAUTIONS

1. Treatment of lethal dysrhythmias (e.g., VF, pVT) 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. Keep time on the scene to a minimum by moving the patient to ambulance prior to ECG if possible.
4. Dirt, oil, sweat and other materials on the skin can interfere with obtaining a quality tracing.
5. Being in a moving vehicle and engine vibration can interfere with obtaining a quality tracing.

### PROCEDURE

1. 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.
2. 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.
3. 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.

### CONTINUED ON NEXT PAGE
4. 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 V₁ through V₆.

<table>
<thead>
<tr>
<th>Lead</th>
<th>Lead Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>V₁</td>
<td>Fourth intercostal space to the right of the sternum</td>
</tr>
<tr>
<td>V₂</td>
<td>Fourth intercostal space to the left of the sternum</td>
</tr>
<tr>
<td>V₃</td>
<td>Directly between leads V₂ and V₄</td>
</tr>
<tr>
<td>V₄</td>
<td>Fifth intercostal space at midclavicular line</td>
</tr>
<tr>
<td>V₅</td>
<td>Level with V₄ at left anterior auxiliary line</td>
</tr>
<tr>
<td>V₆</td>
<td>Level with V₅ at left midaxillary line</td>
</tr>
</tbody>
</table>

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

a. Locating the V₁ 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 V₁ 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 V₁ position.
   v. Place V₁ by attaching the positive electrode to the identified location.

b. Place V₂ by attaching the positive electrode to the left of the sternum at the further intercostal space.

c. Place V₄ by attaching the positive electrode at the midclavicular line at the fifth intercostal space (Note: V₄ must be placed prior to V₃).

d. Place V₃ by attaching the positive electrode in the line midway between lead V₂ and V₄.

e. Place V₅ by attaching the positive electrode at the anterior axillary line as the same level as V₄.

f. Place V₆ by attaching the positive electrode to the midaxillary line at the same level as V₄.

**CAUTION:** When placing electrodes on female patients, always place leads V₃-V₆ 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
5. Ensure that all leads are attached.
6. Turn on the machine.
7. Record the tracing by following the machine specific acquisition procedure and function.
8. Document on the tracing the patient’s name and the date and time the tracing was obtained.
9. Refer to the \textit{ST–ELEVATION MYOCARDIAL INFARCTION (STEMI) TRIAGE}.
10. 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 \textit{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.
CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) Protocol 5.2

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

CONTRAINDICATIONS
1. Depressed mental status with inability to maintain airway.
2. Hypoventilation requiring ventilatory assistance.
3. Upper airway/facial trauma or abnormalities that prevent nasal mask from sealing.
4. Open stoma or tracheostomy.
5. Severe cardio-respiratory instability.
6. SBP less than 100 mm Hg.
7. Tension pneumothorax.

PROCEDURE
1. Assess patient and initiate high flow oxygen as indicated.
2. Monitor pulse oximetry.
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.

WARNING: Do not exceed pressures of 10 cm H₂O.

7. Reassess the patient.
8. Follow the appropriate treatment protocol.
9. Transport as soon as feasible.

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

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. Preferably, don sterile gloves.
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 the scalpel handle into the incision and rotate the handle 90 degrees to dilate the opening.
8. Use an endotracheal tube introducer (gum bougie) to cannulate trachea and pass a Shiley or 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 CO2 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.
INDICATIONS
Ventricular fibrillation and pulseless ventricular tachycardia.

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 on “paddles” (or lead II if monitor leads are used) 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. Apply gel to paddles, or position conductor pads on the patient’s chest.
4. Position paddles or remote defibrillation pad on the patient (sternum-apex).
5. Visually check the monitor display and assess the rhythm. (Subsequent steps assume VF/pVT is present).
   a. If the arrest is not witnessed, give 5 cycles of CPR before attempting defibrillation.
   b. If the arrest is witnessed by the rescuer, attempt defibrillation as soon as possible.
6. Press CHARGE on apex handle or 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, clear the victim before delivering the shock: be sure no one is touching the patient.
   a. Loudly state a “clear the victim” message, such as “Everybody clear” or simply “Clear.”
   b. Look to be sure that no one is in contact with the victim.
8. If using paddles, apply 25 pounds of pressure on both paddles (should deform the shape of the chest).
9. Press the DISCHARGE button. If using paddles, press the two paddle DISCHARGE buttons simultaneously.
10. 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 largest paddles or self-adhering electrodes that will fit on the chest wall without touching (leave about 3 cm between the paddles). The best paddle size is:
   a. Adult paddles (8 to 10 cm) for children greater than or equal to 10 kg (more than approximately 1 year of age)
   b. Infant paddles for infants weighing less than 10 kg.
INDICATIONS
1. Primary confirmation, monitoring and documentation of endotracheal intubation [REQUIRED]
2. Primary confirmation, monitoring and documentation of supraglottic airway insertion.
3. Assessment, monitoring and documentation of the respiratory status of the non-intubated patient experiencing respiratory distress including but not limited to asthma and COPD.

PROCEDURE – INTUBATED PATIENTS (Includes supraglottic airways)
1. Turn cardiac defibrillator/monitor ON. If CO₂ is not already displayed, select display to monitor the CO₂ 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 ETCO₂ values.
5. ETCO₂ numerical values and corresponding capnograph should be compared to normal values and morphology (Figure 5.7A).

Normal ETCO₂ Values
35 – 45 mmHg

![Waveform Labels](image)

Figure 5.7A The Normal CO₂ Waveform

PROCEDURE – NON-INTUBATED PATIENTS
1. Patients should be assessed, oxygenated and ventilated with the appropriate delivery device dependent upon their presenting degree of respiratory distress or obstruction.
2. Interface the end-tidal CO₂ sampling device with the oxygen delivery device being used (i.e., nasal sampling device used under a non-rebreather mask, ETCO₂/O₂ 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. ETCO₂ numerical values and corresponding capnograph should be compared to normal values and morphology (Figure 5.7A).

**NOTE:** ETCO₂ monitoring should be discontinued while administering nebulized medications.
5. ETCO₂ 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.
4. **[EMT]** EMTs who have received device-specific training from the EMS agency may use waveform capnography **ONLY** for supraglottic airway placement confirmation. When using the device, the EMT shall use only the numeric ETCO₂ value to confirm the presence of CO₂.
INDICATION
Use of Easy Cap II® and Pedi-Cap® end-tidal CO₂ (ETCO₂) detectors is indicated for all patients that have been intubated with a supraglottic airway.

- Adult ETCO₂ detector – patient weighing greater than 15 kg.
- Pediatric ETCO₂ detector – patient weighing less than or equal to 15 kg.

NOTE: END-TIDAL CO2 DETECTION / MONITORING, CAPNOGRAPHY is required for endotracheal intubation and preferred for supraglottic airway confirmation.

PRECAUTIONS
1. False-negative readings may be present during cardiac arrest because blood flow and delivery of CO₂ 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 CO₂ 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 or I-GEL SUPRAGLOTTIC 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 5.8A and Table 5.8B.

Table 5.8A. Patients with adequate perfusion / spontaneous heartbeat

<table>
<thead>
<tr>
<th>COLOR RANGE “A” (Purple)</th>
<th>COLOR RANGE “B” (Tan)</th>
<th>COLOR RANGE “C” (Yellow)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.03 to less than 0.5 % ETCO₂ less than 4 mmHg ↓ Airway not properly positioned ↓ Reinsert tube ↓ Recheck with CO₂ detector</td>
<td>0.5 to less than 2 % ETCO₂ 4 to less than 15 mmHg ↓ Retained CO2 in esophagus or low perfusion or hypocarbia ↓ Deliver 6 more breaths ↓ Color remains tan ↓ Airway properly positioned with low perfusion or hypocarbia</td>
<td>2 to 5 % ETCO₂ 15 to 38 mmHg ↓ Airway properly positioned ↓ Secure tube ↓ Continue to observe color change</td>
</tr>
</tbody>
</table>

CONTINUED ON NEXT PAGE
### Table 5.8B. Patients with Poor Perfusion / Cardiac Arrest

<table>
<thead>
<tr>
<th>COLOR RANGE “A” (Purple)</th>
<th>COLOR RANGE “B” (Tan)</th>
<th>COLOR RANGE “C” (Yellow)</th>
</tr>
</thead>
</table>
| 0.03 to less than 0.5 % ETCO₂  
less than 4 mmHg ↓  
Airway not properly positioned  
or inadequate perfusion  
(ineffective CPR)  
↓  
Is ET tube through vocal cords or supraglottic ventilating properly?  
Check ET via direct laryngoscopy | 0.5 to less than 2 % ETCO₂  
4 to less than 15 mmHg ↓  
Retained CO₂ in esophagus  
or low perfusion  
↓  
Deliver 6 more breaths ↓  
Color remains tan ↓  
Airway properly positioned  
with low perfusion | 2 to 5 % ETCO₂  
15 to 38 mmHg ↓  
Airway properly positioned ↓  
Secure tube ↓  
Continue to observe color change |
| No  
Airway not properly positioned  
↓  
Reinsert tube ↓  
Check with CO₂ detector  
| Yes  
Airway properly positioned with inadequate perfusion  
↓  
Take appropriate clinical action |

### CONSIDERATIONS

1. End-tidal CO₂ 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.
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 CO₂ 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 for endotracheal intubation. Colorimetric monitoring may be used temporarily while troubleshooting issues with capnography.
ENDOTRACHEAL TUBE INTRODUCER Protocol 5.7

Scope: EMR | EMT | AEMT | INT | PM

INDICATIONS
1. To assist in endotracheal tube placement [REQUIRED, unless otherwise noted].
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.
GASTRIC DECOMPRESSION

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. Pediatrics: Use length-based resuscitation tape (6 to 16 French)
   b. Adults: 18 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 cc of air into the tube (10 mL of air in children).
11. Tape the tube in place and connect to low suction as needed.
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® product system is indicated whenever fluid or pharmacological therapy is critical but traditional vascular access techniques are not possible or require too much time to achieve a successful insertion. IO site selection depends on patient age, size, anatomy, presenting condition, ability to locate anatomical landmarks, and clinical judgment and experience. Studies and articles suggest the humerus may be a superior site for flow rates, drug delivery, and management of infusion pain.

CONTRAINDICATIONS
1. Fracture in targeted bone.
2. Excessive tissue (Figure 5.14A) or absence of adequate anatomical landmarks.
3. Infection at area of insertion site.
4. Previous, significant orthopedic procedure at site (e.g. prosthetic limb/joint).
5. IO access in targeted bone within past 48 hours.

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-Stabilizer®
- EZ-IO® driver
- 10 mL syringe
- Normal saline
- Tape or gauze
- Pressure bag
- EZ-IO® needle sets

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

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

1. Always observe standard precautions and aseptic techniques when using the EZ-IO®.
2. Locate proper site for EZ-IO® insertion.

   a. **Humeral insertion (adult):**

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

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

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

      4) Place the ulnar aspect of the opposite hand along the midline of the upper arm laterally.
5) Place your thumbs together over the arm. This identifies the vertical line of insertion on the proximal humerus.

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

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

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

8) The insertion site is on the most prominent aspect of the greater tubercle, 1 to 2 cm above the surgical neck.
b. **Proximal tibia insertion (adult):** Extend the leg. Insertion site is approximately 2 cm medial to the tibial tuberosity, or approximately 3 cm (two finger widths) below the patella and approximately 2 cm medial, along the flat aspect of the tibia. (Figure 5.10b)

c. **Proximal tibia insertion (infants and small children):** Extend the leg. Insertion site is approximately 1 cm medial to the tibial tuberosity, or just below the patella (approximately 1 cm or one finger width) and slightly medial (approximately 1 cm or one finger width), along the flat aspect of the tibia. Pinch the tibia between your fingers to identify the center of the medial and lateral borders. (Figure 5.10c)

d. **Distal tibia insertion (adult):** Insertion site is located approximately 3 cm (2 finger widths) proximal to the most prominent aspect of the medial malleolus. Palpate the anterior and posterior borders of the tibia to assure that your insertion site is on the flat center aspect of the bone. (Figure 5.10c)

e. **Distal tibia insertion (infants and small children):** Insertion site is located approximately 1-2 cm (1 finger width) proximal to the most prominent aspect of the medial malleolus. Palpate the anterior and posterior borders of the tibia to assure that your insertion site is on the flat center aspect of the bone. (Figure 5.10c)
3. Clean the insertion site (use aseptic technique).

4. Prepare supplies.
   a. *Prime EZ-Connect®*: Unlock the clamp. Prime the set and purge air.
   b. *Open EZ-Stabilizer®*.

5. Attach needle set to EZ-IO® power driver and remove safety cap from catheter.
   
   **IMPORTANT:** Only handle Needle Set by the plastic hub.

   **IMPORTANT:** Control patient movement prior to and during procedure.

6. Push needle set through skin until tip touches bone (Figure 5.10e).

   **IMPORTANT:** The catheter is marked with a black line 5mm from the hub. If the needle set is inserted through the soft tissue and does not reach the bone or the 5mm mark is not visible above the skin with the tip of the needle set touching the bone, the needle set is too short. A longer needle set or alternate site should be chosen prior to penetration of the bone cortex. Using a needle set that is too short will increase the risk of catheter dislodgement leading to infiltration/extravasation, creating a hole in the bone unnecessarily and rendering the site unusable for future IO access for a minimum of 48 hours.

7. Squeeze trigger and apply moderate steady pressure.

   **IMPORTANT:** **DO NOT USE EXCESSIVE FORCE.** Use moderate steady downward pressure and allow Needle Set rotation to penetrate the bone.

   **Note:** If driver stalls and needle set will not penetrate the bone, operator may be applying too much downward pressure to penetrate bone.

   **Note:** In the event of a driver failure, disconnect the power driver, grasp the needle set hub by hand and advance into the medullary space while twisting.

8. Advance needle set and release trigger.

   a. *Pediatrics*: Release trigger when sudden "give" or "pop" is felt, indicating entry into medullary space.

   b. *Adult*: Advance needle set approximately 1-2 cm after entry into medullary space; in proximal humerus for most adults, needle set should be advanced 2 cm or until hub is flush or against the skin.

9. Stabilize needle set hub, disconnect driver, and remove stylet.

10. Place Stylet into NeedleVISE® for sharps containment.

    **Note:** Place the NeedleVISE® on a flat stable surface. Immediately following use of a Needle and while still holding it with one hand away from the sharp end, firmly insert the sharp pointed tip straight down into the opening in the NeedleVISE® until it stops, making sure to KEEP YOUR FREE HAND AWAY FROM THE SHARPS SECURING DEVICE DURING INSERTION. DO NOT HOLD NeedleVISE® WITH FREE HAND WHILE INSERTING NEEDLE. ALWAYS USE ONE-
HANDED TECHNIQUE WHEN INSERTING SHARP into NeedleVISE®. Dispose of opened sharp into NeedleVISE® whether or not it has been used.

11. Use of the EZ-Stabilizer is strongly recommended for all EZ-IO® insertions. Place stabilizer over catheter hub.

12. Attach a primed EZ-connect® extension set to the hub, firmly secure by twisting clockwise.
   
   Note: Do NOT use any instruments to tighten connections.
   
   Note: To prevent valve damage, Do NOT use needles or blunt cannula to access the swabable valve. Non-standard syringes or connectors can damage the swabable valve.
   
   Note: Operator may use a sterile alcohol wipe, to swab the surface of the EZ-Connect® valve and let it air dry.

13. Attach EZ-Stabilizer™ dressing by pulling the tabs to expose the adhesive and adhere to skin.

14. For patients responsive to pain, consider LIDOCAINE 2% (preservative free) 20- 40 mg for adults, 0.5 mg/kg for children. Use extreme dosage precautions to avoid medication error.

15. Flush the EZ-IO® with normal saline (0.9% Sodium chloride) (5-10 mL for adults; 2-5 mL infant/child) (Figure 5.10f).
   
   a. Prior to flush, aspirate slightly for visual confirmation of bone marrow.
   
   b. Failure to appropriately flush the EZ-IO® catheter may result in limited or no flow. Repeat flush as needed.
   
   c. Once EZ-IO® catheter has been flushed, administer fluids or medications as indicated.

16. Confirm catheter placement with the following recommended methods:
   
   • Stability of catheter in the bone.
   
   • Ability to aspirate after flush.
   
   • Adequate flow rate.

17. Document date/time of insertion and apply EZ-IO® wristband. Monitor insertion site frequently for extravasation.

REMOVAL. To remove the EZ-IO® from patient (Figure 5.10g):

1. Remove EZ-Connect®.

2. Lift & remove EZ-Stabilizer™ adhesive dressing.

3. Attach luer-lock syringe to hub of catheter. Withdraw the Catheter by applying traction while rotating the syringe and catheter clockwise.

4. Maintain axial alignment during removal, do NOT rock or bend the catheter.

5. Once removed, immediately place syringe/catheter in appropriate sharps container.

6. Dress the site.
INTUBATION, OROTRACHEAL

Protocol 5.11

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

CONTRAINDICATIONS
1. Child less than 8 years of age [PM].
2. Child less than 12 years of age [INT].
3. Gag reflex present.
4. Epiglottitis.

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

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

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

1. Use standard isolation precautions including eye protection. Use a face mask and gown when splashing is likely.
2. Open the airway and preoxygenate the patient with a bag-valve-mask supplied with 100% oxygen for at least 30 seconds.
3. Auscultate for breath sounds to establish a baseline.
4. Assemble and check the equipment including:
   a. 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 cc 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 CO₂ DETECTION / MONITORING, 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 6 breaths per minute (adult) or 10 breaths per minute (child). Deliver each breath over about 1 second while chest compressions are delivered at a rate of 100-120 per minute, and do not attempt to synchronize the compressions with the ventilations.
   b. **Patients with a perfusing rhythm:** Deliver approximately 10 to 12 breaths per minute (1 breath every 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.
COMPLICATION: ESOPHAGEAL INTUBATION
1. Deflate the distal cuff.
2. Vigorously suction the oropharynx as needed.
3. Preoxygenate the patient prior to reintubation, if an additional attempt is permitted.

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

EXTUBATION
Extubation is indicated if the patient is able to protect and maintain an open airway, the risks for needing to reintubate are significantly reduced and the patient is not sedated. To perform the procedure:
1. Ensure adequate oxygenation.
2. Confirm patient responsiveness.
3. Suction the oropharynx.
4. Deflate the distal cuff.
5. Remove the endotracheal tube on cough or expiration.

Key Points: INTUBATION, OROTRACHEAL
- Keep the ET tube in the protective wrapper until it is time to insert it into the trachea. This helps prevent the tube from becoming contaminated before its placement.
- It is sometimes best to remove dental appliances such as dentures and partials before intubation (unless they fit tightly).
- Do not use the teeth as a fulcrum.
- Male average tube size: 8.0 to 8.5 ID.
- Female average tube size: 7.5 to 8.0 ID.
- Male average tube insertion depth: 22 cm at the teeth.
- Female average tube insertion depth: 21 cm at the teeth.
- Tube size formula for children older than 2 years of age:
  \[ \text{ET tube (in mm)} = \frac{(16 + \text{age in years})}{4} \]

† INTUBATION ATTEMPT DEFINITION: An intubation attempt is defined as activities occurring during a single laryngoscopy maneuver, beginning when the laryngoscope is inserted into the patient’s mouth, and ending when the laryngoscope is removed, regardless of whether an endotracheal tube is actually inserted into the patient. [National Emergency Airway Registry]
INTUBATION, OROTRACHEAL (VIDEO LARYNGOSCOPY)  Protocol 5.12
Agency-Optional Scope EMR  EMT  AEMT  INT  PM

INTRODUCTION
The following protocol may be substituted for PROTOCOL 5.11 - INTUBATION, OROTRACHEAL. There are numerous video laryngoscope devices on the market. This protocol divides the devices into "blade" devices where the ET tube is inserted separately and "channel" devices where the ET tube is fixed to the device prior to insertion.

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

CONTRAINDICATIONS
1. Child less than 8 years of age [PM].
2. Child less than 12 years of age [INT].
3. Gag reflex present.
4. Epiglottitis.

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

PROCEDURE (MAXIMUM OF 2 ATTEMPTS, REGARDLESS OF TECHNIQUE)†
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 with a bag-valve-mask supplied with 100% oxygen for at least 30 seconds.
3. Auscultate for breath sounds to establish a baseline.
4. Assemble and check the equipment including:
   a. Turn on video laryngoscope.
   b. Check the distal cuff for leaks and lubricate the distal end of the endotracheal tube with a water soluble lubricant.
   c. Prepare mechanical tube holder.
   d. Prepare waveform capnography.
   e. If using a channel device, load the tube into the channel.
   f. Prepare a endotracheal tube introducer or place a the rigid stylet in the tube (blade device only).
5. Turn on the suction unit and attached the appropriate tip.
6. Place the head and neck into a NEUTRAL position.

NOTE: When there is a potential for cervical spine injury, ensure the head is firmly held in a neutral position during intubation.
7. Insert the video laryngoscope in the mouth with your left hand. Keep your eyes on the patient.

<table>
<thead>
<tr>
<th>Blade Device</th>
<th>Channel Device</th>
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| A. Position the blade while viewing the monitor. Visualize the epiglottis. A view that allows visualization of accessory anatomy is ideal.  
B. Insert the tube into the mouth with your right hand. Keep your eyes on the patient.  
C. Place either the endotracheal tube introducer or styled tube through the vocal cords.  
D. **Stylet**: Carefully remove the stylet while holding the tube. Maintain visualization of the vocal cords. Pull the stylet in the direction of the patient’s feet when removing.  
E. **Bougie**: Place the tube over the bougie. Maintain visualization of the vocal cords | A. Visualize the epiglottis on the monitor/eyepiece. A view that allows visualization of accessory anatomy is ideal.  
B. Advance the tube through the channel and through the vocal cords.  
C. If tube passage is difficult it may be necessary to remove the tube partially from the channel to complete passage or to pass a endotracheal tube introducer through the tube.  
D. Carefully remove the tube from the channel. Maintain visualization of the cords if possible. |

8. Hold the tube in place with a free hand. Do not release the tube before it is secured in place.
9. Inflate the distal cuff with the prefilled syringe. Use only the minimum amount of air necessary to create an effective seal and prevent air leakage (typically 5 to 10 cc of air).  
**NOTE:** Ensure the syringe is removed after the distal cuff is inflated.
10. Attach a bag-valve-mask to the tube.
11. Deliver several breaths with the bag-valve-mask and confirm proper tube placement as follows:  
a. Auscultate over the epigastrium.  
b. Auscultate the chest bilaterally at the apices and the bases for the presence of equal, bilateral lung sounds.  
c. Observe for symmetrical chest rise and fall with each breath.  
d. Confirm proper tube placement with **END-TIDAL CO2 DETECTION / MONITORING, 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).
12. Note the depth of the endotracheal tube at the teeth. The average depth is 22 cm for adult males and 21 cm for adult females.
13. Ventilate the patient with the bag-valve-mask supplied with 100% oxygen as indicated.  
a. **During CPR:** Deliver 6 breaths per minute (adult) or 10 breaths per minute (child). Deliver each breath over about 1 second while chest compressions are delivered at a rate of 100-120 per minute, and do not attempt to synchronize the compressions with the ventilations.  
b. **Patients with a perfusing rhythm:** Deliver approximately 10 to 12 breaths per minute (1 breath every 6 to 7 seconds). Deliver these breaths over 1 second.
14. Secure the endotracheal tube in place with a commercial device while continuing ventilatory support.
15. Re-confirm tube placement after the tube is secured, after every patient movement and at regular intervals. Application of a cervical collar and immobilization device will help prevent the patient from moving in such a way as to dislodge the endotracheal tube.
SEDATION

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

- 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.

† 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]
MEAN ARTERIAL PRESSURE (MAP)  Protocol 5.13

INDICATIONS
1. Monitor in patients presenting with hypotension associated with shock.
2. Monitor in patients presenting with severe hypertension with an etiology of suspected increased intracranial pressure.
4. MAP is a decision criteria for treatments and/or pre-hospital alerts in the OVERDOSE – STIMULANT and MEDICAL – SEPTIC SHOCK protocols.

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

PROCEDURE
1. Obtain the patient's auscultated or automated systolic and diastolic blood pressures.
2. Determine the patient’s pulse pressure by subtracting the diastolic from the systolic.
3. Calculate one-third (⅓) of the pulse pressure and add that value to the diastolic pressure to yield the patient’s MAP.
4. Obtain the patient's MAP at the same frequency as other vital signs and observe for trending.

Key Points: MEAN ARTERIAL PRESSURE (MAP)
- Conceptually, MAP is one-third (⅓) the range between the diastolic systolic pressure.
- A MAP < 65 mmHg is associated with severe shock and may present with altered mental status or decreased level of consciousness.
- Use the following formula to calculate the MAP:

\[
MAP = \text{Diastolic} + \frac{1}{3} \text{Pulse Pressure}
\]

- Become familiar with the location that MAP is displayed on the specific cardiac monitor that your agency uses. Images of the way that MAP is displayed is provided below for the following devices:
  - Philips - HeartStart MRx
  - Physio Control - LIFEPAK 15
  - Zoll - R Series
SUCTIONING, ADULT / PEDIATRIC  Protocol 5.14

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 15 seconds at a time.
   b. Children – Suction for no more than 10 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 15 seconds, artificially ventilate for two minutes, then suction for 15 seconds, and continue in that manner.
9. If necessary, rinse the catheter and tubing with water to prevent obstruction of the tubing from dried material.
SUCTIONING, TRACHEOBRONCHIAL Protocol 5.15

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 15 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.
**SUPRAGLOTTIC AIRWAY, I-GEL® SUPRAGLOTTIC AIRWAY**

**Protocol 5.16.1**

**i-gel and i-gel O₂ models**

**Scope**

EMR  EMT  AEMT  INT  PM

**INDICATIONS**

The i-gel supraglottic airway is designed for emergency or difficult intubation in the apneic or unresponsive patient without a gag reflex. The i-gel supraglottic airway is the airway of choice for the delivery of passive oxygenation during cardiocerebral resuscitation (CCR).

**CONTRAINDICATIONS**

1. Trismus, limited mouth opening.
2. Do not reuse or attempt to reprocess the i-gel.
3. Dextrose, naloxone or glucagon to be administered to the patient (precaution only).

**WARNINGS**

1. Do not use excessive force to insert the device.
2. i-gel must be lubricated according to the instructions for use.
3. The patient should always be in the ‘sniffing’ position prior to insertion with the assistant helping to open the patient’s mouth.
4. The leading edge of the i-gel’s tip must follow the curvature of the patient’s hard palate upon insertion.
5. Excessive air leak during manual ventilation is primarily due to either sub-optimal depth of i-gel insertion.

**SIZE SELECTION**

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

<table>
<thead>
<tr>
<th>i-gel size</th>
<th>Patient Size</th>
<th>Patient weight guidance (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Neonate</td>
<td>2-5 kg (5-11 lbs)</td>
</tr>
<tr>
<td>1.5</td>
<td>Infant</td>
<td>5-12 kg (11-25 lbs)</td>
</tr>
<tr>
<td>2</td>
<td>Small pediatric</td>
<td>10-25 kg (22-55 lbs)</td>
</tr>
<tr>
<td>2.5</td>
<td>Large pediatric</td>
<td>25-35 kg (55-77 lbs)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>i-gel O₂ size</th>
<th>Patient Size</th>
<th>Patient weight guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Small adult</td>
<td>30-60 kg (65-130 lbs)</td>
</tr>
<tr>
<td>4</td>
<td>Medium adult</td>
<td>50-90 kg (110-200 lbs)</td>
</tr>
<tr>
<td>5</td>
<td>Large adult+</td>
<td>90+ kg (200+ lbs)</td>
</tr>
</tbody>
</table>
PRE-INSERTION PREPARATION

1. Open the i-gel O₂ package and take out the protective cradle containing the device. Remove the accessory pack containing the sachet of lubricant and airway support strap from the protective cradle and place to one side.

2. Remove the i-gel O₂ and transfer it to the palm of the same hand that is holding the protective cradle, supporting the device between the thumb and index finger.

3. Open the sachet of supplied lubricant and place a small bolus onto the middle of the smooth surface of the protective cradle in preparation for lubrication. Do not use silicone-based lubricants.

4. Grasp the i-gel O₂ with the opposite (free) hand along the integral bite block and lubricate the back, sides and front of the cuff with a thin layer of lubricant.

5. Place the i-gel O₂ back into the protective cradle in preparation for insertion.

INSERTION TECHNIQUE (MAXIMUM OF 2 ATTEMPTS)

6. Remove the i-gel O₂ from the protective cradle. Grasp the lubricated i-gel O₂ firmly along the integral bite block. Position the device so that the i-gel O₂ cuff outlet is facing towards the chin of the patient. The patient should be in the ‘sniffing’ position with head extended and neck flexed. The chin should be gently pressed down before proceeding. Introduce the leading soft tip into the mouth of the patient in a direction towards the hard palate.
7. Glide the device downwards and backwards along the hard palate with a continuous but gentle push until a definitive resistance is felt. The tip of the airway should be located into the upper esophageal opening (a) and the cuff should be located against the laryngeal framework (b). The incisors should be resting on the integral bite-block (c).

8. The strap should be slid under the patient’s neck until the wide central band of the strap is located directly under the neck of the patient. One end of the strap should then be lifted over the patient’s face and secured to the i-gel O₂ by placing an appropriate hole on the strap over the lug of the hook ring located at the top of the integral bite block. The other end of the strap should then be lifted over the other side of the patient’s face and secured in the same manner, ensuring there is sufficient tension to hold the i-gel O₂ securely in place, but not an excessive tension that may cause trauma to the patient’s neck or face or that may cause unwanted downward pressure of the i-gel O₂.
CARDBIOCEREBRAL RESUSCITATION (CCR)
1. Remove the cap from the oxygen port.
2. Connect one end of a standard oxygen tube to the supplementary oxygen port of the i-gel O₂ and the other end to the oxygen regulator.
3. Set the flow rate to 4-6 lpm.

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

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

PROCEDURE – REMOVAL
1. Once it is in the correct position, the i-gel supraglottic airway is well tolerated until the return of protective reflexes.
2. Ensure suctioning equipment is ready.
   Turn the patient to the side and remove the airway carefully, suctioning as needed.
SUPRAGLOTTIC AIRWAY, KING®
LARYNGOTRACHEAL AIRWAY

LT-D and LTS-D models

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 (LTS-D & LT-D models) - (Maximum of 2 Attempts)
1. Using the information provided, choose the correct KING LT airway size based on patient height.

Table 5-x: King LT Airway Sizes

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Description</th>
<th>Connector Color</th>
<th>OD</th>
<th>ID</th>
<th>Inflation Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>LT-D</td>
<td>2</td>
<td>35-45 inches 12-25 kg</td>
<td>Green</td>
<td>11 mm</td>
<td>7.5 mm</td>
<td>25-35 mL</td>
</tr>
<tr>
<td>LT-D</td>
<td>2.5</td>
<td>41-51 inches 25-35 kg</td>
<td>Orange</td>
<td>11 mm</td>
<td>7.5 mm</td>
<td>30-40 mL</td>
</tr>
<tr>
<td>LTS-D</td>
<td>3</td>
<td>4-5 feet (122-155 cm) in height</td>
<td>Yellow</td>
<td>14 mm</td>
<td>10 mm</td>
<td>45-60 mL</td>
</tr>
<tr>
<td>LTS-D</td>
<td>4</td>
<td>5-6 feet (155-180 cm) in height</td>
<td>Red</td>
<td>14 mm</td>
<td>10 mm</td>
<td>60-80 mL</td>
</tr>
<tr>
<td>LTS-D</td>
<td>5</td>
<td>greater than 6 feet (180 cm) in height</td>
<td>Purple</td>
<td>14 mm</td>
<td>10 mm</td>
<td>70-90 mL</td>
</tr>
</tbody>
</table>
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 LTS-D is the "sniffing position". However, the angle and shortness of the tube also allows it to be inserted with the head in a neutral position.

6. Hold the KING LT airway at the connector with dominant hand. With non-dominant hand, hold mouth open and apply chin lift.

7. With the KING LT airway rotated laterally 45-90º such that the blue orientation line is touching the corner of the mouth, introduce tip into mouth and advance behind base of tongue. Never force the tube into position.

8. As tube tip passes under tongue, rotate tube back to midline (blue orientation line faces chin).

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

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

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

11. Attach the bag-valve-mask 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).
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 CO₂ 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 6 breaths per minute (adult) or 10 breaths per minute (child). Deliver each breath over about 1 second while chest compressions are delivered at a rate of 100-120 per minute, and do not attempt to synchronize the compressions with the ventilations.
   b. Patients with a perfusing rhythm: Deliver approximately 10 to 12 breaths per minute (1 breath every 5 to 6 seconds). Deliver these breaths over 1 second.

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.
SYNCHRONIZED CARDIOVERSION

Protocol 5.17

Scope: EMR EMT AEMT INT PM

INDICATIONS
All tachycardias (rate greater than 150 bpm) with serious signs and symptoms related to the tachycardia.
- Supraventricular tachycardia (SVT)
- Atrial fibrillation
- Atrial flutter
- Ventricular tachycardia

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. Reactivation of sync mode is required after each attempted cardioversion.
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.
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:

<table>
<thead>
<tr>
<th>SYNCHRONIZED CARDIOVERSION – INITIAL ENERGY DOSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrial Fibrillation</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Monophasic</td>
</tr>
<tr>
<td>Biphasic</td>
</tr>
</tbody>
</table>

The energy levels listed are monophasic and biphasic initial does energy levels to use if manufacturer recommended settings are unknown for synchronized cardioversion. Providers should use the device-specific energy levels for synchronized cardioversion as recommended by the monitor manufacturer if known. If the initial shock fails, providers should increase the dose in a stepwise fashion.
8. Position conductor pads on the patient (or apply gel to paddles).
10. Announce to team members: "Charging defibrillator – stand clear!"

   - Make one more quick check of the monitor to confirm that tachycardia continues.
11. Press the CHARGE button on the monitor.
12. When the defibrillator is charged, clear the victim before delivering the shock: be sure no one is touching the patient.

   a. Loudly state a "clear the victim" message, such as “Everybody clear” or simply “Clear.”
   b. Look to be sure that no one is in contact with the victim.
13. If using paddles, apply 25 pounds of pressure on both paddles (should deform the shape of the chest).
14. 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.)
15. 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.
THORACENTESIS, NEEDLE

Protocol 5.18

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 mmHg in adults or SBP less than 80 mmHg in children, with signs of shock.

PROCEDURE

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.
TOURNIQUET

Protocol 5.19

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

NOTE: All EMS response vehicles are required to have two (2) tourniquets available, preferably in the “jump bag.”

CONSIDERATIONS
1. Pneumatic tourniquets are preferred. Commercial windless tourniquets per are acceptable. One pneumatic tourniquet and two windless tourniquets are preferred.
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 distal artery 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 15 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.
TRANSCUTANEOUS PACING

Protocol 5.21

Scope EMR EMT AEMT INT PM

INDICATIONS
1. Hemodynamically unstable bradycardia.
2. Sudden and witnessed asystole following a perfusing rhythm.

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 carotid or right femoral 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.

CONTRAINDICATION
The external jugular vein is not visible.

PROCEDURE
1. Prepare all equipment as for peripheral IV access in an upper extremity.
2. Place the patient in a supine and/or in the Trendelenburg position. This position will increase blood flow to the chest and neck, thus distending the vein and making it easier to see. Additionally, the Trendelenburg position decreases the chance of air entering the circulatory system during cannulation.
3. Turn the patient’s head away from the side of the access site. This maneuver makes the site easier to see and reach. Do not perform this maneuver if the patient has traumatic head and/or neck injuries.
4. Identify the external jugular vein. The external jugular can be located between the angle of the jaw and the middle third of the clavicle.
5. Using a circular motion, cleanse the site thoroughly with an alcohol wipe or povidone-iodine. Allow the area to dry before penetrating the skin.
6. Occlude venous return by placing a finger on the external jugular just above the clavicle. Never apply a venous constricting band around a patient’s neck.
7. Position the venipuncture device parallel with the vein, midway between the angle of the jaw and the clavicle. Point the catheter at the medial third of the clavicle and insert it, bevel up, at a 10 to 30-degree angle. Cannulate the vein in the usual method.
8. Connect an injection port or an extension set and the IV tubing to the catheter hub. Be careful not to contaminate either the hub or connector before insertion.
9. Open the IV flow control valve and run the IV infusion for a brief period of time to ensure that the line is patent. To ensure proper IV flow rates, the IV container must hang 30 to 36 inches above the insertion site.
10. Cover the IV site with povidone-iodine ointment or a sterile dressing and bandage.
11. Secure the catheter, administration set tubing and sterile dressing in place with tape or a commercial device.
12. Adjust the IV to the appropriate flow rate for the patient’s condition.
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. Prehospital vein cannulation efforts are to be limited to 2 attempts (per patient) unless otherwise authorized by [Medical Control].
2. Preparations for vein cannulation should be coordinated with rescue efforts so patient transport is not delayed.
3. For IVs started while in transit, transport may be halted only for venipuncture and catheter taping.
4. [EMT] EMTs may transport a patient from a health care facility or physician’s office with an INT. If a patient presents with an IV, the clinician at the facility must convert the IV to an INT before the patient may be transported by an EMT.

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

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

14. Dispose of the needle in a proper biomedical waste container.

15. Connect an injection port or an extension set and the IV tubing to the catheter hub. Be careful not to contaminate either the hub or connector before insertion.

   **NOTE:** To establish an INT, insert the distal end of the intermittent device into the hub of the IV catheter. Inject 3 to 5 mL of 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:**

\[
\text{Flow rate (gtts/min)} = \frac{\text{Volume to be infused (mL)} \times \text{drop factor (gtts/mL)}}{\text{Time of infusion (in minutes)}}
\]
ADENOSINE (Adenocard®)

Scope: EMR EMT AEMT INT PM

Generic Name: Adenosine (ah-den’oh-seen)
Trade Name: Adenocard®
Chemical Class: Endogenous nucleoside
Therapeutic Class: Antiarrhythmic

Actions: Adenosine is a naturally occurring substance that is present in all body cells. Adenosine decreases conduction of the electrical impulse through the AV node and interrupts AV reentry pathways in paroxysmal supraventricular tachycardia (PSVT). It can effectively terminate rapid supraventricular tachycardia such as PSVT. Because of its rapid onset and very short half-life, the administration of adenosine is sometimes referred to as chemical cardioversion. A single bolus of the drug was effective in converting PSVT to a normal sinus rhythm in a significant number (90%) of patients in initial drug studies.

Pharmacokinetics: Cleared from plasma in less than 30 seconds; t½ = 10 seconds

Indications:
1. Unstable narrow QRS tachycardia refractory to vagal maneuvers.
2. Stable, regular, monomorphic wide-complex tachycardia

Contraindications:
1. Second- or third-degree heart block.
2. Sick sinus syndrome.
3. Hypersensitivity to the drug.
4. Bradycardia.
5. Bronchoconstrictive lung disease (i.e. asthma).
6. Irregular wide-complex tachycardias

Precautions:
**Pregnancy Cat. C** Adenosine typically causes dysrhythmias at the time of cardioversion. These generally last a few seconds or less and may include PVCs, PACs, sinus bradycardia, sinus tachycardia and various degrees of AV block. In extreme cases, transient asystole may occur. If this occurs, appropriate therapy should be initiated.

Side Effects:
- CNS: dizziness, headache
- CV: dysrhythmia outlined under precautions, chest pain, facial flushing, palpitations, diaphoresis
- GI: nausea
- RESP: chest pressure, dyspnea

Administration:
**Adult:** Give 6 mg IV over 1 to 3 seconds. If not effective after 2 minutes, give 12 mg IV.
**Pediatric:** [Medical Control] Give 0.1 mg/kg IV over 1 to 3 seconds (maximum first dose 6 mg). If not effective after 2 minutes, give 0.2 mg/kg IV (maximum second dose 12 mg).

Supply: Vials or prefilled syringes containing 6 mg in 2 mL.

Notes:
1. Give adenosine rapidly over 1 to 3 seconds, into the medication administration port closest to the patient, through a large (e.g., antecubital) vein followed by a 10 mL saline flush and elevation of the arm.
2. Higher doses than usual may be needed for patients receiving theophylline preparations or consuming large quantities of caffeine.
3. Dipyridamole (Persantine) can potentiate the effects of adenosine. The dosage of adenosine may need to be reduced in patients receiving dipyridamole.
4. Use of adenosine for irregular wide-complex tachycardias may cause degeneration of the rhythm to VF.
**ALBUTEROL (Proventil®)**

**Protocol 6.2**

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<thead>
<tr>
<th>Scope</th>
<th>EMR</th>
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<th>AEMT</th>
<th>INT</th>
<th>PM</th>
</tr>
</thead>
</table>

**Generic Name:** Albuterol (al-byoo’ter-ole)

**Trade Name:** Airet®, Proventil®, Repetabs®, Respirol®, Ventolin®, Volmax®; Combivent® (combined with ipratropium)

**Chemical Class:** Sympathomimetic amine; β₂-adrenergic agonist

**Therapeutic Class:** Antiasthmatic; bronchodilator

**Actions:** Albuterol is a selective β₂-adrenergic agonist with a minimal number of side effects. It causes prompt bronchodilation and has a duration of action of approximately 5 hours.

**Pharmacokinetics:**
- Onset 5 to 15 minutes.
- Peak 1 to 1½ hours.
- Duration 4 to 6 hours.
- t₁/₂ = 2½ to 4 hours.

**Indications:**
1. Bronchial asthma.
2. Reversible bronchospasm associated with chronic bronchitis and emphysema.
3. Anaphylactic respiratory distress.
4. Crush syndrome [Medical Control].

**Contraindications:**
1. Hypertension (SBP greater than 180).
2. Tachycardia (HR greater than 140 adult, HR greater than 180 child).
3. Severe cardiac disease.
4. Hypersensitivity to the drug.

**Precautions:**
- Pregnancy Cat. C
- 1. Hyperthyroidism.
- 2. Diabetes mellitus.
- 3. Convulsive disorders.

**Side Effects:**
- CNS: dizziness, headache, stimulation, tremors
- CV: chest pain, dysrhythmias, hypertension, palpitations, tachycardia
- GI: nausea, vomiting

**Administration:**
Using a small volume nebulizer, adjust the oxygen flowmeter to 6 to 10 L/min to produce a steady, visible mist.

- **Adult:** Give 2.5 mg (3 mL of 0.083% solution) with a mouthpiece or facemask. Repeat every 10 minutes, up to 4 treatments, if needed.
- **Pediatric:** Give 2.5 mg (3 mL of 0.083% solution) with a mouthpiece or blow-by. Repeat every 10 minutes, up to 4 treatments, if needed.

**Supply:** Unit dose vials containing 2.5 mg in 3 mL.

**Notes:**
1. The possibility of developing unpleasant side effects increases when albuterol is administered with other sympathetic agonists.
2. β-blockers may blunt the pharmacological effects of albuterol.
3. Albuterol is also supplied in metered-dose inhalers (MDI) that deliver 90 mcg per inhalation. Be sure to obtain a complete medication history detailing administration times and frequency of use of home inhalation therapy. Overdoses of inhalers cause bronchial constriction and possibly death.
### AMIODARONE (Cordarone®)

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<tr>
<th><strong>Scope</strong></th>
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<th>AEMT</th>
<th>INT</th>
<th>PM</th>
</tr>
</thead>
</table>

#### Generic Name:
Amiodarone (a-mee’oh-da-rone)

#### Trade Name:
Cordarone®, Pacerone®

#### Chemical Class:
Iodinated benzofuran derivative

#### Therapeutic Class:
Antiarrhythmic

#### Actions:
Amiodarone prolongs myocardial action potential and effective refractory period and causes noncompetitive α- and β-adrenergic inhibition. Amiodarone suppresses atrial and ventricular ectopy (PSVT, AF, ATach, VT, VF, etc.) and slows conduction through the AV node (ventricular rate control; useful in WPW). Amiodarone also causes vasodilation resulting in reduced cardiac work.

#### Pharmacokinetics:
\( t_{1/2} = 20 \) to 47 days

#### Indications:
1. Shock refractory ventricular fibrillation and pulseless ventricular tachycardia.
2. Ventricular tachycardia.
3. Wide-complex tachycardia of unknown type (regular rhythm).

#### Contraindications:
1. Cardiogenic shock (SBP <90).
2. Marked sinus bradycardia.
3. Second- or third-degree heart block.
4. Hypersensitivity to the drug.
5. Torsades de pointes

#### Precautions:
**Pregnancy Cat. D**
1. May worsen existing or precipitate new dysrhythmias, including torsades de pointes and VF.
2. Use with beta-blocking agents could increase risk of hypotension and bradycardia. Amiodarone inhibits atrioventricular conduction and decreases myocardial contractility, increasing the risk of AV block with verapamil or diltiazem or of hypotension with any calcium channel blocker.
3. Use with caution in pregnancy and with nursing mothers.

#### Side Effects:
**CNS:** dizziness, headache  
**CV:** bradycardia, cardiac conduction abnormalities, CHF, dysrhythmias, hypotension, SA node dysfunction, sinus arrest  
**RESP:** dyspnea, pulmonary inflammation

#### Administration:

**Adult:** VF and pVT: Give 300 mg IV/IO. Give additional 150 mg IV push in 3 to 5 minutes for refractory or recurrent VF/pVT.  
VT with pulse: Give a rapid infusion of 150 mg over 10 minutes. Mix in 100 mL of D5W and infuse at 150 gtt/min (15 drop set).

**Pediatric:** VF and pVT: Give 5 mg/kg IV/IO. May repeat up to 2 times for refractory VF/pVT.  
VT with pulse: Give an infusion of 5 mg/kg over 20 minutes. Mix in 100 mL of D5W and infuse at 75 gtt/min (15 drop set).

**Slow Infusion:** 1 mg/min. Mix 150 mg in 250 mL D5W and infuse at 100 gtt/min (60 drop set).

#### Supply:
Vial containing 150 mg in 3 mL.

#### Notes:
## ASPIRIN

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<tr>
<th>Scope</th>
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<th>AEMT</th>
<th>INT</th>
<th>PM</th>
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</thead>
</table>

### Generic Name:
Aspirin (as’pir-in)

### Trade Name:
Bayer®, Bufferin®, Ecotrin®

### Chemical Class:
Salicylate derivative

### Therapeutic Class:
Antiplatelet agent

### Actions:
Aspirin blocks the formation of the substance thromboxane A₂, which causes platelets to aggregate and arteries to constrict. This results in an overall reduction in mortality associated with myocardial infarction. It also appears to reduce the rate of nonfatal reinfarction and nonfatal stroke.

### Pharmacokinetics:
Onset 15 to 30 minutes. Peak 1 to 2 hours. Duration 4 to 6 hours. \( t_{1/2} = 3 \) hours at low doses.

### Indications:
Chest pain suggestive of an acute myocardial infarction.

### Contraindications:
1. Hypersensitivity to the drug, NSAIDS, and tartrazine (FDC yellow dye #5).
2. Bleeding disorders including GI hemorrhage and hemophilia.
3. Hemorrhagic states.

### Precautions:
Children or teenagers with flu-like symptoms (may be associated with the development of Reye’s syndrome)

### Pregnancy Cat. C

### Side Effects:
GI: GI bleeding, heartburn, nausea
HEME: prolonged bleeding time

### Interactions:
When administered together, aspirin and other anti-inflammatory agents may cause an increased incidence of side effects and increased blood levels of both drugs. Administration of aspirin with antacids may reduce the blood levels of the drug by decreasing absorption.

### Administration:
Give four (4) 81 mg chewable tablets (324 mg total dose) PO as soon as possible after the onset of chest pain.

### Supply:
81 mg low dose chewable tablets

### Notes:
### ATROPINE Protocol 6.5

**Scope:** EMR, EMT, AEMT, INT, PM

<table>
<thead>
<tr>
<th>Generic Name:</th>
<th>Atropine (a’troe-peen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade Name:</td>
<td>Atropine Care®, Atropen Autoinjector®, Atropisol®, Atrosulf-1®</td>
</tr>
<tr>
<td>Chemical Class:</td>
<td>Belladonna alkaloid</td>
</tr>
<tr>
<td>Therapeutic Class:</td>
<td>Anticholinergic</td>
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</tbody>
</table>

#### Actions:
Atropine is a potent parasympatholytic that increases cardiac output and heart rate. Atropine acts by blocking acetylcholine receptors, thus inhibiting parasympathetic stimulation. Although it has positive chronotropic properties, it has little or no inotropic effect.

#### Pharmacokinetics:
Peak 2 to 4 minutes. Duration 4 to 6 hours.

#### Indications:
1. **[Adult]** Hemodynamically significant bradycardia (HR less than 60, QRS less than 0.12 sec):
   - Acute altered mental status, ongoing chest pain, hypotension or other signs of shock.
   - Bradycardia associated with “escape” ventricular ectopy (i.e., PVCs attributed to the underlying slow heart rate).
2. **[Pediatric]** Hemodynamically significant bradycardia [HR less than 60 (neonate less than 80/min)] due to increased vagal tone or primary AV block.
3. Severe organophosphate poisonings (insecticides).

#### Contraindication:
Hypersensitivity to the drug

#### Precautions:

- **Pregnancy Cat. C**
  1. Use atropine cautiously in the presence of acute coronary ischemia or myocardial infarction; increased heart rate may worsen ischemia or increase the zone of infarction.
  2. Avoid relying on atropine in type II second-degree or third-degree AV block or in patients with third-degree AV block with a new wide-QRS complex. These patients require immediate pacing.

#### Side Effects:
- **CNS:** drowsiness, confusion
- **CV:** angina, PVCs, tachycardia
- **EENT:** blurred vision, dilated pupils
- **GI:** dry mouth

#### Administration:

- **Adult:** **Bradycardia:** Give 0.5 mg IV. May repeat every 5 minutes to a total dose of 3 mg if needed.
  - **Cholinergic Toxicity:** Give 2 mg IV. Repeat every 5 minutes if needed.
- **Pediatric:** **Bradycardia:** Give 0.02 mg/kg IV/IO. May repeat once in 3 to 5 minutes if needed. (Minimum dose = 0.1 mg, maximum dose = 1 mg)

#### Supply:
Prefilled syringe containing 1 mg in 10 mL.

#### Notes:
**CALCIUM CHLORIDE 10%**

**Protocol 6.6**

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<tr>
<th>Scope</th>
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<th>AEMT</th>
<th>INT</th>
<th>PM</th>
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</thead>
</table>

**Generic Name:** Calcium Chloride (kal’se-um klor-ide)

**Trade Name:** N/A

**Chemical Class:** Divalent cation

**Therapeutic Class:** Electrolyte

**Actions:** Calcium chloride replaces calcium in cases of hypocalcemia. Calcium chloride causes a significant increase in the myocardial contractile force and appears to increase ventricular automaticity.

**Pharmacokinetics:** Rapid increase in serum levels, with return to pre-drug level within 30 minutes to 2 hours.

**Indications:**
1. Magnesium sulfate toxicity [Medical Control].
2. Acute hyperkalemia (elevated potassium) [Medical Control].
3. Acute hypocalcemia (decreased calcium) [Medical Control].
4. Calcium channel blocker toxicity (nifedipine, verapamil, diltiazem) [Medical Control].
5. Crush syndrome [Medical Control].
6. Beta-blocker overdose with shock refractory to other measures.

**Contraindication:** Patients receiving digitalis (can result in sudden cardiac death from VF if digitalis toxicity is present).

**Precautions:**
- Ensure administration by slow IV push; rapid push can cause VF.
- Extravasation can cause tissue necrosis at the injection site.
- Ensure IV line is flushed between administrations of calcium chloride and sodium bicarbonate to avoid precipitation.

**Pregnancy Cat. C**

**Side Effects:**
- CNS: dizziness
- CV: bradycardia, cardiac arrest, dysrhythmias, heart block, hemorrhage, hypotension, shortened Q-T
- GI: nausea, vomiting

**Administration:**
- Give 8 mg/kg of 10% solution IV over 5 minutes. Repeat dose in 10 minutes if needed.
- **[Beta Blocker Overdose]:** 20 mg/kg of 10% solution IV over 5 to 10 minutes.

**Supply:** Prefilled syringe containing 1 g in 10 mL (10% solution)

**Notes:**


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CEFAZOLIN

Protocol 6.7

Scope

EMR | EMT | AEMT | INT | PM

Generic Name: Cefazolin (sef-ah'-soe-lin)

Trade Name: Ancef®, Kefzol®

Chemical Class: First-generation cephalosporin

Therapeutic Class: Antibiotic

Actions: A bactericidal agent that acts by inhibition of bacterial cell wall synthesis.


Indications: Open skeletal fracture; a break in the skin over a fracture site.

Contraindications: 1. History of anaphylaxis (not simple rash) to penicillin.
                   2. Known allergy to the cephalosporin group of antibiotics (see notes for list of common cephalosporin antibiotics).
                   3. Age less one (1) year.

Precautions: Be alert for hypersensitivity reaction. Discontinue the IV infusion if signs and symptoms of an allergic reaction develop.

Pregnancy Cat. B: Be alert for hypersensitivity reaction. Discontinue the IV infusion if signs and symptoms of an allergic reaction develop.

Side Effects: GI: diarrhea

OTHER: anaphylaxis, itching, skin rash, rarely pain with intramuscular injection

Administration: Give 25 mg/kg up to 2 grams IV infusion over 10 minutes.

Directions: Reconstitute with 2.5 mL sterile water. Resultant approximate volume is 3 mL (330 mg/mL). Mix measured dose of reconstituted solution in 100 mL D5W and “piggyback” infuse over 10 minutes.

Supply: 1 gram vials

Notes: Parenteral drug products should be shaken well when reconstituted and inspected visually for particulate matter prior to administration. If particulate matter is evident in reconstituted fluids, the drug solutions should be discarded.

Reconstituted solutions may range in color from pale yellow to yellow without a change in potency.

Common cephalosporin antibiotics: Biocef® (cephalexin), Cedax® (cefibuten), Cefizox® (cefizoxide), Cefobid® (cefoxerazine), Cefotan® (ceftetan), Ceftin® (cefturoxime), Cefzil® (cefprozil), Ceptaz® (ceftazidime), Claforan® (cefotaxime), Duricef® (cefadroxil), Fortaz® (ceftazidime), Keflex® (cephalexin), Lorabid® (loracarbef), Maxipime® (cefepeime), Mefoxin® (cefoxitin), Omnicef® (cetdinir), Panixine® (cephalexin), Ranicol® (cefaclor), Rocephin® (ceftriaxone), Spectrocef® (cefditoren), Suprax® (cefixime), Tazicef® (ceftazidime), Vantin® (cefpodoxime), Velosef® (cephradine), Zinacef® (cefturoxime)
### DEXTROSE (Glucose®)

**Scope**: EMR EMT AEMT INT PM

<table>
<thead>
<tr>
<th>Generic Name:</th>
<th>Dextrose (dex'trose)</th>
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</thead>
<tbody>
<tr>
<td>Trade Name:</td>
<td>Glucose®, Glutose®, Insta-Glucose®</td>
</tr>
<tr>
<td>Chemical Class:</td>
<td>Carbohydrate</td>
</tr>
<tr>
<td>Therapeutic Class:</td>
<td>Nutrient, caloric</td>
</tr>
<tr>
<td>Actions:</td>
<td>Dextrose supplies supplemental glucose in cases of hypoglycemia and restores blood sugar level to normal (70 to 110 mg/dL).</td>
</tr>
<tr>
<td>Pharmacokinetics:</td>
<td>N/A</td>
</tr>
</tbody>
</table>
| Indications: | 1. Altered mental status of unknown etiology (GCS less than or equal to 12).  
2. Hypoglycemia (less than 60 mg/dL) based on rapid glucose determination or clinical judgment.  
4. Oral hypoglycemic agent overdose.  
5. Neonatal resuscitation not responsive to ventilation and chest compressions. |
| Contraindications: | No contraindications for a patient with suspected hypoglycemia. |
| Precautions: | 1. Use with caution in patients with increased intracranial pressure because the dextrose load may worsen cerebral edema.  
2. Localized venous irritation may occur when smaller veins are used.  
3. Infiltration may result in tissue necrosis.  
4. Dextrose is only administered via the IV or IO route. |
| Side Effects: | Tissue necrosis and phlebitis at the injection site. |
| Administration: | **Patient > 5 years old**: Give dextrose 50% 1 g/kg up to 25 g IV. Repeat once in 2 minutes if altered mental status persists.  
**Child < 5 years old**: Give dextrose 25% 0.5 g/kg up to 25 g IV. Repeat once in 2 minutes if altered mental status persists.  
**Neonate (< 28 days old)**: Give dextrose 10% 0.5 g/kg (5 mL/kg). |
| Supply: | Prefilled syringe containing 25 g in 50 mL (50% solution) |
| Notes: | 1. Establish a free flowing IV of normal saline in a large vein. Aspirate blood before and during administration of dextrose to ensure IV patency.  
2. Hypoglycemic states require immediate intervention. Prolonged hypoglycemia can result in permanent brain damage.  
3. To make Dextrose 25%, dispel 25 mL of solution from the prefilled syringe and draw 25 mL of normal saline back into the syringe. The resultant Dextrose 25% will contain 12.5 g in 50 mL. To make Dextrose 10%, dispel 40 mL of solution from the prefilled syringe and draw 40 mL of normal saline back into the syringe. The resultant Dextrose 10% will contain 5 g in 50 mL. |
### DIPHENHYDRAMINE (Benadryl®)

**Protocol 6.9**

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<thead>
<tr>
<th>Scope</th>
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<th>INT</th>
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#### Generic Name:
Diphenhydramine (dye-fen-hye’dra-meen)

#### Trade Name:
Benadryl®

#### Chemical Class:
Ethanolamine derivative

#### Therapeutic Class:
Antihistamine, antianaphylactic (adjunct)

#### Actions:
Diphenhydramine is an antihistamine with anticholinergic (drying) and sedative side effects. Diphenhydramine decreases the allergic response by blocking histamine at H₁ receptor sites.

#### Pharmacokinetics:
**PO:** Peak 2 to 4 hours. t₁/₂ = 2 to 8 hours. (IV pharmacokinetics not available)

#### Indications:
1. **Anaphylaxis,** *as an adjunct to epinephrine.*
2. Severe vomiting and motion sickness [Medical Control].
3. To treat dystonic reactions and extrapyramidal effects caused by haloperidol and phenothiazines. [Levels INT, PM].

#### Contraindications:
1. Bronchial asthma.
2. Nursing mothers.
3. Children less than 10 kg.
5. Hypersensitivity to the drug or other antihistamines.

#### Precautions:
*Pregnancy Cat. B*
Use with caution in patients with a history of hyperthyroidism, cardiovascular disease, and hypertension.

#### Side Effects:
- **CNS:** dizziness, drowsiness, sedation, sleepiness
- **CV:** headache, palpitations
- **GI:** dryness of mouth, nose and throat
- **RESP:** thickening of bronchial secretions, wheezing

#### Interactions:
1. Diphenhydramine has additive effects with alcohol and other CNS depressants (hypnotics, sedatives, tranquilizers, etc).
2. MAO inhibitors prolong and intensify the anticholinergic (drying) effects of antihistamines.

#### Administration:
**Adult:** Give 1 mg/kg up to 50 mg IM or slow IV push (25 mg/min).

**Pediatric:** Give 1 mg/kg up to 50 mg IM or slow IV push (25 mg/min).

#### Supply:
Vial containing 50 mg in 1 mL

#### Notes:
The IV route is preferred for the patient in severe shock. If an IV cannot be readily established, give diphenhydramine via the IM route. Administer deep IM into large muscle mass.
DOPAMINE (Intropin®)

Protocol 6.10

Scope

EMR  EMT  AEMT  INT  PM

Generic Name: Dopamine (doe’pa-meen)

Trade Name: Intropin®

Chemical Class: Catecholamine

Therapeutic Class: Vasopressor, α- and β-adrenergic sympathomimetic

Actions: Dopamine stimulates both adrenergic and dopaminergic receptors in a dose-dependent manner. Low doses (1-5 mcg/kg/min) stimulate mainly dopaminergic receptors producing renal and mesenteric vasodilation. Intermediate doses (5-10 mcg/kg/min) stimulate both dopaminergic and β1-adrenergic receptors producing cardiac stimulation and renal dilation. Large doses (10-20 mcg/kg/min) stimulate α-adrenergic receptors producing vasoconstriction and increases in peripheral vascular resistance and blood pressure.

Pharmacokinetics: Onset 5 minutes. Duration less than 10 minutes. t½ = 2 minutes.

Indications: 1. Hemodynamically significant bradycardia that does not respond to atropine and/or transcutaneous pacing. 2. Hemodynamically significant hypotension associated with cardiogenic shock. 3. Post cardiac arrest severe hypotension with normal or tachycardic heart rate, unresponsive to fluid resuscitation.

Contraindications: 1. Hypovolemic shock; volume replacement must be accomplished prior to using dopamine. 2. Pheochromocytoma (tumor of the adrenal gland).

Precautions: 1. Dopamine increases heart rate and can induce or worsen supraventricular and ventricular dysrhythmias. 2. Dopamine should not be administered in the presence of tachydysrhythmias or ventricular fibrillation.

Pregnancy Cat. C

Side Effects: CNS: headache, nervousness
CV: anginal pain, ectopic beats, hypertension, palpitation, tachycardia, vasoconstriction
GI: nausea, vomiting
RESP: dyspnea

Administration: IV infusion at 5 to 20 mcg/kg/min. Titrate to SBP = 100. Piggyback the dopamine infusion into an already established IV infusion.

Supply: Vial containing 200 mg in 5 mL.

Notes: 1. To prepare a dopamine infusion, mix 200 mg dopamine in a 250 mL bag of D5W and mix well. Resultant concentration is 800 mcg/mL. Infuse using a 60 drop administration set. Use the formula below to calculate the drip rate.
2. Tissue sloughing may occur with extravasation. Antecubital veins are preferable sites. Monitor closely for leakage and/or infiltration.

Dopamine Infusion Formula

\[
\frac{\text{Dose} \times \text{weight in kg} \times 60 \text{ drops/min}}{\text{Concentration of drug in 1 mL}} = \text{gtts/min}
\]
EPINEPHRINE 1:1,000

Scope

Generic Name: Epinephrine 1:1,000 (1 mg/mL)

Trade Name: Adrenalin®

Chemical Class: Catecholamine

Therapeutic Class: Bronchodilator, vasopressor

Actions: 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.

Pharmacokinetics: IM: Onset variable; Peak unknown; Duration 1-4 hr
SC: Onset 5-10 min; Peak 30 min; Duration 1-4 hr

Indications: 1. Anaphylaxis.
2. Bronchial asthma.
3. Respiratory distress due to epiglottitis or croup [Medical Control].

Contraindications: Epinephrine should be avoided in the following patients unless signs and symptoms are severe:
1. Hypertension (SBP greater than 180).
2. Tachycardia (HR greater than 140 adult, HR greater than 180 child).
3. Cardiovascular disease.
4. Elderly (age greater than 55 years).
5. Angle closure glaucoma.

2. Diabetes Mellitus.

Pregnancy Cat. C

Side Effects: CNS: anxiety, dizziness, restlessness, tremulousness, headache
CV: anginal pain, dysrhythmias, hypertension, palpitations
GI: nausea, vomiting
SKIN: pallor

Interactions: Cyclic antidepressants and antihistamines may potentiate the effects of epinephrine.

Administration: Adult: Give 0.01 mg/kg up to 0.5 mg IM\(^1\). Repeat in 10 minutes if needed.
Pediatric\(^2\): Give 0.01 mg/kg up to 0.3 mg IM\(^1\). Repeat in 10 minutes if needed.
Other: Croup/epiglottitis: Epinephrine is administered via hand held nebulizer. See Protocol 4.19 RESPIRATORY DISTRESS – CROUP/EPIGLOTTITIS for dosing and administration guidelines.

Supply: Ampule containing 1 mg in 1 mL.

Notes: \(^1\) The IM route is preferred for the patient in severe shock.
\(^2\) Child is defined as a pre-pubertal patient weighing less than 35–40 kg; not defined by age.
**EPINEPHRINE 1:10,000**

*Scope* | EMR | EMT | AEMT | INT | PM |
---|---|---|---|---|---|

**Generic Name:** Epinephrine 1:10,000 (1 mg/mL)

**Trade Name:** Adrenalin®

**Chemical Class:** Catecholamine

**Therapeutic Class:** Bronchodilator, vasopressor

**Actions:** Epinephrine is a naturally occurring catecholamine. It acts directly on α- and β-adrenergic receptors. Its effect on β-receptors is much more profound than its effect on α-receptors. The effects of epinephrine on β1-adrenergic receptors include a positive chronotropic effect (increased heart rate) and a positive inotropic effect (cardiac contractile force). The effects of epinephrine on α-adrenergic receptor sites include increased systemic vascular resistance. The effects on these receptor sites together cause an increased blood pressure. Epinephrine also causes bronchodilation due to its effects on β2-adrenergic receptors.

**Pharmacokinetics:** IV: Onset immediate; Peak 5 min; Duration short

**Indications:**
1. Cardiac arrest.
2. Pediatric bradycardia unresponsive to ventilation.
3. Neonatal bradycardia unresponsive to ventilation and chest compressions.

**Contraindications:** No contraindications when used for indicated conditions.

**Precautions:** No precautions when used for indicated conditions.

**Pregnancy Cat. C**

**Side Effects:**
- CNS: anxiety, dizziness, restlessness, tremulousness, headache
- CV: anginal pain, dysrhythmias, hypertension, palpitations
- GI: nausea, vomiting
- SKIN: pallor

**Administration:**
- **Adult:** Give 1 mg (10 mL) IV/IO. Repeat every 3 to 5 minutes if needed.
- **Pediatric:** Give 0.01 mg/kg (0.1 mL/kg) IV/IO. Repeat every 3 to 5 minutes if needed.

**Supply:** Prefilled syringe containing 1 mg in 10 mL

**Notes:**
EPINEPHrine INFUSion

Protocol 6.13

Scope: EMR, EMT, AEMT, INT, PM

Indications:
1. **Symptomatic bradycardia** if atropine and transcutaneous pacing fail or if pacing is not available. [INT, PM]
2. **Post cardiac arrest (ROSC) severe hypotension** (eg, SBP <80 mm Hg) with relative bradycardia, unresponsive to atropine, pacing or fluid resuscitation. [INT, PM]
3. **Anaphylaxis** refractory to initial resuscitation. [PM]

Contraindications: No contraindications when used for indicated conditions.

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

Side Effects:  
- **CNS**: anxiety, dizziness, restlessness, tremulousness, headache
- **CV**: anginal pain, dysrhythmias, hypertension, palpitations
- **GI**: nausea, vomiting
- **SKIN**: pallor

Administration:
- **Bradycardia**: Give 2 – 10 mcg/min IV infusion. Titrate to effect. Piggyback the epinephrine infusion to an already established IV infusion.
- **Post-ROSC Hypotension**: Give 0.1 – 0.5 mcg/kg/min IV infusion. Titrate to response. Piggyback the epinephrine infusion to an already established IV infusion.
- **Anaphylaxis**: Give 0.1 – 0.5 mcg/kg/min IV infusion. Titrate to response. Piggyback the epinephrine infusion to an already established IV infusion.

### EPINEPHrine INFUSion REFERENCE

**2–10 mcg/min dose**

Mix 1 mg epinephrine 1:1,000 in 250 mL bag of D5W.

4 mcg/mL concentration

Use 60 drop administration set.

<table>
<thead>
<tr>
<th>Dose (mcg/min)</th>
<th>Drops/min 4 mcg/mL conc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>45</td>
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<tr>
<td>4</td>
<td>60</td>
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<td>8</td>
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<tr>
<td>9</td>
<td>135</td>
</tr>
<tr>
<td>10</td>
<td>150</td>
</tr>
</tbody>
</table>

### EPINEPHrine INFUSion REFERENCE

**0.1 – 0.5 mcg/kg/min dose**

Mix 2 mg epinephrine 1:1,000 in 250 mL bag of D5W.

8 mcg/mL concentration

Use 60 drop administration set.

Mix 4 mg epinephrine 1:1,000 in 250 mL bag of D5W.

16 mcg/mL concentration

Use 60 drop administration set.

<table>
<thead>
<tr>
<th>Dose/min (mcg/min)</th>
<th>Drops/min 8 mcg/mL conc.</th>
<th>Drops/min 16 mcg/mL conc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
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</tr>
<tr>
<td>4</td>
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</tr>
<tr>
<td>6</td>
<td>45</td>
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<tr>
<td>8</td>
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<td>50</td>
<td>–</td>
<td>188</td>
</tr>
<tr>
<td>60</td>
<td>–</td>
<td>225</td>
</tr>
</tbody>
</table>
DOSE PER MINUTE TABLE

0.1 – 0.5 mcg/kg/min

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

<table>
<thead>
<tr>
<th></th>
<th>10 kg</th>
<th>20 kg</th>
<th>30 kg</th>
<th>40 kg</th>
<th>50 kg</th>
<th>60 kg</th>
<th>70 kg</th>
<th>80 kg</th>
<th>90 kg</th>
<th>100 kg</th>
<th>125 kg</th>
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<tbody>
<tr>
<td>0.1 mcg/kg</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>0.2 mcg/kg</td>
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<td>6</td>
<td>8</td>
<td>10</td>
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<td>14</td>
<td>16</td>
<td>18</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>0.3 mcg/kg</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>15</td>
<td>18</td>
<td>21</td>
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<td>0.4 mcg/kg</td>
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<td>28</td>
<td>32</td>
<td>36</td>
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<td>50</td>
</tr>
<tr>
<td>0.5 mcg/kg</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>45</td>
<td>50</td>
<td>63</td>
</tr>
</tbody>
</table>
### EPINEPHRINE AUTO-INJECTOR

<table>
<thead>
<tr>
<th>Scope</th>
<th>EMR</th>
<th>EMT</th>
<th>AEMT</th>
<th>INT</th>
<th>PM</th>
</tr>
</thead>
</table>

#### Protocol 6.14

<table>
<thead>
<tr>
<th><strong>Drug Names:</strong></th>
<th>Epinephrine (EpiPen®, EpiPen Jr.®)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overview:</strong></td>
<td>Epinephrine auto-injector 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.</td>
</tr>
<tr>
<td><strong>Indications:</strong></td>
<td>Patient exhibiting the assessment findings of an allergic reaction (shock and/or respiratory distress).</td>
</tr>
<tr>
<td><strong>Contraindications:</strong></td>
<td>No contraindications when used in a life-threatening situation.</td>
</tr>
<tr>
<td><strong>Side Effects:</strong></td>
<td>Increased pulse rate, tremors, nervousness</td>
</tr>
</tbody>
</table>
| **Administration:** | 1. Assure right medication, right patient, right route and right dose.  
2. Ensure medication is not discolored (liquid may not be visible inside all types of devices).  
3. Remove safety cap from the auto-injector.  
4. Place tip of auto-injector against the thigh and press firmly until the injector activates.  
5. Hold injector firmly against thigh for a minimum of 10 seconds to allow for full dose delivery.  
6. Record activity and time.  
7. Dispose of injector in biohazard container.  
8. If patient condition continues to worsen:  
   a. Decreasing mental status, increasing breathing difficulty, decreasing blood pressure.  
   b. Give an additional dose of epinephrine using a second EpiPen®. |
| **Supply:** | 1. EpiPen® contains 0.3 mg of epinephrine  
2. EpiPen Jr.® contains 0.15 mg of epinephrine |

#### Notes:
# FENTANYL (Sublimaze®)

**Protocol 6.15**

<table>
<thead>
<tr>
<th>Generic Name:</th>
<th>Fentanyl (fen'-ta-nil)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade Name:</td>
<td>Sublimaze®, Duragesic®, Fentora®</td>
</tr>
<tr>
<td>Chemical Class:</td>
<td>Opiate derivative</td>
</tr>
<tr>
<td>Therapeutic Class:</td>
<td>Narcotic analgesic</td>
</tr>
</tbody>
</table>

**Actions:** Fentanyl is a powerful synthetic opiate with mechanism of action similar to Morphine. It is considered both faster acting and of shorter duration than Morphine. Interacts with opiate receptors decreasing pain impulse transmission.

**Pharmacokinetics:**
- **IV:** Onset immediate. Peak effect several minutes. Duration of action 30 to 60 min.
- **IM:** Onset of action 7 – 8 minutes. Duration of action 1 – 2 hours.

**Indication:** Moderate to severe pain.

**Contraindications:**
1. Known hypersensitivity
2. Respiratory depression

**Precautions:**
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.

**Side Effects:**
- **CNS:** dizziness
- **CV:** hypotension, hypertension, bradycardia
- **EENT:** blurred vision
- **GI:** nausea, vomiting
- **RESP:** respiratory depression, apnea, laryngospasm
- **SKIN:** diaphoresis

**Administration:**

- **Pain**
  - **Adult/Ped:** 1 mcg/kg up to 100 mcg IM or IV over 1 to 2 minutes. Titrate to effect. If needed, repeat every 5 minutes. Do not exceed 3 mcg/kg.
  - **Pain >65 years:** 0.5 mcg/kg up to 50 mcg IM or IV over 1 to 2 minutes. Titrate to effect. If needed, repeat every 5 minutes. Do not exceed 3 mcg/kg.
  - **Pain Intranasal:** 1.5 mcg/kg up to 100 mcg IN (½ volume in each nostril). Repeat every 10 minutes. Do not exceed 3 mcg/kg.

- **Chest pain:** 50 mcg IV, repeat every 5 minutes (up to 150 mcg).

**Supply:** 100 mcg in 2 mL

**Notes:** If a subsequent dose is given prior to the peak effect of the initial dose, there is a risk of dose stacking and potential overdose.
GLUCAGON (GlucaGen®)

Protocol 6.16

Scope: EMR EMT AEMT INT PM

| Generic Name: | Glucagon (gloo'ka-gon) |
| Trade Name: | GlucaGen® |
| Chemical Class: | Polypeptide hormone |
| Therapeutic Class: | Antihypoglycemic |
| Actions: | Glucagon is a protein secreted by the α cells of the pancreas. When released, it causes the breakdown of glycogen, stored in the liver, to glucose. It also inhibits the synthesis of glycogen from glucose. Both actions tend to cause an increase in circulating blood glucose. A return to consciousness following the administration of glucagon usually takes 5 to 20 minutes. Glucagon is only effective if there are sufficient stores of glycogen in the liver. |
| Pharmacokinetics: | Onset within 15 minutes. $t_{1/2} = 3$ to 6 minutes. |
| Indications: | When unable to obtain IV access and give dextrose, and |
| | 1. Altered mental status of unknown etiology (GCS less than or equal to 12). |
| | 2. Hypoglycemia (less than 60 mg/dL) based on rapid glucose determination or clinical judgment. |
| | 4. Oral hypoglycemic agent overdose. |
| Contraindications: | Hypersensitivity to the drug. |
| Precautions: | 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. |
| Pregnancy Cat. C | |
| Side Effects: | CNS: dizziness, headache |
| | CV: hypotension |
| | GI: nausea, vomiting |
| Administration: | Adult: 1 mg IM |
| | Pediatric: 1 mg IM |
| Supply: | Glucagon must be reconstituted before administration. It is supplied in rubber-stoppered vials containing 1 mg of powder and 1 mL of diluting solution. |
| Notes: | [EMT] Only EMTs who have completed training through a CSEMS BLS Local Protocol Program course are authorized to give glucagon. 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 3 to 5 mg/h infusion. |
HALOPERIDOL (Haldol®)

Generic Name: Haloperidol (ha-loe-per'idole)

Trade Name: Haldol®

Chemical Class: Butyrophenone derivative

Therapeutic Class: Antipsychotic

Actions: Haloperidol is a major tranquilizer that has provided effective in the management of acute psycholitc episodes. Haloperidol appears to block dopamine receptors in the brain associated with mood and behavior. Haloperidol has weak anticholinergic properties.

Pharmacokinetics: IM: Peak 10-20 minutes, t½ = 17 hours; IV: N/A

Indications: Combative patients secondary to acute psychotic episodes.

Contraindications: 1. Severe toxic central nervous system depression or comatose states from any cause.
   2. Hypersensitivity to the drug.
   4. Age less than 8 years. [Medical Control]

Precautions:

Pregnancy Cat. C 1. Haloperidol may impair mental and physical abilities. Occasionally, orthostatic hypotension may be seen in conjunction with haloperidol use. Caution should be used when administering haloperidol to patients on anticoagulants.
   2. Extrapyramidal reactions have been known to occur following the administration of haloperidol, especially in children. Diphenhydramine should be available.

Side Effects: CNS: extrapyramidal symptoms, drowsiness, headache, insomnia, restlessness, seizures, vertigo
   CV: hypertension, hypotension, tachycardia
   EENT: blurred vision
   GI: nausea, vomiting, dry mouth, constipation

Administration:  
   Adult: Give 5 mg IM. Contact [Medical Control] for repeat dosing.
   Pediatric: Contact [Medical Control].

Supply: Ampule containing 5 mg in 1 mL.

Note: Haloperidol may be mixed with midazolam for injection.
**HYDROXOCOBALAMIN (Cyanokit®)**

**Generic Name:** Hydroxocobalamin (hye-drox-oh-koe-bal'-a-min)

**Trade Name:** Cyanokit®

**Chemical Class:** Vitamin B complex

**Therapeutic Class:** Hematinic; vitamin

**Actions:** Cyanide is an extremely toxic poison. In the absence of rapid and adequate treatment, exposure to a high dose of cyanide can result in death within minutes due to inhibition of cytochrome oxidase resulting in arrest of cellular respiration. Specifically, cyanide binds rapidly with cytochrome a3, a component of the cytochrome c oxidase complex in mitochondria. Inhibition of cytochrome a3 prevents the cell from using oxygen and forces anaerobic metabolism, resulting in lactate production, cellular hypoxia and metabolic acidosis. The action of Cyanokit® in the treatment of cyanide poisoning is based on its ability to bind cyanide ions to form cyanocobalamin, which is then secreted in the urine.

**Pharmacokinetics:** N/A

**Indications:** Known or suspected cyanide poisoning.

**Contraindications:** Hypersensitivity to hydroxocobalamin or cyanocobalamin

**Precautions:**

- **Pregnancy Cat. C**
  1. Allergic reactions may include anaphylaxis, chest tightness, edema, urticaria, pruritus, dyspnea and rash.
  2. Hypertension.

**Side Effects:**

- **CNS:** headache
- **CV:** increased blood pressure
- **GI:** transient chromoauria (abnormal coloration of the urine), nausea
- **SKIN:** erythema, rash, injection site reactions

**Administration:**

- **Adult:** Give 5 g IV infused over 15 minutes. If signs and symptoms persist, a repeat dose can be administered [Medical Control]. The infusion rate for second dose is usually between 15 minutes and 2 hours.

- **Pediatric:** Give 70 mg/kg, up to 5 g IV infused over 15 minutes. If signs and symptoms persist, a repeat dose can be administered [Medical Control]. The infusion rate for second dose is usually between 15 minutes and 2 hours.

**Preparation:**

1. **Reconstitute:** Place the vial in an upright position. Add 200 mL of 0.9% Sodium Chloride (not included) to the vial using the transfer spike. Fill to the line.

2. **Mix:** The vial should be repeatedly inverted or rocked, not shaken, for at least 60 seconds prior to infusion. CYANOKIT solutions should be visually inspected for particulate matter and color prior to administration. Discard solution if particulate matter is present or solution is not dark red.

3. **Infuse Vial:** Use vented intravenous tubing, hang and infuse over 15 minutes.

**Notes:**

- The drug substance is the hydroxylated active form of vitamin B12.
- Cyanide poisoning may result from inhalation, ingestion, or dermal exposure to various cyanide-containing compounds, including smoke from closed-space fires. The presence and extent of cyanide poisoning are often initially unknown. There is 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.
- Incompatible with diazepam, dobutamine, dopamine, fentanyl, nitroglycerin, pentobarbital, propofol, thiopental, blood products, sodium thiosulfate, sodium nitrite and ascorbic acid. Use separate IV lines.
**IPRATROPIUM (Atrovent®)**

<table>
<thead>
<tr>
<th>Scope</th>
<th>EMR</th>
<th>EMT</th>
<th>AEMT</th>
<th>INT</th>
<th>PM</th>
</tr>
</thead>
</table>

### Generic Name
- Ipratropium (eye-tra-potroep’ee-um)

### Trade Name
- Atrovent®

### Chemical Class
- Quaternary ammonium compound

### Therapeutic Class
- Bronchodilator

### Actions
Ipratropium is an anticholinergic bronchodilator that is chemically related to atropine. Ipratropium acts by inhibiting the action of acetylcholine at receptor sites on bronchial smooth muscle, thus inhibiting parasympathetic stimulation and causing bronchodilation. Ipratropium has antisecretory properties when applied locally.

### Pharmacokinetics
- Onset 5 to 15 minutes. Peak effect 1 to 2 hours. Duration of action 3 to 6 hours.

### Indications
1. Bronchoconstriction in COPD, including chronic bronchitis and emphysema as an adjunct to albuterol.
2. Bronchial asthma as an adjunct to albuterol.

### Contraindications
1. Hypersensitivity to the drug, or to atropine and its derivatives.

### Precautions
- Pregnancy Cat. B
  - Ipratropium should be used with caution in patients with narrow-angle glaucoma, prostatic hypertrophy or bladder-neck obstruction.

### Side Effects
- **CNS:** anxiety, dizziness, headache, nervousness
- **CV:** palpitations
- **EENT:** blurred vision, dry mouth
- **GI:** nausea, vomiting
- **RESP:** bronchospasm, cough

### Administration
Using a small volume nebulizer, adjust the oxygen flowmeter to 6 to 10 L/min to produce a steady, visible mist.
- **Adult:** Give 500 mcg in 2.5 mL with a mouthpiece or facemask. Do not repeat.
- **Pediatric:** Give 500 mcg in 2.5 mL with a mouthpiece or blow-by. Do not repeat.

### Supply
- Unit dose vials containing 500 µg in 2.5 mL.

### Notes
1. Give only one dose of ipratropium with the initial albuterol treatment. Ipratropium is not used as a stand alone drug.
2. Ipratropium is not used for anaphylactic respiratory distress.
KETAMINE (Ketalar®)  Protocol 6.20

Scope: EMR EMT AEMT INT PM

Generic Name: Ketamine (ket’a-meen)
Trade Name: Ketalar®
Chemical Class: Analgesic
Therapeutic Class: Subdissociative anesthetic

Actions: Ketamine attaches to NMDA receptors, which disassociates the portion of the brain that controls consciousness from the portion of the brain that controls vital bodily functions. Low doses of ketamine for pain augmentation administered after multiple doses of opioid analgesics can achieve potent analgesia.

Pharmacokinetics: IM. Onset 3 to 4 minutes. Duration: 10 to 25 minutes.

Indications: 1. Analgesic as an adjunct to an opiate analgesic

Contraindications: 1. Hypersensitivity to the drug.

Precautions: 1. IV administration of ketamine is less safe than IM due to improper rate of administration.

Pregnancy Cat. B

Side Effects: CNS: confusion, delirium, vivid dreams
CV: hypertension, tachycardia
GI: nausea, vomiting, hypersalivation
RESP: respiratory depression (if given quickly)

Interactions: Administering ketamine to a patient who has used ethanol (ETOH) can increase nervous system side effects such as dizziness, drowsiness, and difficulty concentrating.

Supply: Vial 500 mg in 10 mL.

Administration: Age 4 and up: IM: Pain Augmentation (if pain persists after two doses of first line analgesic): Give 0.15 mg/kg IM. Repeat every 20 to 30 minutes if needed to a maximum of three doses.

Age 3 and below: [Medical Control]

Notes: 1. Ketamine (in lower doses) is more effective in relieving pain when given adjunctively to opiate analgesics and should be given after the second dose of an opiate. The first line analgesic is fentanyl. Use morphine only if fentanyl is contraindicated or not available.
2. The first line analgesic is fentanyl. Morphine may be substituted when a fentanyl contraindication exists or when fentanyl is not available.
3. Some patients will feel “funny” or “not right” after ketamine. Nystagmus might be noted. This is not dangerous and will pass.
# LIDOCAINE (Xylocaine®)

**Generic Name:** Lidocaine (lye’doe-kane) Hydrochloride 2%

**Trade Name:** Xylocaine®

**Chemical Class:** Amide derivative

**Therapeutic Class:** Anesthetic, local

**Actions:** Lidocaine stabilizes the neuronal membrane by inhibiting the ionic fluxes required for the initiation and conduction of nerve impulses, thereby effecting local anesthetic action.

**Pharmacokinetics:** Onset of anesthesia: 15-30 seconds. Duration 30-60 minutes.

**Indication:** Pain associated with infusing fluid under pressure via the EZ-IO® system.

**Contraindications:**
1. Hypersensitivity to the drug.
2. Stokes-Adams syndrome
3. Wolff-Parkinson-White syndrome
4. Severe degrees of sinoatrial, atrioventricular or intraventricular block in the absence of an artificial pacemaker.

**Precautions:** Use cautiously in patients with severe liver or kidney disease, hypovolemia, severe congestive heart failure and shock.

**Pregnancy Cat. B**

**Side Effects:**
- **CNS:** seizures, tremors, twitching, dizziness, unconsciousness
- **CV:** bradycardia, edema, heart block, hypotension
- **EENT:** blurred or diplopia, tinnitus
- **Other:** respiratory depression, nausea, vomiting

**Administration**
- **Adult:** 20-40 mg IO. Give slowly in small increments (4 mg/0.2 mL) until pain is resolved.
- **Pediatric:** 0.5 mg/kg up to 40 mg IO. Give slowly in small increments (4 mg/0.2 mL) until pain is resolved.

**Supply:** Vial contains 40 mg in 2 mL.
MAGNESIUM SULFATE

Scope

<table>
<thead>
<tr>
<th></th>
<th>EMR</th>
<th>EMT</th>
<th>AEMT</th>
<th>INT</th>
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Protocol 6.22

<table>
<thead>
<tr>
<th>Generic Name:</th>
<th>Magnesium Sulfate (mag-nee’see-um sul’fate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade Name:</td>
<td>Magnesium Sulfate Inj. 50%</td>
</tr>
<tr>
<td>Chemical Class:</td>
<td>Divalent cation</td>
</tr>
<tr>
<td>Therapeutic Class:</td>
<td>Antiarrhythmic, electrolyte</td>
</tr>
</tbody>
</table>

**Actions:** Magnesium sulfate is a salt that dissociates into the magnesium cation (Mg\(^{2+}\)) and the sulfate anion when administered. Magnesium is an essential element in many of the biochemical processes that occur in the body. It acts as a physiological calcium channel blocker and blocks neuromuscular transmission by decreasing acetylcholine release at the neuromuscular junction. Magnesium slows the rate of SA node impulse formation and prolongs conduction time.

**Pharmacokinetics:** Onset immediate. Duration 30 minutes.

**Indications:**
1. Torsades de pointes.
2. Eclampsia.
3. Tricyclic antidepressant toxicity.
4. Status asthmaticus non-responsive to standard medications.

**Contraindications:** Third-degree AV block.

**Precautions:**
1. If reflexes disappear in the eclamptic patient, do not repeat the dose.
2. Magnesium sulfate should be administered slowly to minimize side effects.
3. Any patient receiving intravenous magnesium sulfate should have continuous cardiac monitoring and frequent monitoring of vital signs.
4. Magnesium sulfate should be given very cautiously in the presence of serious impairment of renal function since it is excreted almost entirely by the kidneys.

**Side Effects:**
- CNS: coma, depressed reflexes, lethargy, weakness
- CV: heart block, hypotension, bradycardia
- RESP: respiratory depression
- SKIN: flushing, sweating

**Interactions:** Magnesium sulfate can cause cardiac conduction abnormalities if administered in conjunction with digitalis.

**Administration:** Prior to administration, magnesium sulfate should be diluted to make a 20% solution. For a 2 g dose, mix 2 g (4 mL) of magnesium sulfate with 6 mL of normal saline to make a 20% solution.

- **Adult:**
  - **Pulseless:** Give 2 g (20% solution) IV over 1 to 2 minutes.
  - **With Pulse:** Give 2 g (20% solution) IV over 5 minutes. Repeat dose if needed.

- **Seizure (eclampsia):** 4 g (20% solution) IV over 4 minutes. Repeat dose (if available) in 5 minutes if seizure persists [Medical Control].

- **Pediatric:**
  - **Pulseless:** Give 25 mg/kg up to 2 g IV/IO, for torsades de pointes.

**Supply:** Vial containing 1 g in 2 mL.

**Notes:**
### METERED DOSE INHALER

**Protocol 6.23**

#### Scope

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#### Drug Names:
1. **Albuterol** (Proventil®, Ventolin®)
2. **Metaproterenol** (Metaprel®, Alupent®)
3. **Isoetharine** (Bronchosal®, Bronkometer®)

#### Overview:
Bronchodilators are drugs that dilate, or enlarge the air passages, making breathing easier. Bronchodilators begin to work immediately and last for hours. The device administers a specific measured (metered) dose of medication. A spacer can be utilized to help administer the medication.

#### Indications:
1. Shortness of breath and/or signs and symptoms of difficulty breathing, and 
2. Patient has the medication and the medication is prescribed for the patient.

#### Contraindications:
1. Patient is unable to use the device (i.e., unresponsive).
2. Patient has taken the maximum number of prescribed doses prior to the arrival of EMS.

#### Side Effects:
Increased pulse rate, tremors, nervousness

#### Administration:
1. Assure right medication, right patient, right route, patient alert enough to use inhaler.
2. Check expiration date of the inhaler.
3. Check to see if the patient has already taken any doses.
4. Assure the inhaler is at room temperature or warmer.
5. Remove oxygen adjunct from patient.
6. Have the patient exhale deeply.
7. Have the patient put lips around the opening of the inhaler.
8. Have the patient depress the handheld inhaler as he begins to inhale deeply.
9. Instruct the patient to breathe a few times and repeat second dose per medical direction.
10. 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.
11. Record activity and time.

#### Supply:
Varies by medication.
## METHYLPREDNISOLONE (Solu-Medrol®)

### Protocol 6.24

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<thead>
<tr>
<th>Scope</th>
<th>EMR</th>
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<th>INT</th>
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</thead>
</table>

### Generic Name: Methylprednisolone (meth-il-pred-niss’oh-lone)

### Trade Name: Solu-Medrol®

### Chemical Class: Glucocorticoid, synthetic

### Therapeutic Class: Corticosteroid, systemic

### Actions:
Methylprednisolone is an intermediate-acting corticosteroid related to the natural hormones secreted by the adrenal cortex. Methylprednisolone enters target cells and causes many complex reactions that are responsible for its anti-inflammatory and immunosuppressive effects.

### Pharmacokinetics:
Peak 2 hours. $t_{1/2} = 3$ hours.

### Indications:
1. Anaphylaxis.
2. Respiratory distress from asthma or COPD.
3. Respiratory distress due to croup.

### Contraindications:
Hypersensitivity to the drug.

### Precautions:
A single dose of methylprednisolone is all that should be given in the prehospital phase of care. Long-term steroid therapy can cause gastrointestinal bleeding and prolonged wound healing.

### Pregnancy Cat. C

### Side Effects:
- **CNS:** seizures, vertigo
- **CV:** CHF, hypertension, tachycardia
- **GI:** abdominal distension, diarrhea, GI hemorrhage, increased appetite, nausea

### Interactions:
N/A

### Administration:
- **Adult:** 2 mg/kg up to 125 mg IV over 1 to 2 minutes or IM.
- **Pediatric:** 2 mg/kg up to 125 mg IV over 1 to 2 minutes or IM.

### Supply:
Methylprednisolone must be reconstituted before administration. It is supplied in an Act-O-Vial® containing 125 mg of powder and 2 mL of diluting solution.

### Notes:
To use the Act-O-Vial®:
1. Press down on plastic activator to force diluent into the lower compartment.
2. Gently agitate to effect solution.
3. Remove plastic tab covering the center stopper
4. Withdraw dose as with a normal vial.
**METOPROLOL (Lopressor®)**

**Scope**

- EMR
- EMT
- AEMT
- INT
- PM

**Generic Name:** Metoprolol (me-toe‘pro-lole)

**Trade Name:** Lopressor®, Toprol XL®

**Chemical Class:** β₁-adrenergic blocker, cardioselective

**Therapeutic Class:** Antianginal, antihypertensive

**Actions:** Metoprolol is a β-antagonist that blocks both β₁- and β₂-adrenergic receptors, but is selective for β₁-adrenergic receptors. Metoprolol produces negative inotropic and chronotropic responses, slows AV nodal conduction, and has antiarrhythmic effects. Metoprolol causes reduction in heart rate, systolic blood pressure and cardiac output. Because of these effects, metoprolol is thought to be protective of the heart and is used to reduce potential complications in selected patients who have suffered an acute myocardial infarction. Metoprolol has proved effective in reducing the incidence of ventricular fibrillation and chest pain in these patients.

**Pharmacokinetics:** Peak 20 minutes. Duration 5 to 8 hours. \( t_{1/2} = 3 \) to 4 hours.

**Indications:**
1. Irregular narrow-complex tachycardia [probable atrial fibrillation or possible atrial flutter or MAT (multifocal atrial tachycardia)].
2. Regular narrow-complex tachycardia that does not covert following administration of adenosine.
3. Stable wide-complex tachycardia [Medical Control].

**Contraindications:**
1. Bradycardia (HR less than 60).
2. Hypotension (SBP less than 100).
3. Bronchial asthma.
5. Second- or third-degree AV block.

**Precautions:**

**Pregnancy Cat. C** The blood pressure, pulse rate, ECG and respiratory status should be continuously monitored during metoprolol therapy. Be alert for signs and symptoms of congestive heart failure, bradycardia, shock, heart block and bronchospasm. The presence of any of these signs or symptoms is an indication for discontinuing the medication.

**Side Effects:**

- CNS: dizziness, lethargy
- CV: bradycardia, CHF, cold extremities, heart block, hypotension
- RESP: bronchospasm (1%), dyspnea

**Interactions:**

Administer with caution to patients taking antihypertensive agents or calcium channel blockers.

**Administration:**

- **Adult:** Give 5 mg IV over 2 minutes. Repeat every 5 minutes if needed to a total dose of 15 mg.
- **Pediatric:** Not indicated.

**Supply:** Ampule containing 5 mg in 5 mL.

**Notes:**


173
MIDAZOLAM (Versed®)

Protocol 6.26

**Scope**

<table>
<thead>
<tr>
<th>Class</th>
<th>EMR</th>
<th>EMT</th>
<th>AEMT</th>
<th>INT</th>
<th>PM</th>
</tr>
</thead>
</table>

**Generic Name:** Midazolam (mid-az’zoe-lam)  
**Trade Name:** Versed®  
**DEA Class:** Schedule IV

**Chemical Class:** Benzodiazepine  
**Therapeutic Class:** Sedative/hypnotic

**Actions:** Midazolam causes central nervous systems depression via facilitation of inhibitory GABA¹ at benzodiazepine receptor sites (BZ₁ – associated with sleep; BZ₂ – associated with memory, motor, sensory and cognitive function). Midazolam is a short-acting benzodiazepine that is three to four times more potent than diazepam. Midazolam has important amnestic properties.

**Pharmacokinetics:**
- **IM:** Onset 15 minutes. Peak 30 to 60 minutes.
- **IV:** Onset 3 to 5 minutes. $t_{1/2} = 1.2$ to $12.3$ hours.

**Indications:**
1. Sedation for cardioversion and transcutaneous pacing.
2. Sedation for endotracheal intubation **ONLY AFTER** the ET tube is inserted.
3. Seizures not caused by hypoglycemia.
4. Severe agitation, tachycardia, or hallucinations caused by alcohol withdrawal.
5. Behavioral or alcohol related agitation as an adjunct to haloperidol.
6. Sedation for shivering secondary to induced hypothermia.

**Contraindications:**
1. Hypersensitivity to the drug.
2. Hypotension (SBP less than 100).
3. Acute angle closure glaucoma.

**Precautions:**
- **Pregnancy Cat. D**

Administer cautiously when alcohol intoxication is suspected. Emergency resuscitative equipment must be available prior to the administration of midazolam. Vital signs must be continuously monitored during and after drug administration. Midazolam has more potential than the other benzodiazepines to cause respiratory depression and respiratory arrest.

**Side Effects:**
- CNS: drowsiness, amnesia, altered mental status
- CV: hypotension, tachycardia, PVCs
- RESP: bronchospasm, coughing, laryngospasm, respiratory depression and arrest

**Interactions:** The effects of midazolam can be accentuated by CNS depressants such as narcotics and alcohol.

**Administration:**

**Adult:** Give 2.5 to 5 mg slow IV titrated to effect, based on protocol. May repeat dose every 5 minutes if needed.

Midazolam may also be administered 5 mg IM if unable to readily establish IV access.

**Pediatric:** Give 0.1 mg/kg slow IV, titrated to effect. May repeat every 5 minutes as needed [Medical Control].

Midazolam may also be administered 0.1 mg/kg IM if unable to readily establish IV access [Medical Control].

**Intranasal:** 0.25 mg/kg up to 5 mg IN (½ volume in each nostril).

**NOTE:** May cause some sustained burning, particularly in pediatric patients. Consider lidocaine 10 mg (0.5 mL) in each nare 3-5 minutes prior to midazolam. Do not delay midazolam administration in an emergency.

**Supply:** Vial containing 5 mg in 1 mL.

**Notes:**
1 GABA = gammaaminobutyric acid, the chief inhibitory neurotransmitter in the CNS. GABA hyperpolarizes the membrane of the CNS neurons decreasing their response to stimuli.
MORPHINE

Protocol 6.27

Scope EMR EMT AEMT INT PM

**Generic Name:** Morphine (mor'feen)

**Trade Name:** Astramorph®, Duramorph®, MS Contin®, Roxanol®

**Chemical Class:** Natural opium alkaloid, phenanthrene derivative

**Therapeutic Class:** Narcotic analgesic

**Actions:** Morphine is a central nervous system depressant that acts on opiate receptors in the brain, providing both analgesia and sedation. It increases peripheral venous capacitance and decreases venous return. Morphine also reduces myocardial oxygen demand due to both the decreased systemic vascular resistance and the sedative effects of the drug.

**Pharmacokinetics:**
- **IM:** Onset 10 to 30 minutes. Peak analgesia 30 to 60 minutes. Duration 4.5 hours.
- **IV:** Peak analgesia 20 minutes. $t_{1/2} = 2.5$ to 3 hours.

**Indications:**
- All indications are for pain refractory to FENTANYL administration or when FENTANYL is contraindicated (i.e. allergy).
  1. Pain associated with acute myocardial infarction unresponsive to nitrates.
  2. Acute pain, such as isolated extremity trauma.
  3. Pain from burns (not involving respiratory tract).
  4. Pulmonary edema [Medical Control].
  5. Acute abdominal pain [Medical Control].

**Contraindications:**
- 1. Hypotension (SBP less than 100 adult, SBP less than 80 child).
- 2. Respiratory depression.
- 3. Hypersensitivity to the drug.
- 4. Multi-system trauma.
- 5. Head injury.
- 6. Altered mental status from any cause.

**Precautions:**
- **Pregnancy Cat. B** Morphine causes severe respiratory distress in high doses, especially in patients who already have some form of respiratory impairment. Naloxone should be readily available whenever morphine is administered.

**Side Effects:**
- **CNS:** dizziness, drowsiness, headache, sedation
- **CV:** hypotension
- **EENT:** blurred vision, constricted pupils, diplopia
- **GI:** abdominal cramps, constipation, nausea, vomiting
- **RESP:** respiratory depression

**Interactions:** The CNS depression associated with morphine can be enhanced when administered with antihistamines, antiemetics, sedatives, hypnotics, barbiturates and alcohol.

**Administration:**
- **Adult:**
  - **Pain with AMI:** Give 5 mg IV at 1 mg/min, titrated to effect. If additional dosing is needed, contact [Medical Control].
  - **Other acute pain:** 0.1 mg/kg IV at 1 mg/min., not to exceed 20 mg, titrated to effect. Or, 0.1 mg/kg IM, not to exceed 10 mg (1.0 mL); repeat IM dose in 10 minutes if necessary.
  - **Pulmonary edema:** Contact [Medical Control].
- **Pediatric:** Give 0.1 mg/kg IV/IM at 1 mg/min., not to exceed 10 mg, titrated to effect. If additional dosing is needed, contact [Medical Control].

**Supply:** Vial containing 10 mg in 1 mL.

**Notes:** Discontinue the IV injection if the pain is relieved or a contraindication develops.
NALOXONE (Narcan®)  Protocol 6.28

Generic Name: Naloxone (nal-oks’one)

Trade Name: Narcan®

Chemical Class: Thebaine derivative

Therapeutic Class: Antidote, opiate

Actions: Naloxone is chemically similar to the narcotics. However, it has only antagonistic properties. Naloxone competes for opiate receptors in the brain. It also displaces narcotic molecules from opiate receptors. It can reverse respiratory depression associated with narcotic overdose.

Pharmacokinetics: IV: Onset 2 minutes. t½ = 64 minutes.

Indications: Respiratory depression caused by narcotics.

Contraindications: Hypersensitivity to the drug.

Precautions: 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).

Pregnancy Cat. B

Side Effects: CNS: seizures, tremulousness
CV: hypertension, hypotension, tachycardia, ventricular dysrhythmia
GI: nausea, vomiting

Interactions: Naloxone may cause narcotic withdrawal in the narcotic-dependent patient. In cases of suspected narcotic dependence, only enough drug to reverse respiratory depression should be administered.

Administration: Adult: IV: Give 2 mg IV at 0.4 mg/min.
Pediatric: IN: Give 0.1 mg/kg up to 2 mg IN (½ volume in each nostril).
IM: Give 0.1 mg/kg up to 2 mg IM.
If no response to initial dose of naloxone, contact [Medical Control].

[EMT] IM: Give 2 mg IM for patient weighing 20 kg or more.

Supply: Prefilled syringe 2 mg in 2 mL.

Notes: 1. Unless necessary, avoid insertion of an advanced airway prior to administration of naloxone.
2. Administer naloxone by a slow IV push (0.4 mg/min).
3. Reversal of the effects of narcotics may be only temporary. Titrate administration of naloxone to respiratory rate.
5. [EMT] is required to use a prefilled syringe containing 2 mg in 2 mL. Calculating and measuring a dose from any other supplied concentration is not permitted.
Generic Name: Nitroglycerin (nye-troe-gli'ser-in)

Trade Name: Nitrolingual®, Nitroquick®, Nitrostat®, Nitr-bid®, Nitrol®

Chemical Class: Nitrate, organic

Therapeutic Class: Antianginal, vasodilator

Actions: Nitroglycerin is a rapid smooth muscle relaxant that causes vasodilation and, to a lesser degree, dilates the coronary arteries. This results in increased coronary blood flow and improved perfusion of the ischemic myocardium. Relief of ischemia causes reduction and alleviation of chest pain. Vasodilation decreases preload and leads to decreased cardiac work that can help reverse the effects of angina pectoris. Additionally, decreased preload results in decreased pulmonary capillary hydrostatic pressure and reduction of fluid passing into the pulmonary interstitium and alveoli in cardiogenic pulmonary edema.

Pharmacokinetics:

<table>
<thead>
<tr>
<th>Route</th>
<th>Onset</th>
<th>Peak</th>
<th>Duration</th>
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<tbody>
<tr>
<td>SL</td>
<td>1 to 3 minutes.</td>
<td>5 minutes.</td>
<td>at least 25 minutes.</td>
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<tr>
<td>TOP</td>
<td>15 to 60 minutes.</td>
<td>30 to 120 minutes.</td>
<td>2 to 12 hours.</td>
</tr>
<tr>
<td>t½</td>
<td>2 to 3 minutes.</td>
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Indications:
1. Chest pain suspected to be cardiac in origin.
2. Cardiogenic pulmonary edema.

Contraindications:
1. Hypotension (SBP less than 100).
2. Bradycardia (HR less than 60).
3. Increased intracranial pressure (i.e., CVA, head injury).
4. Hypersensitivity to the drug.
5. Patient on sildenafil (Viagra®) or other anti-impotence agent.

Precautions: Pregnancy Cat. C
1. Administer nitrates with extreme caution if at all to patients with suspected inferior wall MI with possible right ventricular (RV) involvement because these patients require adequate RV preload.
2. Patients taking the drug routinely may develop a tolerance and require an increased dose.
3. Postural syncope sometimes occurs following the administration of nitroglycerin; it should be anticipated and the patient kept supine when possible.
4. Careful clinical or hemodynamic monitoring must be used because of the possibility of hypotension and tachycardia.

Side Effects:
- CNS: dizziness, headache, weakness
- CV: dysrhythmias, palpitations, postural hypotension, tachycardia
- GI: nausea, vomiting
- SKIN: diaphoresis, flushing, pallor, rash

Interactions:
1. Severe hypotension is possible when administered to patients who have recently ingested alcohol.
2. Orthostatic hypotension is possible when used in conjunction with β-adrenergic antagonists.
3. Administration of nitroglycerin is contraindicated in patients who are using anti-impotence agents such as sildenafil (Viagra®) since these agents have been shown to potentiate the hypotensive effects of organic nitrates.

CONTINUED ON NEXT PAGE
## NITROGLYCERIN (Nitrostat®)

### Protocol 6.2

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

### CONTINUED FROM PREVIOUS PAGE

**Administration:** An IV or INT must be established prior to administering nitroglycerin unless the patient has taken nitroglycerin before without complications.

| Sublingual | Adult: | Chest Pain: Give 0.4 mg SL. Repeat every 5 minutes, if needed, up to 3 doses.  
|           | Pulmonary Edema (SBP greater than 180): Give 2 tablets, 0.4 mg SL. Repeat 2 tablets every 3 minutes if needed.  
|           | Pulmonary Edema (SBP 100–180): Give 1 tablet, 0.4 mg SL. Repeat 1 tablet every 5 minutes if needed.  
| Pediatric: | Not indicated.  
| Notes:     | 1. Alternate the sublingual site (right to left side of tongue) when repeating nitroglycerin tablets.  
|           | 2. Nitroglycerin may produce a burning or tingling sensation when administered sublingually; however, the ability to produce a burning or tingling sensation should not be considered a reliable method for determining the potency of the tablets.  

| Topical | Adult: | Chest Pain: If pain persists following administration of nitroglycerin SL, apply 1 inch of nitroglycerin paste topically.  
|         | Pulmonary Edema (SBP greater than 180): Apply 2 inches of nitroglycerin paste topically.  
|         | Pulmonary Edema (SBP 100–180): Apply 1 inch of nitroglycerin paste topically.  
| Pediatric: | Not indicated.  
| Notes: | 1. Apply nitroglycerin paste to the chest or upper arm.  
|        | 2. Do not rub the paste into the skin.  
|        | 3. If contraindications develop when nitroglycerin paste is applied, remove the paste.  
|        | 4. Wear gloves for application and/or removal of nitroglycerin paste.  

**Supply:**  
- Tablet: Bottle containing 0.4 mg (1/150 grain) tablets.  
- Paste: Packets containing 1 g (1 inch) or tubes containing 30 to 60 grams.

**Notes:** Nitroglycerin should be kept in the original glass container, tightly capped.
## NITROGLYCERIN, ASSISTED (Nitrostat®)

### Protocol 6.30

#### Scope

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<th>PM</th>
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#### Drug Names:

**Nitroglycerin** (Nitrolingual®, Nitroquick®, Nitrostat®)

#### Overview:

Nitroglycerin (nitro) is a potent vasodilator which helps to dilate the coronary arteries that supply the heart with blood. Nitroglycerin relieves the chest pain associated with angina. Patients that are prescribed nitroglycerin are instructed to take the medication when they experience chest pain and may have taken it before EMS arrives on scene. Assisting a patient with nitroglycerin may help to reduce myocardial damage. Absorption rate is 1 to 2 minutes with a duration of 30 minutes.

#### Indications:

1. Patient complains of chest pain, *and*
2. Patient has a history of cardiac problems, *and*
3. Patient’s physician has prescribed nitroglycerin, *and*
4. Patient has the medication and the medication is prescribed for the patient.

#### Contraindications:

1. Hypotension (SBP less than 120).
2. Bradycardia (HR less than 60).
3. Increased intracranial pressure (i.e., CVA, head injury).
4. Hypersensitivity to the drug.
5. Patient on sildenafil (Viagra®) or other anti-impotence agent
6. Infants and children.
7. Patient has already met maximum prescribed dose prior to EMS arrival.

#### Side Effects:

1. Hypotension.
2. Headache.
3. Pulse rate changes.

#### Administration:

1. Assure right medication, right patient, right route, patient alert.
2. Check expiration date of nitroglycerin.
3. Question patient on last dose administration, effects, and assure understanding of route of administration.
4. Ask patient to lift tongue and place the tablet under the tongue (while wearing gloves) or have patient place tablet under the tongue.
5. Have patient keep mouth closed with the tablet under the tongue (without swallowing) until dissolved and absorbed.
6. Recheck blood pressure within 2 minutes.
7. Record activity and time.

#### Supply:

Bottle containing 0.4 mg (1/150 grain) tablets
**ONDANSETRON (Zofran®)**

**Generic Name:** Ondansetron (on-dan-she’tron)

**Trade Name:** Zofran®

**Chemical Class:** Carbazole derivative

**Therapeutic Class:** Antiemetic

**Actions:** Ondansetron is a selective 5-HT₃ 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-HT₃ type, present both peripherally on vagal nerve terminals and centrally in the chemoreceptor trigger zone of the area postrema.

**Pharmacokinetics:**
- **IV:** Peak immediate. **IM:** N/A

**Indications:**
1. Severe vomiting or nausea.
2. Consider as a prophylactic adjunct to prevent nausea and vomiting when administering narcotic analgesics.
3. Vertigo.

**Contraindications:**
1. Hypersensitivity to the drug.
2. Age less than 2 years for ODT/SL administration of orally disintegrating tables (ODT/SL).

**Precautions:**
- *Pregnancy Cat. B* Rarely, transient ECG changes including QT interval prolongation have been reported.

**Side Effects:**
- **CNS:** headache, lightheadedness, seizures
- **CV:** angina, bradycardia, syncope, tachycardia
- **ENT:** blurred vision
- **GI:** constipation, diarrhea
- **RESP:** bronchospasm
- **SKIN:** rash

**Interactions:** N/A

**Administration:**
- **IV:** Give 0.1 mg/kg up to 4 mg over 2 to 5 minutes. May repeat once in 5 minutes if needed.
- **IM:** Give 0.1 mg/kg up to 4 mg IM. Do not repeat.
- **ODT/SL:** Give 4 mg. Place tablet on patient’s tongue. The tablet dissolves quickly and can be swallowed with saliva. May repeat once in 10 minutes if needed.

**Supply:**
- Vial containing 4 mg in 2 mL
- Orally Disintegrating Tablets (ODT), 4 mg
**ORAL GLUCOSE (Insta-Glucose®)**  
**Protocol 6.32**

<table>
<thead>
<tr>
<th><strong>Scope</strong></th>
<th>EMR</th>
<th>EMT</th>
<th>AEMT</th>
<th>INT</th>
<th>PM</th>
</tr>
</thead>
</table>

**Drug Names:** Dextrose (Glutose®, Insta-Glucose®)

**Overview:** Oral glucose is used to treat patients with a history of diabetes exhibiting an altered mental status and the ability to swallow. Oral glucose is a form of glucose that can reverse a diabetic’s hypoglycemic condition. Time of administration can make a critical difference. The preparation comes in a tube.

**Indications:** Patient with altered mental status and a known history of diabetes controlled by medication.

**Contraindications:**
1. Unresponsive.
2. Unable to swallow.

**Side Effects:** None when given properly. May be aspirated by the patient without a gag reflex.

**Administration:**
1. Assure signs and symptoms of altered mental status with a known history of diabetes.
2. Assure patient is conscious and can swallow and protect the airway.
3. Administer glucose:
   a. Between cheek and gum
   b. Place on tongue depressor between cheek and gum.

**Supply:** Tube contains 15 g.
Removed from drug formulary and protocols effective July 1, 2017.
Generic Name: Sodium Bicarbonate (so’dee-um bye-kar’boe-nate)
Trade Name: N/A
Chemical Class: Monosodium salt of carbonic acid
Therapeutic Class: Alkalining agent; electrolyte supplement

**Actions:** Sodium bicarbonate is an alkalizing agent used to buffer acids present in the body during and after severe hypoxia. Sodium bicarbonate combines with excess acids (usually lactic acid) present in the body to form a weak, volatile acid. This acid is broken down into CO₂ and H₂O. Sodium bicarbonate is effective only when administered with adequate ventilation and oxygenation. Sodium bicarbonate may be administered to alkalize the urine to speed excretion of tricyclic antidepressants.

**Pharmacokinetics:** Onset in seconds. Peak 1 to 2 minutes. Duration 10 minutes.

**Indications:**
1. Prolonged cardiac arrest.
2. Known metabolic acidosis.
4. Tricyclic antidepressant (TCA) overdose.
5. Crush syndrome [Medical Control].

**Contraindications:** Hypokalemia.

**Precautions:** Sodium bicarbonate can cause metabolic alkalosis when administered in large quantities. It is important to calculate the dosage based on patient weight and size.

**Pregnancy Cat. C**

**Side Effects:**
1. Metabolic alkalosis.
2. Hypernatremia.
3. Hypokalemia.

**Interactions:**
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.
2. Sodium bicarbonate should not be administered in conjunction with calcium chloride. A precipitate can form and block the IV line.

**Administration:**

- **Adult:** Cardiac arrest: Give 1 mEq/kg IV up to 100 mEq.
  TCA overdose: Give 50 mEq IV over 2 minutes. Repeat in 15 minutes if needed.

- **Pediatric:** Contact [Medical Control].

**Supply:** Prefilled syringe containing 50 mEq in 50 mL (8.4% solution).

**Notes:**
TRANEXAMIC ACID

Scope

Generic Name: Tranexamic Acid (tran-ex-am'-ik as-id)
Trade Name: Cyklokapron®
Chemical Class: Amino acid derivative
Therapeutic Class: Antifibrinolytic
Actions: Inhibits plasminogen activation and plasmin activity.
Pharmacokinetics: IV: Onset 5-15 minutes. t½ = 2 hours. Duration of action: Approximately 3 hours.
Indications: Any trauma patient, fourteen (14) years of age or older, who is at high risk for ongoing internal hemorrhage meeting one of more of the following criteria:
1. Systolic blood pressure less than 90 mmHg.
2. Patients over 65 years of age with systolic blood pressure less than 110 mmHg.
3. Tachycardia with heart rate greater than 120 beats per minute with signs of hypoperfusion present (confusion, altered mental status, cool extremities, etc.).
4. Contact [Medical Control] as needed if the patient does not meet the above criteria.
Contraindications: 1. Injuries greater than three (3) hours old.
2. Evidence of disseminated intravascular coagulation (DIC).
3. Patients less than fourteen (14) years of age.
4. Hypersensitivity to the drug.
Precautions: 1. Excreted in breast milk.
Pregnancy Cat. B 2. Caution in patients with history of deep vein thrombosis (DVT), pulmonary embolus, other blood clots, or severe renal failure.
3. Can cause worsened coagulopathy in some patients.
Side Effects: CNS: anxiety, blurred vision, confusion
CV: hypotension, chest pain, tachycardia
GI: nausea, vomiting, diarrhea
RESP: shortness of breath, cough
Interactions: Female patients taking or using any form of birth control containing estrogen and progestin are at increased risk for blood clots and this medication increases that risk significantly.
Administration: Loading Dose: IV infusion of one (1) gram tranexamic acid (TXA) infused over ten (10) minutes. Piggy back the TXA infusion into an already established IV infusion.
Maintenance Dose: IV infusion of one (1) gram TXA infused over eight (8) hours. Piggy back the TXA infusion into an already established IV infusion.
Supply: Vial containing 1,000 mg in 10 mL.
Notes: 1. To prepare loading dose, mix one (1) gram TXA in 100 mL of D5W. Attach a 15 drop set and infuse at 150 drops/min over ten (10) minutes.
2. To prepare maintenance infusion, mix one (1) gram TXA in 250 mL of D5W. Attach a 60 drop set and infuse at 30 drops/min over eight (8) hours.
3. Major external bleeding MUST be controlled by direct pressure, hemostatic dressings, and tourniquets; TXA administration does NOT control external hemorrhage.
4. The maintence dose of TXA will have to come from another cardiac box; this should be considered for longer transport times.
5. Be sure to CLEARLY document the mechanism of injury, the time of injury/incident, and the time that the TXA bolus was administered (as well as when the maintenance infusion was started, if applicable).
### ABBREVIATIONS and SYMBOLS

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

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

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CCR</td>
<td>cardiocerebral resuscitation</td>
</tr>
<tr>
<td>CPR</td>
<td>cardiopulmonary resuscitation</td>
</tr>
<tr>
<td>C-SECTION</td>
<td>caesarean section</td>
</tr>
<tr>
<td>CSF</td>
<td>cerebrospinal fluid</td>
</tr>
<tr>
<td>C-SPINE</td>
<td>cervical spine</td>
</tr>
<tr>
<td>CT</td>
<td>cat scan, Cardiac Technician</td>
</tr>
<tr>
<td>CV</td>
<td>cardiovascular</td>
</tr>
<tr>
<td>CVA</td>
<td>cerebrovascular accident (stroke)</td>
</tr>
<tr>
<td>D5W</td>
<td>5% dextrose in water</td>
</tr>
<tr>
<td>DDNR</td>
<td>durable do not resuscitate</td>
</tr>
<tr>
<td>DKA</td>
<td>diabetic ketoacidosis</td>
</tr>
<tr>
<td>DNR</td>
<td>do not resuscitate</td>
</tr>
<tr>
<td>DOA</td>
<td>dead on arrival</td>
</tr>
<tr>
<td>DT</td>
<td>delirium tremens</td>
</tr>
<tr>
<td>Dx</td>
<td>diagnosis</td>
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<tr>
<td>ECG</td>
<td>electrocardiogram</td>
</tr>
<tr>
<td>EEG</td>
<td>electroencephalogram</td>
</tr>
<tr>
<td>EENT</td>
<td>eye, ear, nose, and throat</td>
</tr>
<tr>
<td>EMS</td>
<td>emergency medical services</td>
</tr>
<tr>
<td>EMT</td>
<td>emergency medical technician</td>
</tr>
<tr>
<td>ET</td>
<td>endotracheal</td>
</tr>
<tr>
<td>ETA</td>
<td>estimated time of arrival</td>
</tr>
<tr>
<td>ETCO2</td>
<td>end-tidal CO₂</td>
</tr>
<tr>
<td>ETOH</td>
<td>ethanol (alcohol)</td>
</tr>
<tr>
<td>ETT</td>
<td>endotracheal tube</td>
</tr>
<tr>
<td>EXT</td>
<td>external (extension)</td>
</tr>
<tr>
<td>F</td>
<td>female</td>
</tr>
<tr>
<td>FB</td>
<td>foreign body</td>
</tr>
<tr>
<td>FBAO</td>
<td>foreign body airway obstruction</td>
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<tr>
<td>FLEX</td>
<td>flexion</td>
</tr>
<tr>
<td>Fx</td>
<td>fracture</td>
</tr>
<tr>
<td>g</td>
<td>gram(s)</td>
</tr>
<tr>
<td>GI</td>
<td>gastrointestinal</td>
</tr>
<tr>
<td>GSW</td>
<td>gunshot wound</td>
</tr>
<tr>
<td>gtts</td>
<td>drops</td>
</tr>
<tr>
<td>GU</td>
<td>gastourinary</td>
</tr>
<tr>
<td>GYN</td>
<td>gynecology (gynecological)</td>
</tr>
<tr>
<td>H/A</td>
<td>headache</td>
</tr>
<tr>
<td>HEENT</td>
<td>head, eyes, ears, nose, throat</td>
</tr>
<tr>
<td>HEME</td>
<td>hematologic, hematology</td>
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</table>

CONTINUED ON NEXT PAGE
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>HR</td>
<td>heart rate (hour)</td>
</tr>
<tr>
<td>HHN</td>
<td>hand-held nebulizer</td>
</tr>
<tr>
<td>HS</td>
<td>hour of sleep (bedtime), heart sounds</td>
</tr>
<tr>
<td>HTN</td>
<td>hypertension</td>
</tr>
<tr>
<td>Hx</td>
<td>history</td>
</tr>
<tr>
<td>ICP</td>
<td>intracranial pressure</td>
</tr>
<tr>
<td>ICU</td>
<td>intensive care unit</td>
</tr>
<tr>
<td>IM</td>
<td>intramuscular</td>
</tr>
<tr>
<td>INT</td>
<td>intermittent infusion device</td>
</tr>
<tr>
<td>IO</td>
<td>intraosseous</td>
</tr>
<tr>
<td>IV</td>
<td>intravenous</td>
</tr>
<tr>
<td>IVP</td>
<td>intravenous push</td>
</tr>
<tr>
<td>J</td>
<td>joules</td>
</tr>
<tr>
<td>JVD</td>
<td>jugular vein distension</td>
</tr>
<tr>
<td>kg</td>
<td>kilogram</td>
</tr>
<tr>
<td>KVO</td>
<td>keep vein open</td>
</tr>
<tr>
<td>L</td>
<td>left</td>
</tr>
<tr>
<td>L/S-SPINE</td>
<td>lumbarsacral spine</td>
</tr>
<tr>
<td>LAT</td>
<td>lateral</td>
</tr>
<tr>
<td>lb</td>
<td>pound</td>
</tr>
<tr>
<td>LLQ</td>
<td>left lower quadrant</td>
</tr>
<tr>
<td>LMP</td>
<td>last menstrual period</td>
</tr>
<tr>
<td>LPM</td>
<td>liters per minutes</td>
</tr>
<tr>
<td>LR</td>
<td>lactated ringers</td>
</tr>
<tr>
<td>L-SPINE</td>
<td>lumbar spine</td>
</tr>
<tr>
<td>LUQ</td>
<td>left upper quadrant</td>
</tr>
<tr>
<td>M</td>
<td>male</td>
</tr>
<tr>
<td>MAP</td>
<td>mean arterial pressure</td>
</tr>
<tr>
<td>MAST</td>
<td>military anti-shock trousers</td>
</tr>
<tr>
<td>MAT</td>
<td>multifocal atrial tachycardia</td>
</tr>
<tr>
<td>mcg</td>
<td>microgram(s)</td>
</tr>
<tr>
<td>MED</td>
<td>medicine</td>
</tr>
<tr>
<td>mg</td>
<td>milligram(s)</td>
</tr>
<tr>
<td>MI</td>
<td>myocardial infarction (heart attack)</td>
</tr>
<tr>
<td>min</td>
<td>minimum / minute</td>
</tr>
<tr>
<td>MS</td>
<td>mental status</td>
</tr>
<tr>
<td>MVC</td>
<td>motor vehicle crash</td>
</tr>
<tr>
<td>N/V</td>
<td>nausea/vomiting</td>
</tr>
<tr>
<td>N/V/D</td>
<td>nausea/vomiting/diarrhea</td>
</tr>
<tr>
<td>NAD</td>
<td>no apparent distress</td>
</tr>
<tr>
<td>NC</td>
<td>nasal cannula</td>
</tr>
</tbody>
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### ABBREVIATIONS and SYMBOLS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEB</td>
<td>nebulizer</td>
</tr>
<tr>
<td>NKDA</td>
<td>no known drug allergies</td>
</tr>
<tr>
<td>NRB</td>
<td>non-rebreather</td>
</tr>
<tr>
<td>NS</td>
<td>normal saline</td>
</tr>
<tr>
<td>NSR</td>
<td>normal sinus rhythm</td>
</tr>
<tr>
<td>OB/GYN</td>
<td>obstetrics/gynecology</td>
</tr>
<tr>
<td>PAC</td>
<td>premature atrial contraction</td>
</tr>
<tr>
<td>PALP</td>
<td>palpation</td>
</tr>
<tr>
<td>PASG</td>
<td>pneumatic anti-shock garment</td>
</tr>
<tr>
<td>PE</td>
<td>pulmonary embolus</td>
</tr>
<tr>
<td>PEA</td>
<td>pulseless electrical activity</td>
</tr>
<tr>
<td>PEARL</td>
<td>pupils equal and reactive to light</td>
</tr>
<tr>
<td>PMHx</td>
<td>past medical history</td>
</tr>
<tr>
<td>PO</td>
<td>orally</td>
</tr>
<tr>
<td>PPE</td>
<td>personal protection equipment</td>
</tr>
<tr>
<td>PRN</td>
<td>as needed</td>
</tr>
<tr>
<td>PT</td>
<td>patient</td>
</tr>
<tr>
<td>PVAD</td>
<td>preexisting vascular access device</td>
</tr>
<tr>
<td>pVT</td>
<td>pulseless ventricular tachycardia</td>
</tr>
<tr>
<td>PVC</td>
<td>premature ventricular contraction</td>
</tr>
<tr>
<td>QID</td>
<td>four times daily</td>
</tr>
<tr>
<td>R</td>
<td>right</td>
</tr>
<tr>
<td>RLQ</td>
<td>right lower quadrant</td>
</tr>
<tr>
<td>RUQ</td>
<td>right upper quadrant</td>
</tr>
<tr>
<td>Rx</td>
<td>medicine</td>
</tr>
<tr>
<td>RXN</td>
<td>reaction</td>
</tr>
<tr>
<td>SBP</td>
<td>systolic blood pressure</td>
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<tr>
<td>SC</td>
<td>subcutaneous</td>
</tr>
<tr>
<td>SL</td>
<td>sublingual</td>
</tr>
<tr>
<td>SOB</td>
<td>shortness of breath</td>
</tr>
<tr>
<td>ST</td>
<td>sinus tachycardia</td>
</tr>
<tr>
<td>STT</td>
<td>Shock Trauma Technician</td>
</tr>
<tr>
<td>SVT</td>
<td>supraventricular tachycardia</td>
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<tr>
<td>Sx</td>
<td>symptom</td>
</tr>
<tr>
<td>SZ</td>
<td>seizure</td>
</tr>
<tr>
<td>T</td>
<td>temperature</td>
</tr>
<tr>
<td>TIA</td>
<td>transient ischemic attack</td>
</tr>
<tr>
<td>TID</td>
<td>three times a day</td>
</tr>
<tr>
<td>TKO</td>
<td>to keep open (refers to IV’s – same as KVO)</td>
</tr>
<tr>
<td>T-SPINE</td>
<td>thoracic spine</td>
</tr>
<tr>
<td>Tx</td>
<td>treatment</td>
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**CONTINUED ON NEXT PAGE**
**ABBREVIATIONS and SYMBOLS**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UOA</td>
<td>upon our arrival</td>
</tr>
<tr>
<td>URI</td>
<td>upper respiratory infection</td>
</tr>
<tr>
<td>UTI</td>
<td>urinary tract infection</td>
</tr>
<tr>
<td>VF</td>
<td>ventricular fibrillation</td>
</tr>
<tr>
<td>VS</td>
<td>vital signs</td>
</tr>
<tr>
<td>VT</td>
<td>ventricular tachycardia</td>
</tr>
<tr>
<td>WAP</td>
<td>wandering atrial pacemaker</td>
</tr>
<tr>
<td>WNL</td>
<td>within normal limits</td>
</tr>
<tr>
<td>YO (YOA)</td>
<td>years old (years of age)</td>
</tr>
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<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
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<tbody>
<tr>
<td>♂</td>
<td>male</td>
</tr>
<tr>
<td>♀</td>
<td>female</td>
</tr>
<tr>
<td>+</td>
<td>positive</td>
</tr>
<tr>
<td>-</td>
<td>negative</td>
</tr>
<tr>
<td>?</td>
<td>questionable</td>
</tr>
<tr>
<td>~</td>
<td>approximately</td>
</tr>
<tr>
<td>=</td>
<td>equal</td>
</tr>
<tr>
<td>↑</td>
<td>upper (increased)</td>
</tr>
<tr>
<td>ă</td>
<td>before</td>
</tr>
<tr>
<td>ă</td>
<td>after</td>
</tr>
<tr>
<td>ă</td>
<td>with</td>
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<tr>
<td>ă</td>
<td>without</td>
</tr>
<tr>
<td>Δ</td>
<td>change</td>
</tr>
<tr>
<td>↓</td>
<td>lower (decreased)</td>
</tr>
<tr>
<td>ą°</td>
<td>primary</td>
</tr>
<tr>
<td>ą°</td>
<td>secondary</td>
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CONTINUED ON NEXT PAGE
# ABBREVIATIONS and SYMBOLS

**Protocol 7.1**

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

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

### Protocol 7.1

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

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

Key Points: DECEASED PATIENT PROTOCOL

- For medical examiner case, 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 BY WEIGHT CHART

#### Protocol 7.3

<table>
<thead>
<tr>
<th>DRUG</th>
<th>5 kg</th>
<th>10 kg</th>
<th>20 kg</th>
<th>30 kg</th>
<th>40 kg</th>
<th>50 kg</th>
<th>60 kg</th>
<th>70 kg</th>
<th>80 kg</th>
<th>90 kg</th>
<th>100 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADENOSINE (0.1 mg/kg)</td>
<td>0.5 mg</td>
<td>1 mg</td>
<td>2 mg</td>
<td>3 mg</td>
<td>4 mg</td>
<td>5 mg</td>
<td>6 mg</td>
<td>6 mg</td>
<td>6 mg</td>
<td>6 mg</td>
<td>6 mg</td>
</tr>
<tr>
<td>ADENOSINE (0.2 mg/kg)</td>
<td>0.2 mg</td>
<td>0.4 mg</td>
<td>0.8 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
</tr>
<tr>
<td>ALBUTEROL</td>
<td>2.5 mg</td>
<td>2.5 mg</td>
<td>2.5 mg</td>
<td>2.5 mg</td>
<td>2.5 mg</td>
<td>2.5 mg</td>
<td>2.5 mg</td>
<td>2.5 mg</td>
<td>2.5 mg</td>
<td>2.5 mg</td>
<td>2.5 mg</td>
</tr>
<tr>
<td>AMIODARONE (5 mg/kg)</td>
<td>25 mg</td>
<td>50 mg</td>
<td>100 mg</td>
<td>150 mg</td>
<td>200 mg</td>
<td>250 mg</td>
<td>300 mg</td>
<td>300 mg</td>
<td>300 mg</td>
<td>300 mg</td>
<td>300 mg</td>
</tr>
<tr>
<td>ASPIRIN</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>324 mg</td>
<td>324 mg</td>
<td>324 mg</td>
<td>324 mg</td>
<td>324 mg</td>
<td>324 mg</td>
</tr>
<tr>
<td>ATROPINE (0.02 mg/kg)</td>
<td>0.1 mg</td>
<td>0.2 mg</td>
<td>0.4 mg</td>
<td>0.6 mg</td>
<td>0.8 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
</tr>
<tr>
<td>CALCIUM CHLORIDE (8 mg/kg)</td>
<td>40 mg</td>
<td>80 mg</td>
<td>160 mg</td>
<td>240 mg</td>
<td>320 mg</td>
<td>400 mg</td>
<td>480 mg</td>
<td>560 mg</td>
<td>640 mg</td>
<td>720 mg</td>
<td>800 mg</td>
</tr>
<tr>
<td>CEFAZOLIN (25 mg/kg)</td>
<td>-</td>
<td>250 mg</td>
<td>500 mg</td>
<td>750 mg</td>
<td>1 g</td>
<td>1.25 g</td>
<td>1.5 g</td>
<td>1.75 g</td>
<td>2 g</td>
<td>2 g</td>
<td>2 g</td>
</tr>
<tr>
<td>DEXTROSE (0.5 g/kg)</td>
<td>2.5 g</td>
<td>5 g</td>
<td>10 g</td>
<td>15 g</td>
<td>20 g</td>
<td>25 g</td>
<td>25 g</td>
<td>25 g</td>
<td>25 g</td>
<td>25 g</td>
<td>25 g</td>
</tr>
<tr>
<td>DEXTROSE (1 g/kg)</td>
<td>5 g</td>
<td>10 g</td>
<td>20 g</td>
<td>25 g</td>
<td>25 g</td>
<td>25 g</td>
<td>25 g</td>
<td>25 g</td>
<td>25 g</td>
<td>25 g</td>
<td>25 g</td>
</tr>
<tr>
<td>DIPHENHYDRAMINE (1 mg/kg)</td>
<td>-</td>
<td>10 mg</td>
<td>20 mg</td>
<td>30 mg</td>
<td>40 mg</td>
<td>50 mg</td>
<td>50 mg</td>
<td>50 mg</td>
<td>50 mg</td>
<td>50 mg</td>
<td>50 mg</td>
</tr>
<tr>
<td>DOPAMINE (5 mcg/kg/min)</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>11</td>
<td>15</td>
<td>19</td>
<td>23</td>
<td>26</td>
<td>30</td>
<td>34</td>
<td>38</td>
</tr>
<tr>
<td>DOPAMINE (10 mcg/kg/min)</td>
<td>4</td>
<td>8</td>
<td>15</td>
<td>23</td>
<td>30</td>
<td>38</td>
<td>45</td>
<td>53</td>
<td>60</td>
<td>68</td>
<td>75</td>
</tr>
<tr>
<td>DOPAMINE (20 mcg/kg/min)</td>
<td>8</td>
<td>15</td>
<td>30</td>
<td>45</td>
<td>60</td>
<td>75</td>
<td>90</td>
<td>105</td>
<td>120</td>
<td>135</td>
<td>150</td>
</tr>
<tr>
<td>EPINEPHRINE 1:1000 (0.01 mg/kg)</td>
<td>0.05 mg</td>
<td>0.1 mg</td>
<td>0.2 mg</td>
<td>0.3 mg</td>
<td>0.4 mg</td>
<td>0.5 mg</td>
<td>0.5 mg</td>
<td>0.5 mg</td>
<td>0.5 mg</td>
<td>0.5 mg</td>
<td>0.5 mg</td>
</tr>
<tr>
<td>EPINEPHRINE 1:10,000 (0.1 mg/kg)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
</tr>
<tr>
<td>EPINEPHRINE 1:10,000 (0.01 mg/kg)</td>
<td>0.05 mg</td>
<td>0.1 mg</td>
<td>0.2 mg</td>
<td>0.3 mg</td>
<td>0.4 mg</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EPINEPHRINE INFUSION</td>
<td>See charts in 6.13 EPINEPHRINE INFUSION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FENTANYL (1 mcg/kg)</td>
<td>5 mcg</td>
<td>10 mcg</td>
<td>20 mcg</td>
<td>30 mcg</td>
<td>40 mcg</td>
<td>50 mcg</td>
<td>60 mcg</td>
<td>70 mcg</td>
<td>80 mcg</td>
<td>90 mcg</td>
<td>100 mcg</td>
</tr>
<tr>
<td>FENTANYL (0.5 mcg/kg)</td>
<td>2.5 mcg</td>
<td>5 mcg</td>
<td>10 mcg</td>
<td>15 mcg</td>
<td>20 mcg</td>
<td>25 mcg</td>
<td>30 mcg</td>
<td>35 mcg</td>
<td>40 mcg</td>
<td>45 mcg</td>
<td>50 mcg</td>
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<tr>
<td>GLUCAGON</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
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<td>HALOPERIDOL</td>
<td>-</td>
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<td>-</td>
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<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
</tr>
<tr>
<td>IPRATROPILUM</td>
<td>500 mcg</td>
<td>500 mcg</td>
<td>500 mcg</td>
<td>500 mcg</td>
<td>500 mcg</td>
<td>500 mcg</td>
<td>500 mcg</td>
<td>500 mcg</td>
<td>500 mcg</td>
<td>500 mcg</td>
<td>500 mcg</td>
</tr>
<tr>
<td>LIDOCAINE (0.5 mg/kg)</td>
<td>2.5 mg</td>
<td>5 mg</td>
<td>10 mg</td>
<td>20 mg</td>
<td>30 mg</td>
<td>40 mg</td>
<td>40 mg</td>
<td>40 mg</td>
<td>40 mg</td>
<td>40 mg</td>
<td>40 mg</td>
</tr>
<tr>
<td>MAGNESIUM SULFATE</td>
<td>125 mg</td>
<td>250 mg</td>
<td>500 mg</td>
<td>750 mg</td>
<td>1 g</td>
<td>2 g</td>
<td>2 g</td>
<td>2 g</td>
<td>2 g</td>
<td>2 g</td>
<td>2 g</td>
</tr>
<tr>
<td>METHYLPREDNISOLONE (2 mg/kg)</td>
<td>10 mg</td>
<td>20 mg</td>
<td>40 mg</td>
<td>60 mg</td>
<td>80 mg</td>
<td>125 mg</td>
<td>125 mg</td>
<td>125 mg</td>
<td>125 mg</td>
<td>125 mg</td>
<td>125 mg</td>
</tr>
<tr>
<td>METOPROLOL</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
</tr>
<tr>
<td>MIDEZOLAM (0.1 mg/kg)</td>
<td>0.5 mg</td>
<td>1 mg</td>
<td>2 mg</td>
<td>2.5 mg</td>
<td>2.5 mg</td>
<td>2.5 mg</td>
<td>2.5 mg</td>
<td>2.5 mg</td>
<td>2.5 mg</td>
<td>2.5 mg</td>
<td>2.5 mg</td>
</tr>
<tr>
<td>MIDEZOLAM (0.25 mg/kg)</td>
<td>1.25 mg</td>
<td>2.5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
</tr>
<tr>
<td>MORPHINE (0.1 mg/kg)</td>
<td>0.5 mg</td>
<td>1 mg</td>
<td>2 mg</td>
<td>3 mg</td>
<td>4 mg</td>
<td>5 mg</td>
<td>6 mg</td>
<td>7 mg</td>
<td>8 mg</td>
<td>9 mg</td>
<td>10 mg</td>
</tr>
<tr>
<td>NALOXONE (0.1 mg/kg)</td>
<td>0.5 mg</td>
<td>1 mg</td>
<td>2 mg</td>
<td>2 mg</td>
<td>2 mg</td>
<td>2 mg</td>
<td>2 mg</td>
<td>2 mg</td>
<td>2 mg</td>
<td>2 mg</td>
<td>2 mg</td>
</tr>
<tr>
<td>NITROGLYCERIN</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.4 mg</td>
<td>0.4 mg</td>
<td>0.4 mg</td>
<td>0.4 mg</td>
<td>0.4 mg</td>
<td>0.4 mg</td>
<td>0.4 mg</td>
</tr>
<tr>
<td>NITROPASTE 2% OINTMENT</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1-2”</td>
<td>1-2”</td>
<td>1-2”</td>
<td>1-2”</td>
<td>1-2”</td>
<td>1-2”</td>
<td>1-2”</td>
</tr>
<tr>
<td>ONDANSETRON (0.1 mg/kg)</td>
<td>0.5 mg</td>
<td>1 mg</td>
<td>2 mg</td>
<td>3 mg</td>
<td>4 mg</td>
<td>4 mg</td>
<td>4 mg</td>
<td>4 mg</td>
<td>4 mg</td>
<td>4 mg</td>
<td>4 mg</td>
</tr>
<tr>
<td>SODIUM BICARBONATE (1 mEq/kg)</td>
<td>5 mEq</td>
<td>10 mEq</td>
<td>20 mEq</td>
<td>30 mEq</td>
<td>40 mEq</td>
<td>50 mEq</td>
<td>60 mEq</td>
<td>70 mEq</td>
<td>80 mEq</td>
<td>90 mEq</td>
<td>100 mEq</td>
</tr>
</tbody>
</table>

1 Values listed for dopamine are in drops/min and assume an 800 mcg/mL concentration.
### Glasgow Coma Scale

<table>
<thead>
<tr>
<th>Category</th>
<th>Over 5 years</th>
<th>Under 5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eye Opening</strong></td>
<td>Spontaneous</td>
<td>Spontaneous</td>
</tr>
<tr>
<td></td>
<td>To Verbal Stimulation</td>
<td>To Inconsolable</td>
</tr>
<tr>
<td></td>
<td>To Painful Stimulation</td>
<td>Cries/Inconsolable</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>Cries/Inconsolable</td>
</tr>
<tr>
<td><strong>Verbal</strong></td>
<td>Oriented/Appropriate</td>
<td>Smiles/Coos/Cries Appropriately</td>
</tr>
<tr>
<td></td>
<td>Confused</td>
<td>Cries/Inconsolable</td>
</tr>
<tr>
<td></td>
<td>Inappropriate Words</td>
<td>Inappropriate Cry</td>
</tr>
<tr>
<td></td>
<td>Non-specific sounds</td>
<td>Persistent Cry/Grunting</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Motor</strong></td>
<td>Obeys Commands</td>
<td>Spontaneous</td>
</tr>
<tr>
<td></td>
<td>Localization of Pain</td>
<td>Localization of Pain</td>
</tr>
<tr>
<td></td>
<td>Withdrawal (pain)</td>
<td>Withdrawal (pain)</td>
</tr>
<tr>
<td></td>
<td>Flexor Posturing (pain)</td>
<td>Flexor Posturing (pain)</td>
</tr>
<tr>
<td></td>
<td>Extensor Posturing (pain)</td>
<td>Extensor Posturing (pain)</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

**TOTAL GLASGOW COMA SCALE**  3 – 15
### IV INFUSION CHART

**Protocol 7.5**

<table>
<thead>
<tr>
<th>mL/hour</th>
<th>Drip Set</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10 drops/min</td>
</tr>
<tr>
<td>25</td>
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<tr>
<td>50</td>
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<td>900</td>
<td>150</td>
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<td>1000</td>
<td>167</td>
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</table>
### Table 7.5.1 Pediatric Vital Signs

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

### Table 7.5.2 Pediatric Airway Management Supplies

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

**HOSPITALS**

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Telephone #</th>
<th>Fax #</th>
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<tr>
<td>Augusta Health – Fishersville, VA</td>
<td>540-332-4474</td>
<td>540-332-4475</td>
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<tr>
<td>Bath County Community Hospital – Hot Springs, VA</td>
<td>540-839-7032</td>
<td>540-839-7096</td>
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<tr>
<td>Martha Jefferson Hospital – Charlottesville, VA</td>
<td>434-654-7150</td>
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<tr>
<td>Rockingham Memorial Hospital – Harrisonburg, VA</td>
<td>540-689-9999</td>
<td>540-689-1415</td>
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<tr>
<td>Stonewall Jackson Hospital – Lexington, VA</td>
<td>540-458-3348</td>
<td>540-458-3366</td>
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<tr>
<td>University of Virginia Medical Center – Charlottesville, VA</td>
<td>434-924-9287</td>
<td>434-971-1137</td>
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</table>

**AIR MEDICAL TRANSPORT**

<table>
<thead>
<tr>
<th>Service</th>
<th>Telephone #</th>
<th>Fax #</th>
</tr>
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<tr>
<td>Carilion Life-Guard 10 – Roanoke, VA</td>
<td>540-344-4357</td>
<td>540-344-5674</td>
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<tr>
<td>Carilion Life-Guard 11 – Marion, VA</td>
<td>540-344-4357</td>
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<tr>
<td>Fairfax County Police – Fairfax, VA</td>
<td>703-691-2131</td>
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<tr>
<td>LifeEvac – Fredericksburg, VA</td>
<td>877-902-7779</td>
<td>540-720-8885</td>
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<tr>
<td>LifeEvac – Petersburg, VA</td>
<td>877-902-7779</td>
<td>804-722-0916</td>
</tr>
<tr>
<td>MedSTAR – Washington, DC</td>
<td>800-824-6814</td>
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<tr>
<td>Nightingale Regional Air Ambulance – Norfolk, VA</td>
<td>800-572-4354</td>
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<tr>
<td>Pegasus – Charlottesville, VA</td>
<td>800-552-1826</td>
<td>804-434-1137</td>
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<tr>
<td>PHI AirCare 1 – Manassas, VA</td>
<td>703-393-7379</td>
<td>703-393-7974</td>
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<tr>
<td>PHI AirCare 2 – Fredericksburg, VA</td>
<td>540-368-9709</td>
<td>540-368-9241</td>
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<tr>
<td>PHI AirCare 3 – Leesburg, VA</td>
<td>703-737-7712</td>
<td>703-737-7785</td>
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<td>PHI AirCare 4 – Winchester, VA</td>
<td>540-667-0288</td>
<td>540-667-0350</td>
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<td>PHI AirCare 5 – Weyers Cave, VA</td>
<td>540-453-2000</td>
<td>540-453-2004</td>
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<tr>
<td>PHI SkyStat 1 – Richmond, VA</td>
<td>804-714-0945</td>
<td>804-714-0948</td>
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**HELIQUOPTER RESCUE**

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<tr>
<td>Coast Guard</td>
<td>757-398-6390</td>
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<tr>
<td>U. S. Park Police</td>
<td>202-610-7500</td>
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**EMERGENCY COMMUNICATIONS CENTERS**

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<td>540-245-5501</td>
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<tr>
<td>Bath County</td>
<td>540-839-2331</td>
<td>540-839-3344</td>
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<td>Harrisonburg City/Rockingham County</td>
<td>540-434-4436</td>
<td>540-434-2512</td>
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<tr>
<td>Highland County</td>
<td>540-468-2210</td>
<td>540-468-3040</td>
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<tr>
<td>Rockbridge County</td>
<td>540-261-6171</td>
<td>540-261-9303</td>
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<tr>
<td>Staunton City</td>
<td>540-332-3842</td>
<td>540-332-3980</td>
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<tr>
<td>Waynesboro City</td>
<td>540-942-6701</td>
<td>540-942-6795</td>
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**OTHER**

<table>
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<td>Central Shenandoah EMS Council</td>
<td>540-886-3676</td>
<td>540-886-3735</td>
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<td>CHEMTREC</td>
<td>800-424-9300</td>
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<tr>
<td>CISM team activation/requests</td>
<td>540-245-5501</td>
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<tr>
<td>Poison Control Center</td>
<td>800-222-1222</td>
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<tr>
<td>Virginia Department of Emergency Management</td>
<td>800-468-8892</td>
<td>804-674-2419</td>
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<tr>
<td>Virginia Office of Emergency Medical Services</td>
<td>800-523-6019</td>
<td>804-371-3108</td>
</tr>
<tr>
<td>Virginia State Police (Appomattox)</td>
<td>800-552-0962</td>
<td></td>
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<tr>
<td>Virginia State Police (Culpepper)</td>
<td>800-572-2260</td>
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</tr>
<tr>
<td>Virginia State Police (Salem)</td>
<td>800-542-5959</td>
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</tr>
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</table>
TRIAGE, START (ADULT)  Protocol 7.9

All walking wounded

Minor
Green tag

RESPIRATIONS

YES

Respirations

Immediate
Red tag

NO
Position Airway

Less than 30/min

Immediate
Red tag

Greater than 30/min

Deceased
Black tag

PERFUSION
Radial Pulse Present?

YES

Control bleeding

Immediate
Red tag

NO

MENTAL STATUS
Follow simple commands?

YES

Immediate
Red tag

NO

Delayed
Yellow tag

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
Protocol 7.10
VACCINATION ADMINISTRATION

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

1. Providers who are administering the vaccine must be approved by the agency Operational Medical Director (OMD).

2. Providers must participate in training associated with the specific vaccine immediately prior to, and not longer than 12 months prior to, participating as a provider.

3. All administrations must be entered into the Virginia Immunization Information System (VIIS).

TRAINING REQUIREMENTS

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

With Operational Medical Director approval, the training may be developed by the regional EMS Council, a VIIS Program Coordinator, or local health department.
Protocol 7.11
MEDICATION ADMINISTRATION

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

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

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

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

4. Prior to any medication administration, EMS providers should review the Six Rights of Medication Administration:
   a. Right Medication
   b. Right Dose/Concentration
   c. Right Route
   d. Right Patient (Protocol)
   e. Right Time
   f. Right Documentation
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American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care, International Consensus on Science. 2015.


National Emergency Airway Registry


World Allergy Organization Guidelines for the Assessment and Management of Anaphylaxis, WAO Journal, February 2011
The drugs in this section are not routinely stocked in CSEMS drug boxes. These drugs may be used during drug shortages when they can serve as an alternate to the drug that is unavailable.
### ATENOLOL (Tenormin®)

**Protocol 8.1**

<table>
<thead>
<tr>
<th><strong>Scope</strong></th>
<th>EMR</th>
<th>EMT</th>
<th>AEMT</th>
<th>INT</th>
<th>PM</th>
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<tbody>
<tr>
<td><strong>Alternate</strong></td>
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**Generic Name:** Atenolol (a-tin-o-lole)  
**Trade Name:** Tenormin®

**Chemical Class:** β1-adrenergic blocker, cardioselective  
**Therapeutic Class:** Antihypertensive  
**DEA Class:** NA

**Actions:** Atenolol is a β-antagonist that blocks both β1- and β2-adrenergic receptors, but is selective for β1-adrenergic receptors. Atenolol produces negative inotropic and chronotropic responses, slows AV nodal conduction, and has antiarrhythmic effects. Atenolol causes reduction in heart rate, systolic blood pressure, cardiac output and decreases cardiac oxygen consumption.

**Pharmacokinetics:** Peak 5 minutes. Duration 12 to 24 hours. $t_{1/2} = 6$ to 7 hours

**Indications:**  
1. Irregular narrow-complex tachycardia [probable atrial fibrillation or possible atrial flutter or MAT (multifocal atrial tachycardia)].  
2. Regular narrow-complex tachycardia that does not covert following administration of adenosine.  
3. Stable wide-complex tachycardia [Medical Control].

**Contraindications:**  
1. Bradycardia (HR less than 60).  
2. Hypotension (SBP less than 100).  
3. Bronchial asthma.  
5. Second- or third-degree AV block.  
6. Untreated pheochromocytoma.

**Precautions:** The blood pressure, pulse rate, ECG and respiratory status should be continuously monitored during Atenolol therapy.

**Pregnancy Cat. D**  
**Side Effects:**  
- CNS: dizziness, lethargy, vertigo, fever  
- CV: bradycardia, CHF, cold extremities, heart block, hypotension  
- GI: nausea, diarrhea  
- RESP: bronchospasm, dyspnea  
- SKIN: rash

**Interactions:** Administer with caution to patients taking antihypertensive agents or calcium channel blockers.

**Administration:**  
- **Adult:** Give 5 mg IV over 5 minutes (1mg/min). Repeat in 10 minutes if needed to a total dose of 10 mg.  
- **Pediatric:** Not indicated.

**Supply:** Ampule containing 5mg in 10mL.

**Notes:**  
**Special:** Drug is not routinely stocked in CSEMS drug boxes. This drug may be used during drug shortages as an alternate to metoprolol (Lopressor).
**ALTERNATE**

<table>
<thead>
<tr>
<th><strong>Scope</strong></th>
<th>EMR</th>
<th>EMT</th>
<th>AEMT</th>
<th>INT</th>
<th>PM</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Generic Name:</strong></th>
<th>Dexamethasone (dex-a-meth-a-zone)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trade Name:</strong></td>
<td>Decadron®, Hexadrol®</td>
</tr>
<tr>
<td><strong>Chemical Class:</strong></td>
<td>Glucocorticoid, synthetic</td>
</tr>
<tr>
<td><strong>Therapeutic Class:</strong></td>
<td>Corticosteroid, systemic</td>
</tr>
<tr>
<td><strong>DEA Class:</strong></td>
<td>NA</td>
</tr>
</tbody>
</table>

**Actions:**
Dexamethasone is an intermediate-acting corticosteroid related to the natural hormones secreted by the adrenal cortex. Dexamethasone enters target cells and causes many complex reactions that are responsible for its anti-inflammatory and immunosuppressive effects.

**Pharmacokinetics:**
Peak 1 hour. $t_{1/2} = 1$-$2$ days.

**Indications:**
1. Anaphylaxis.
2. Respiratory distress from asthma or COPD.
3. Respiratory distress due to croup.

**Contraindications:**
Hypersensitivity to the drug.

**Precautions:**
A single dose of dexamethasone is all that should be given in the prehospital phase of care. Long-term steroid therapy can cause gastrointestinal bleeding and prolonged wound healing.

**Pregnancy Cat. C**

**Side Effects:**
- CNS: seizures, vertigo, headache
- CV: CHF, hypertension, tachycardia, thromboembolism
- GI: abdominal distension, diarrhea, GI hemorrhage, increased appetite, nausea

**Interactions:**
N/A

**Administration:**
- *Adult:* 10 mg IV over 1-2 minutes or IM *wide range of recommended doses*
- *Pediatric:* 0.5 mg/kg up to 10mg

**Supply:**
10mg/ml

**Notes:**

**Special:** Drug is not routinely stocked in CSEMS drug boxes. This drug may be used during drug shortages as an alternate to methylprednisolone (Solumedrol).
## DIAZEPAM (Valium®)

### Generic Name:
Diazepam (dye-az’e-pam)

### Trade Name:
Valium®

### Chemical Class:
Benzodiazepine

### Therapeutic Class:
Anesthesia adjunct, anticonvulsant, sedative/hypnotic, skeletal muscle relaxant

### DEA Class:
Schedule IV

### Actions:
Diazepam causes central nervous system depression via facilitation of inhibitory GABA\(^1\) at benzodiazepine receptor sites (BZ\(_1\) – associated with sleep; BZ\(_2\) – associated with memory, motor, sensory and cognitive function).

### Pharmacokinetics:

<table>
<thead>
<tr>
<th>Route</th>
<th>Onset</th>
<th>Peak</th>
<th>Duration</th>
<th>(t_{1/2})</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>1 to 3 minutes</td>
<td>1.5 hours</td>
<td>15 minutes</td>
<td>20 to 50 hours</td>
</tr>
<tr>
<td>PR</td>
<td>5 to 15 minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Indications:
1. Seizures not caused by hypoglycemia.
2. Severe agitation, tachycardia, or hallucinations caused by alcohol withdrawal.
3. Sedation for cardioversion and transcutaneous pacing.
4. Sedation for endotracheal intubation only after the ET tube is inserted.
5. Tachydysrhythmias with HR greater than 120 bpm associated with stimulant (i.e. cocaine and methamphetamine) abuse.
6. Sedation for shivering secondary to induced hypothermia.

### Contraindications:
1. Hypersensitivity to the drug.
2. Altered mental status not related to seizures.
3. Respiratory depression.

### Precautions:

<table>
<thead>
<tr>
<th>Pregnancy Cat. D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Use cautiously with the elderly, the debilitated, hepatic disease and renal disease.</td>
</tr>
<tr>
<td>2. The benefits of giving diazepam to the pregnant patient for seizures outweigh the associated risks.</td>
</tr>
</tbody>
</table>

### Side Effects:
CNS: dizziness, drowsiness, headache; CV: hypotension; EENT: blurred vision; GI: nausea, vomiting; RESP: respiratory depression

### Interactions:
1. Diazepam is incompatible with many medications. Whenever diazepam is given intravenously in conjunction with other drugs, the IV line should be adequately flushed.
2. The effects of diazepam can be additive when used in conjunction with other CNS depressants and alcohol.

### Administration:

<table>
<thead>
<tr>
<th>Route</th>
<th>Adult</th>
<th>Pediatric</th>
<th>Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Give 0.25 mg/kg up to 5 mg slow IV push, titrated to effect. Repeat dose in 5 minutes if seizure persists.</td>
<td>Give 0.25 mg/kg up to 5 mg slow IV push, titrated to effect. Repeat dose in 5 minutes if seizure persists.</td>
<td>Carpuject or vial containing 10 mg in 2 mL.</td>
</tr>
<tr>
<td></td>
<td>PR: Give 0.25 mg/kg up to 5 mg PR.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Supply:
Carpuject or vial containing 10 mg in 2 mL.

### Notes:
\(^1\) GABA – gammaaminobutyric acid, the chief inhibitory neurotransmitter in the CNS. GABA hyperpolarizes the membrane of the CNS neurons decreasing their response to stimuli.

**Special:** Drug is not routinely stocked in CSEMS drug boxes. This drug may be used during drug shortages as an alternate to midazolam (Versed).


210
**Generic Name:** Hydromorphone (hye-droe-mor-fone)  
**Trade Name:** Dilaudid®

**Chemical Class:** Semi-synthetic opiate, phenanthrene derivative

**Therapeutic Class:** Narcotic analgesic

**DEA Class:** Schedule II Controlled Substance

**Actions:** Hydromorphone is a powerful semi-synthetic opiate derived from Morphine with mechanism of action similar to Morphine. It is considered both faster acting and of shorter duration than Morphine. Interacts with opiate receptors decreasing pain impulse transmission.

**Pharmacokinetics:**  
- **IM:** Onset 15 minutes. Peak analgesia 4-5 hours. Duration of action 2-3 hours.  
- **IV:** Onset 10-15 minutes. Peak analgesia 15-30 minutes. t½ = 2.5 to 4 hours.

**Indication:** All indications are for moderate to severe pain refractory to FENTANYL administration or when FENTANYL is contraindicated (i.e. allergy) or when FENTANYL is not stocked in drug box.

**Contraindications:**  
1. Known hypersensitivity  
2. Respiratory depression  
3. Altered mental status from any cause  
4. Hypotension (SBP less than 100 adult, SBP less than 80 child).  
5. Head injury  
6. Paralytic ileus

**Precautions:**  
- **Pregnancy Cat. C** Hydromorphone 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. Hydromorphone should be given cautiously to elderly patients and patients with hepatic and/or renal impairment. It is recommended only ½ the starting dose is given.

**Side Effects:**  
- **CNS:** dizziness, confusion, muscle spasms  
- **CV:** hypotension, flushing, hypertension, bradycardia  
- **EENT:** blurred vision, diplopia  
- **GI:** nausea, vomiting  
- **RESP:** respiratory depression, apnea, bronchospasm  
- **SKIN:** diaphoresis, pruritis

**Interactions:** The CNS depression associated with hydromorphone can be enhanced when administered with antihistamines, antiemetics, sedatives, hypnotics, tricyclic antidepressants, barbiturates and alcohol.

**Administration:**  
- **Adult:** 1 mg slow IV push over 2-4 minutes, titrated to effect, or 1 mg IM. May repeat dose once in 15 minutes (maximum total dose 2mg) if necessary.  
  0.5 mg in age >65
- **Pediatric:** 0.015 mg/kg up to 1 mg slow IV push over 2-4 minutes, titrated to effect. Or 0.015 mg/kg IM, not to exceed 1mg (0.5mL).

**Supply:** Vial containing 2mg in 1mL.

**Notes:** 1. 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.

**Special:** Drug is not routinely stocked in CSEMS drug boxes. This drug may be used during drug shortages as an alternate to fentanyl (Sublimaze) or morphine.
LORAZEPAM (Ativan®)

### Protocol 8.5

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

<table>
<thead>
<tr>
<th>Generic Name:</th>
<th>Lorazepam (lor-az-e-pam)</th>
<th><strong>DEA Class:</strong> Schedule IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade Name:</td>
<td>Ativan®</td>
<td></td>
</tr>
<tr>
<td>Chemical Class:</td>
<td>Benzodiazepine</td>
<td></td>
</tr>
<tr>
<td>Therapeutic Class:</td>
<td>Anesthesia adjunct, anticonvulsant, sedative/hypnotic, skeletal muscle relaxant, anxiolytic</td>
<td></td>
</tr>
<tr>
<td>DEA Class:</td>
<td>Schedule IV</td>
<td></td>
</tr>
</tbody>
</table>

**Actions:**
Lorazepam causes central nervous system depression via facilitation of inhibitory GABA\(^1\) at benzodiazepine receptor sites (BZ\(_1\) – associated with sleep; BZ\(_2\) – associated with memory, motor, sensory and cognitive function).

**Pharmacokinetics:**
- **IV:** Onset 5 minutes. Duration 6-8 hours. \(t\_\text{½} = 10\) to 20 hours.
- **IM:** Onset 15 to 30 minutes. Peak 1.5 hours. Duration 6-8 hours.

**Indications:**
1. Seizures not caused by hypoglycemia.
2. Severe agitation, tachycardia, or hallucinations cause by alcohol withdrawal.
3. Sedation for cardioversion and transcutaneous pacing.
4. Sedation for endotracheal intubation only after the ET tube is inserted.
5. Tachydysrhythmias with HR greater than 120 bpm associated with stimulant (i.e. cocaine and methamphetamine) abuse.
6. Sedation for shivering secondary to induced hypothermia.

**Contraindications:**
1. Hypersensitivity to the drug or benzodiazepines.
2. Altered mental status not related to seizures.
3. Respiratory depression

**Precautions:**
- **Pregnancy Cat. D**
  1. Use cautiously with the elderly, the debilitated, hepatic disease and renal disease.
  2. The benefits of giving lorazepam to the pregnant patient for seizures outweigh the associated risks.

**Side Effects:**
- **CNS:** dizziness, drowsiness, confusion, headache; **CV:** hypotension; **EENT:** blurred vision; **GI:** nausea, vomiting; **RESP:** respiratory depression

**Interactions:**
1. Lorazepam is incompatible with many medications. Whenever diazepam is given intravenously in conjunction with other drugs, the IV line should be adequately flushed.
2. The effects of diazepam can be additive when used in conjunction with other CNS depressants and alcohol.

**Administration:**
- **Adult:** 1 mg slow IV push, titrated to effect. Lorazepam should be diluted with volume of normal saline equal to dose prior to administration. Repeat dose in 5 minutes if seizure persists, maximum dose 2mg.
  If unable to start IV, 2.0 mg lorazepam may be given IM. 0.5 mg > 65 years
- **Pediatric:** 0.1 mg/kg up to 2 mg slow IV push, titrated to effect. Mix dose with equal volume of normal saline to dilute prior to administration.

**Supply:** Carpuject or vial containing 2mg/mL.

**Notes:**
1. GABA – gammaaminobutyric acid, the chief inhibitory neurotransmitter in the CNS. GABA hyperpolarizes the membrane of the CNS neurons decreasing their response to stimuli.
2. Lorazepam should be stored at room temperature and away from heat and light. Recommended shelf life for lorazepam in drug boxes is 60 days.

**Special:**
Drug is not routinely stocked in CSEMS drug boxes. This drug may be used during drug shortages as an alternate to midazolam (Versed) or diazepam (Valium).
**PROMETHAZINE (Phenergan®)**

**Protocol 8.6**

**ALTERNATE**

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Promethazine (proe-meth’a-zeen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade Name</td>
<td>Phenergan®</td>
</tr>
<tr>
<td>Chemical Class</td>
<td>Ethylamine phenothiazine derivative</td>
</tr>
<tr>
<td>Therapeutic Class</td>
<td>Antiemetic; antihistamine; antitussive; antivertigo agent; sedative</td>
</tr>
<tr>
<td>Actions</td>
<td>Promethazine possesses antihistaminic, sedative, antimotion-sickness, antiemetic, and anticholinergic effects. As an antihistamine, it acts by competitive antagonism but does not block the release of histamine. It antagonizes in varying degrees most but not all of the pharmacological effects of histamine.</td>
</tr>
</tbody>
</table>
| Pharmacokinetics      | *IV*: Onset 3 to 5 minutes. Duration 4 to 6 hours. $t_{1/2} = 10$ to 14 hours  
*IM*: Onset 20 minutes. Duration 6 to 12 hours. |
| Indications           | 1. Severe vomiting or nausea.  
2. Vertigo. |
| Contraindications     | 1. Children less than 2 years.  
2. Altered mental status.  
3. Hypersensitivity or prior reaction to the drug. |
| Precautions           | 1. Lactating mothers.  
2. Glaucoma.  
3. Elderly.  
5. Promethazine may impair mental and physical abilities.  
6. Care must be taken to avoid accidental intra-arterial injection; it should never be administered subcutaneously.  
7. Extrapyramidal symptoms may be experienced by the patient following administration of the drug. Diphenhydramine should be available. |
| **Pregnancy Cat. C**   |  |
| Side Effects          | CNS: anxiety, dizziness, drowsiness, dystonia (odd movements of the neck or body), sedation  
CV: bradycardia, tachycardia, hypotension  
EENT: blurred vision  
GI: dry mouth |
| Interactions          | 1. The depressant effect on the central nervous system of narcotics, sedatives or hypnotics, and alcohol is potentiated by the drug.  
2. An increased incidence of extrapyramidal symptoms has been reported when the drug is administered to patients taking monoamine oxidase inhibitors (MAOIs). |
| Administration        | **Adult**: *IV*: Give 12.5 mg IV over 3 minutes. Dilute the IV dose in 10 mL of normal saline.  
*IM*: Give 12.5 mg deep IM.  
May repeat the IV/IM dose in 15 minutes if well tolerated and nausea or vomiting persists.  
**Pediatric**: Do not exceed 50% of adult dose. |
| Supply                | Vial or ampule containing 25 mg in 1 mL |
| Notes                 | Ensure a free-flowing IV, adequate dilution and slow administration. Promethazine can damage the tissues severely if it infiltrates or gets into the subcutaneous tissues. Promethazine can also cause vein damage and phlebitis if not diluted. |
| **Special**:           | Drug is not routinely stocked in CSEMS drug boxes. This drug may be used during drug shortages as an alternate to Ondansetron (Zofran). |
### ALTERNATE DRUGS

<table>
<thead>
<tr>
<th>DRUG</th>
<th>5 kg</th>
<th>10 kg</th>
<th>20 kg</th>
<th>30 kg</th>
<th>40 kg</th>
<th>50 kg</th>
<th>60 kg</th>
<th>70 kg</th>
<th>80 kg</th>
<th>90 kg</th>
<th>100 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEXAMETHASONE (0.5 mg/kg)</td>
<td>2.5 mg</td>
<td>5 mg</td>
<td>10 mg</td>
<td>10 mg</td>
<td>10 mg</td>
<td>10 mg</td>
<td>10 mg</td>
<td>10 mg</td>
<td>10 mg</td>
<td>10 mg</td>
<td>10 mg</td>
</tr>
<tr>
<td>DIAZEPAM (0.25 mg/kg)</td>
<td>1.25 mg</td>
<td>2.5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
<td>5 mg</td>
</tr>
<tr>
<td>HYDROMORPHONE (0.015 MG/KG)</td>
<td>0.075 mg</td>
<td>0.15 mg</td>
<td>0.3 mg</td>
<td>0.45 mg</td>
<td>0.6 mg</td>
<td>0.75 mg</td>
<td>0.9 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
</tr>
<tr>
<td>LORAZEPAM (0.1 mg/kg)</td>
<td>0.5 mg</td>
<td>1 mg</td>
<td>2 mg</td>
<td>2 mg</td>
<td>2 mg</td>
<td>2 mg</td>
<td>2 mg</td>
<td>2 mg</td>
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<td>2 mg</td>
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