## Medical Control Guideline: DRUG REFERENCE

<table>
<thead>
<tr>
<th>DRUG</th>
<th>Ref. No.</th>
<th>Date of last Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenosine</td>
<td>1317.1</td>
<td>07-01-18</td>
</tr>
<tr>
<td>Albuterol</td>
<td>1317.3</td>
<td>07-01-18</td>
</tr>
<tr>
<td>Amiodarone</td>
<td>1317.5</td>
<td>07-01-18</td>
</tr>
<tr>
<td>Aspirin</td>
<td>1317.7</td>
<td>07-01-18</td>
</tr>
<tr>
<td>Atropine</td>
<td>1317.9</td>
<td>04-01-19</td>
</tr>
<tr>
<td>Calcium Chloride</td>
<td>1317.11</td>
<td>07-01-18</td>
</tr>
<tr>
<td>Dextrose</td>
<td>1317.13</td>
<td>07-01-18</td>
</tr>
<tr>
<td>Diphenhydramine</td>
<td>1317.15</td>
<td>07-01-18</td>
</tr>
<tr>
<td>Epinephrine</td>
<td>1317.17</td>
<td>07-01-18</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>1317.19</td>
<td>04-01-19</td>
</tr>
<tr>
<td>Glucagon</td>
<td>1317.21</td>
<td>07-01-18</td>
</tr>
<tr>
<td>Lidocaine</td>
<td>1317.23</td>
<td>07-01-18</td>
</tr>
<tr>
<td>Midazolam</td>
<td>1317.25</td>
<td>07-01-18</td>
</tr>
<tr>
<td>Morphine Sulfate</td>
<td>1317.27</td>
<td>04-01-19</td>
</tr>
<tr>
<td>Naloxone</td>
<td>1317.29</td>
<td>04-01-19</td>
</tr>
<tr>
<td>Nitroglycerin</td>
<td>1317.31</td>
<td>07-01-18</td>
</tr>
<tr>
<td>Ondansetron</td>
<td>1317.33</td>
<td>07-01-18</td>
</tr>
<tr>
<td>Oxygen</td>
<td>1317.35</td>
<td>07-01-18</td>
</tr>
<tr>
<td>Pralidoxime Chloride (DuoDote™)</td>
<td>1317.37</td>
<td>07-01-18</td>
</tr>
<tr>
<td>Sodium Bicarbonate</td>
<td>1317.39</td>
<td>07-01-18</td>
</tr>
</tbody>
</table>
Medical Control Guideline: DRUG REFERENCE – ADENOSINE

Classification
Antidysrhythmic

Prehospital Indications
Cardiac Dysrhythmia:
- SVT - Narrow Complex: HR ≥ 150 for adults; ≥180 for a child; and ≥220 for infants
- Perfusing unresponsive to Valsalva
- Poorly perfusing (if alert)
- Regular/Monomorphic Wide Complex Tachycardia with adequate perfusion

Other Common Indications
Used in hospital setting as part of drug combination for cardiac “stress testing” and diagnosis of pulmonary hypertension

Adult Dose
6 or 12mg rapid IVP (per protocol), within 1-3 seconds, followed by a rapid flush of 10mL of NS
If no conversion after 1-2 minutes, may repeat 12mg rapid IVP followed by rapid flush of 10mL of NS.

Pediatric Dose
0.1mg/kg (3mg/mL) rapid IVP, dose per MCG 1309, maximum 6mg, followed by a rapid flush of 10mL NS
If no conversion after 1-2 minutes, may repeat one time 0.2mg/kg (3mg/mL) followed by a rapid flush of 10mL NS, dose per MCG 1309, maximum 12mg

Mechanism of Action
Slows conduction through the AV node and interrupts AV reentry pathways as well as conduction through the sinoatrial (SA) nodes

Pharmacokinetics
Onset immediate, Duration < 10 secs

Contraindications
- Should not be used for sinus tachycardia, despite rate >150
- 2nd and 3rd degree heart block without pacemaker
- Sinus Node Disease (Sick Sinus Syndrome)
- Wolff-Parkinson-White (WPW) Syndrome or ECG consistent with WPW
- Atrial flutter or fibrillation
- Heart transplant – Base contact required, as noted “super-sensitivity” of transplanted heart to adenosine

Interactions
Potentiated by blocker of nucleoside transport [e.g., carbamazepine (Tegretol)]
Antagonized by methylxanthines such as caffeine and theophylline

Adverse Effects
- Blurred vision
- Bradycardia / Asystole
- Chest pain / Chest pressure
- Dyspnea
- Head pressure
- Hypotension
- Lightheadedness / Dizziness
- Metallic taste / Throat tightness
- Numbness / Tingling
- Palpitations
Prehospital Considerations

- Cannulate a large proximal vein with an 18-20g catheter. Use IV port closest to patient and immediately flush with 10mL Normal Saline to ensure rapid administration of drug.
- Run a 6 second ECG strip before, during and after drug administration.
- Patients usually have a 10 second period of escape beats or asystole before the sinus node starts up again. This is perceived as a feeling of impending death and can be extremely frightening for patients.
- If the wide-complex tachycardia is ventricular in origin, Adenosine is highly unlikely to cause successful cardioversion.
Classification

Sympathomimetic, B₂ Receptor Agonist, Bronchodilator

Prehospital Indications

Cardiac Dysrhythmia: suspected hyperkalemia causing bradycardia
Respiratory Distress: bronchospasm caused by acute asthma, bronchitis, bronchiolitis, COPD, drug overdose, near drowning, pulmonary edema, and/or toxic gas inhalation
Pulmonary Edema/CHF: persistent wheezing despite CPAP
Traumatic Injury: suspected hyperkalemia in the setting of crush injury or potential for development of crush syndrome (administer prior to release of crushed tissue)

Other Common Indications

None

Adult Dose

Cardiac Dysrhythmia/Crush – Evidence of or suspected hyperkalemia
5mg (6mL) via neb, repeat continuously until hospital arrival
Crush – at risk for Crush Syndrome
5 minutes prior to extrication: 5mg (6mL) via mask nebulization x2 for a total dose of 10mg
Respiratory Distress, Pulmonary Edema/CHF with wheezing, Allergic Reaction with wheezing, Inhalation Injury with wheezing
5mg (6mL) via neb
May repeat x2 prn for wheezing

Pediatric Dose

Crush – Evidence of or suspected hyperkalemia
5mg (6mL) via neb, repeat continuously until hospital arrival
Crush – at risk for Crush Syndrome
5 minutes prior to extrication: 5mg (6mL) via neb, repeat immediately x1
Respiratory Distress, Allergic Reaction with wheezing, Inhalation Injury with wheezing
< 1 year of age 2.5mg (3mL) via neb
≥ 1 year of age 5mg (6mL) via neb
Repeat x2 prn, maximum 3 total doses prior to Base contact

Mechanism of Action

Selective beta-2 adrenergic agonist that causes relaxation of smooth muscles in the bronchial tree, decreasing airway resistance, facilitating mucous drainage and increasing vital capacity
Shifts potassium intracellular. Has mild beta-1 activity with mild effect on heart rate.

Pharmacokinetics

Onset 5-15 min inhaled, Duration 3-6 hours for bronchial smooth muscle relaxation, Duration 3-4 hours for hyperkalemia shifting potassium intracellular

Contraindications

Do not use for patients with a known hypersensitivity/allergy to the drug

Interactions

Administer with extreme caution to patients being treated with MAO inhibitors or tricyclic antidepressants
Beta blocking agents and Albuterol may each inhibit the effects of the other, monitor closely

Adverse Effects

Anxiety/Tremors
Hypertension
Hypokalemia
Palpitations/Tachycardia
Medical Control Guideline: DRUG REFERENCE – ALBUTEROL

Prehospital Considerations

- Young children 2-6 years old may be more prone to adverse effects
- Don’t assume patients have administered their own drug properly. Do not include home doses of albuterol in your total drug administration consideration.
Medical Control Guideline: DRUG REFERENCE – AMIODARONE

Classification
Antidysrhythmic

Prehospital Indications
Cardiac Arrest – Non-Traumatic (adult and pediatric): pulseless ventricular tachycardia or ventricular fibrillation persistent/recurrent after defibrillation x2

Other Common Indications
Ventricular tachycardia with pulses and adequate perfusion,
Atrial fibrillation or atrial flutter with rapid ventricular rate unresponsive to other treatments

Adult Dose
300mg (6mL) IV/IO
May repeat 150mg (3mL) IV/IO x1 prn after 2-cycles of CPR, max total dose 450mg

Pediatric Dose
5mg/kg (50mg/mL) IV/IO dose per MCG 1309, max total dose 300mg

Mechanism of Action
Class III antiarrhythmic agent, which inhibits adrenergic stimulation; affects sodium, potassium, and calcium channels; markedly prolongs action potential and delays repolarization; decreases AV conduction and sinus node function

Pharmacokinetics
Onset minutes after IV bolus administration

Contraindications
None in cardiac arrest

Interactions
None in cardiac arrest

Adverse Effects
Bradysrhythmias
Congestive heart failure
Hypotension

Prehospital Considerations
- Monitor heart rate, blood pressure, and cardiac rhythm closely post resuscitation
- Should not be used routinely in cardiac arrest. For use only in ventricular fibrillation or ventricular tachycardia without pulses unresponsive to attempted defibrillation x2
Medical Control Guideline: DRUG REFERENCE – ASPIRIN

Classification
   Non- steroidal anti-inflammatory drug (NSAID)
   Platelet Inhibitor

Prehospital Indications
   Chest Pain – Suspected Cardiac
   Chest Pain – STEMI

Other Common Indications
   Mild to moderate pain
   Prophylactic use in the primary prevention of cardiovascular disease

Adult Dose
   325mg nonenteric/chewable tablets PO

Pediatric Dose
   Not recommended for pediatric administration in the out-of-hospital setting

Mechanism of Action
   Inhibits platelet aggregation, inhibits synthesis of prostaglandin by cyclooxygenase, has antipyretic and analgesic activity

Pharmacokinetics
   Onset is 5-30 min,

Contraindications
   Known aspirin allergy, bleeding GI ulcers
   Should not be administered to pediatric patients

Interactions
   Anticoagulants and alcohol abuse potentiates risk of bleeding

Adverse Effects
   GI bleeding
   Prolonged bleeding time

Prehospital Considerations
   • Chewing allows for rapid absorption. Chewable preparations are preferred, because it is less likely to provoke nausea but the pill can also be swallowed if chewable not available.
   • A significant portion (7%) of patients with asthma may have aspirin sensitivity. Careful respiratory monitoring should be performed on all patients with history of asthma who receive aspirin in the prehospital setting.
   • Tinnitus can be a clinical symptom of aspirin overdose
Classification
Anticholinergic

Prehospital Indications
Cardiac Dysrhythmia: symptomatic bradycardia in adults; suspected AV Block or increased vagal tone in pediatrics
Hazmat exposure: organophosphate/pesticide/nerve agent poisoning with heart rate < 60 bpm, respiratory depression and/or extreme salivation

Other Common Indications
End-of-life care, to dry secretions for patient comfort
Eye disorders requiring mydriasis (pupillary dilation) for treatment/testing, administered as eye drop
GI disorders caused by hypermobility (chronic diarrhea, irritable bowel syndrome)

Adult Dose
Cardiac Dysrhythmia
0.5mg (5mL) IV/IO push repeat every 3-5 min prn, maximum total dose 3mg
Organophosphate poisoning
2mg (20mL) IV/IM/IO, may repeat every 5 min until patient is asymptomatic

Pediatric Dose
Cardiac Dysrhythmia
0.02mg/kg (0.1mg/mL) IV/IO, dose per MCG 1309, may repeat x1 in 5 min
Organophosphate poisoning
0.05mg/kg (0.1mg/mL) IV/IM, may be repeated every 5 min, maximum total dose 5mg

Mechanism of Action
Competitively inhibits action of acetylcholine on autonomic effectors innervated by postganglionic nerves

Pharmacokinetics
Peak effect in 20-30 min IM, 2-4 min IV/IO, duration 4 hr

Contraindications
Glaucoma
Tachycardia
Thyrotoxicosis

Interactions
None for IV/IM/IO administration

Adverse Effects
Dry mouth / Thirst
Dysrhythmias
Flushed dry skin
Hypertension / Hypotension
Hyperthermia
Increased intraocular pressure
Mydriasis (pupil dilation)

Prehospital Considerations
- Use cautiously if myocardial infarction and/or ischemia is suspected, as atropine will increase myocardial O2 demand, which may worsen the infarct.
- Bradycardia due to 2nd degree type II and 3rd degree heart blocks will not improve with atropine; if treatment indicated, transcutaneous pacing (TCP) should be performed.
Medical Control Guideline: DRUG REFERENCE – CALCIUM CHLORIDE

Classification
Electrolyte

Prehospital Indications
Cardiac Arrest – Non-Traumatic: suspected hyperkalemia, patients with renal failure
Cardiac Dysrhythmia: suspected hyperkalemia causing bradycardia
Overdose / Poisoning / Ingestion: calcium channel blocker toxicity
Traumatic Injury: suspected hyperkalemia in the setting of crush injury or potential for development of crush syndrome (administer prior to release of crushed tissue)

Other Common Indications
Acute hypocalcemia with or without tetany
Topically for hydrofluoric acid burns
Calcium channel blocker overdose

Adult Dose
Cardiac Arrest
1gm (10mL) IVP/IO
Cardiac Dysrhythmia/Crush - Suspected hyperkalemia
1gm (10mL) slow IV/IO push, may repeat x1 for persistent symptoms / ECG abnormalities
Overdose / Poisoning / Ingestion - Suspected Calcium Channel Blocker Overdose
1g (10mL) IV slow push over 60 seconds

Pediatric Dose
Crush - Suspected hyperkalemia
20mg/kg (100mg/mL) slow IV/IO push, dose per MCG 1309, repeat x1 for persistent ECG abnormalities
Overdose / Poisoning / Ingestion - Suspected Calcium Channel Blocker Overdose
20mg/kg (100mg/mL) IV slow push over 60 seconds, dose per MCG 1309

Mechanism of Action
Essential regulator for the excitation threshold of nerves and muscles; causes significant increase in myocardial contractility and ventricular automaticity. Antidote for some electrolyte imbalances and calcium channel blocker toxicity.

Pharmacokinetics
Onset and peaks immediately, duration varies

Contraindications
Hypercalcemia
Ventricular fibrillation

Interactions
Inactivates or minimizes the effects of catecholamines if not flushed properly
Can cause cardiac standstill in patients taking Digoxin

Adverse Effects
Cardiac arrest
Hypotension or hypertension
Pain and burning at injection site
Tingling sensations

Prehospital Considerations
- Precipitates to form calcium carbonate (chalk) when used with sodium bicarbonate. Administer calcium chloride and sodium bicarbonate in separate IV/IO or thoroughly flush in between administrations using at least 10mL of normal saline
- Confirm IV is patent prior to administration as extravasation causes severe tissue necrosis
Classification
Carbohydrate

Prehospital Indication
Hypoglycemia: blood glucose < 60mg/dL

Other Common Indications
None

Adult Dose
Dextrose 10% in water, 125 mL IV and reassess, if patient remains symptomatic, repeat x1 for a total of 250 mL

Pediatric Dose
<24 kg: Dextrose 10% in water, 5mL/kg IV in 1mL/kg increments dose per MCG 1309, reassess for clinical improvement after every 1mL/kg. Administer slow IVP. May repeat as needed, maximum total dose 5mL/kg. Recheck glucose pm after 3mL/kg infused.
≥ or >24 kg, Dextrose 10% in water, administer 125mL IVPB and reassess, continue infusion as needed with maximum dose of 5mL/kg

Mechanism of Action
Principal form of glucose (sugar) used by the body to create energy

Pharmacokinetics
Onset < 1min, peak effect dependent upon degree and cause of hypoglycemia

Contraindications
None

Interactions
None

Adverse Effects
Pain or burning at injection site
Phlebitis or thrombosis in vein of administration

Prehospital Considerations
- Confirm the IV line is patent prior to administration as severe tissue necrosis may occur with extravasation.
- Report and record blood glucose levels before and after administering this solution.
Classification
Antihistamine

Prehospital Indications
Allergic Reaction: itching and/or hives
Dystonic Reaction

Other Common Indications
Over-the-counter sleep aid, prevention or treatment of motion sickness, nausea and vomiting
Mild Parkinson’s disease
Prevention of extrapyramidal symptoms in patients on antipsychotic medications

Adult Dose
50mg slow IV push or 50mg IM, may repeat in 15 min x1, total maximum dose 100mg

Pediatric Dose
1mg/kg slow IV push one time, dose per MCG 1309, if unable to obtain venous access 1mg/kg deep IM, dose per MCG 1309

Mechanism of Action
Histamine H1- receptor antagonist of effector cells in respiratory tract, blood vessels, and GI smooth muscle. Possesses anticholinergic properties, resulting in antidyskinetic properties.

Pharmacokinetics
Onset is 15-30 min, duration is < 10 min

Contraindications
Acute asthma attack

Interactions
Increase central nervous system depression when used with alcohol and other central nervous system depressants, or MAO inhibitors

Adverse Effects
Confusion
Drowsiness
Mild hypotension
Palpitation
Paradoxical excitement in children
Tachycardia
Wheezing

Prehospital Considerations
- Administer injection deep IM into a large muscle group (lateral thigh, gluteus).
- Diphenhydramine (Benadryl) does not treat anaphylaxis/airway edema; if signs of anaphylaxis present, administer epinephrine IM
- Use with caution in elderly as they have increased adverse effects such as confusion, drowsiness
- Use with caution on all patients with a history of asthma.
- May cause paradoxical agitation in pediatric patients.
Classification
Sympathomimetic

Prehospital Indications
Anaphylaxis
Cardiac Arrest – Non-Traumatic: cardiac arrest resuscitation, hypotension after return of spontaneous circulation (ROSC) not responsive to IV fluid resuscitation
Cardiac Dysrhythmia: symptomatic bradycardia not responsive to atropine and transcutaneous pacing
Respiratory Distress / Bronchospasm: asthma, reactive bronchospasm (unlikely to benefit in COPD)
Airway Obstruction: stridor or visible airway swelling, croup/tracheitis in pediatrics
Shock / Hypotension: non-traumatic hypotension not responsive to IV fluid resuscitation

Adult Dose
Anaphylaxis
0.5mg (1mg/mL) IM in the lateral thigh, may repeat every 10 min x2 prn, maximum total 3 doses
Cardiac Arrest
1mg (0.1mg/mL) 10mL IV/IO every 3-5 min
Non-traumatic shock (including from symptomatic bradycardia or after ROSC)
Push-dose epinephrine – mix 9mL normal saline with 1mL epinephrine 0.1mg/mL (IV formulation) in a 10mL syringe. Administer push-dose epinephrine 1mL IV/IO every 1-5 min as needed to maintain SBP >90mmHg
Respiratory Distress/Bronchospasm
0.5mg (1mg/mL) IM in the lateral thigh
Airway Obstruction - Stridor
Epinephrine (1mg/mL solution) administer 5mg (5mL) via neb, repeat x1 in 10 min prn
Airway Obstruction – Airway swelling
Epinephrine (1mg/mL) administer 0.5mg (0.5mL) IM, repeat every 10 min prn x2, maximum total 3 doses

Pediatric Dose
Anaphylaxis
0.01mg/kg (1mg/mL) IM, dose per MCG 1309, in the lateral thigh, may repeat every 10 min x2 prn for persistent symptoms, maximum total 3 doses
Cardiac Arrest
0.01mg/kg (0.1mg/mL) IV/IO, dose per MCG 1309, may repeat every 3-5 min, maximum single dose 1mg
Cardiac Dysrhythmia - Symptomatic bradycardia
0.01mg/kg (0.1mg/mL) slow IV/IO push, dose per MCG 1309
Shock / Hypotension (including hypotension after ROSC)
Push-dose epinephrine – mix 9mL normal saline with 1mL epinephrine (0.1mg/mL) IV formulation in a 10mL syringe. Administer push-dose epinephrine (0.01mg/mL), dose per MCG 1309 every 1-5 min as needed to maintain SBP >70mmHg
Respiratory Distress/Bronchospasm
Epinephrine (1mg/mL) 0.01mg/kg IM in the lateral thigh, dose per MCG 1309
Airway obstruction – Stridor from croup/tracheitis
<1 year old: Epinephrine (1mg/mL) 2.5mL via neb, dose per MCG 1309
≥ 1 year of age: Epinephrine (1mg/mL) 5mL via neb, dose per MCG 1309
Repeat x1 in 10 min prn, maximum 2 total doses prior to Base contact
Airway obstruction - Airway swelling
Epinephrine (1mg/mL) 0.01mg/kg IM dose per MCG 1309, repeat every 10 min prn x2, maximum 3 total doses prior to Base contact

Mechanism of Action
A naturally occurring catecholamine. Acts directly on alpha and beta adrenergic receptors. It is the most potent activator of alpha receptors vasoconstricting the aorta and peripheral vasculature. Beta 1 stimulation increases inotropy, chronotropy, and AV conduction. Beta 2 stimulation causes bronchial smooth muscle relaxation and vasodilation to internal organs and skeletal muscles.

Pharmacokinetics
Onset is < 2 min IV, 1-3 min IM; duration is 5-10 min IV, 20-30 min IM

Contraindications
None

Interactions
Can be partially deactivated by highly alkaline solutions, such as sodium bicarbonate.

Adverse Effects
Anxiety
CVA or MI (rare, IV only)
Hypertension
Palpitations
Tachydyssrhythmias
Tremors

Prehospital Considerations
- Inadvertent IV injection of usual IM formulation and dose constitutes a 10-fold overdose that can result in sudden severe hypertension and possible cerebral hemorrhage.
Classification
Synthetic opioid

Prehospital Indications
Multiple provider impressions: pain management

Other Common Indications
None

Adult Dose
50mcg (1mL) slow IV push or IM/IN, repeat every 5 min prn, maximum total dose prior to Base contact 150mcg
Contact Base for additional pain management after maximum dose administered: may repeat dose for a maximum total dose of 250mcg

Pediatric Dose
1mcg/kg (50mcg/mL) slow IV push or IM, dose per MCG 1309, or
1.5mcg/kg (50mcg/mL) IN, dose per MCG 1309
Repeat in 5 min prn x1, maximum 2 total doses prior to Base contact
Contact Base for additional pain management after maximum dose administered: may repeat dose for a maximum 4 total doses

Mechanism of Action
Narcotic agonist-analgesic of opiate receptors; inhibits ascending pain pathways thus altering response to pain, increases pain threshold, produces analgesia, respiratory depression and sedation

Pharmacokinetics
Onset is immediate; peak in 3-5 min; duration is 30-60 min

Contraindications
Hypersensitivity

Interactions
Alcohol and other central nervous system depressants potentiate its effect

Adverse Effects
Chest wall stiffness / Chest wall pain
Delirium / Convulsions (uncommon)
Muscle stiffness
Nausea and vomiting (most common)
Respiratory depression

Prehospital Considerations
- Monitor respiratory status. Respiratory depression, when it occurs, may last longer than the analgesic effect.
- Administer slowly to decrease likelihood of chest stiffness, which can be life threatening.
- Onset of fentanyl is quicker and duration of action is shorter as compared to morphine. Unlike morphine, does not cause histamine release. Therefore, it is unlikely to cause hypotension in therapeutic dosages.
- Naloxone can be used for reversal if needed.
Medical Control Guideline: DRUG REFERENCE – GLUCAGON

Classification
Hormone (pancreatic)

Prehospital Indications
Hypoglycemia: glucose <60mg/dL and venous access cannot be established

Other Common Indications
Clearance of impacted esophageal foreign body (via smooth muscle relaxation)
Treatment of beta-blocker overdose and/or adjunctive treatment of calcium channel blocker overdose

Adult Dose
1mg (1mL) IM, may repeat in x1 in 20 min prn

Pediatric Dose
< 1 year of age 0.5mL (1mg/mL) IM, may repeat in x1 in 20 min prn
≥ 1 year of age 1.0mL (1mg/mL) IM, may repeat in x1 in 20 min prn

Mechanism of Action
A hormone naturally produced by pancreatic alpha cells of the islets of Langerhans. Causes breakdown of glycogen (stored in the liver) to glucose and inhibits the synthesis of glycogen from glucose. The combined actions increase the blood levels of glucose.

Pharmacokinetics
Onset is 5-20 min; duration is 1-1.5 hr

Contraindications
In patients with known insulinoma (insulin-secreting tumor), glucagon will produce worsening hypoglycemia

Interactions
None

Adverse Effects
Hypotension
Nausea and vomiting

Prehospital Considerations
• Use mixture immediately after reconstitution of dry powder and provided solution.
• Patient usually awakens from hypoglycemic coma 5-20 min after glucagon injection. PO carbohydrates should be given as soon as possible after patient regains consciousness.
• Symptoms such as headache, nausea and weakness may persist after recovery from hypoglycemic reaction.
• Glucagon is effective only if there are glycogen stores in the liver. Therefore, it is unlikely to be effective in patients with severe malnutrition, adrenal insufficiency or chronic hypoglycemia.
Classification
Local Anesthetic

Prehospital Indications
Multiple provider impressions: patients responsive to pain that have intraosseous (IO) access

Other Common Indications
Topical, transmucosal or intradermal anesthesia
Ventricular arrhythmias refractory to other treatments

Adult Dose
2% 40mg slow IO push over 2 minutes; may give second dose of 20 mg x1 prn

Pediatric Dose
2% 0.5mg/kg (20mg/mL) slow IO push over 2 minutes, dose per MCG 1309, not to exceed adult dose; may repeat second dose at half the initial dose x1 prn

Mechanism of Action
Inhibits sodium ion channels, stabilizing neuronal cell membranes causing a nerve conduction blockage

Pharmacokinetics
Onset is 2 min; peak in 3-5 min; duration is 10-20 min

Contraindications
None, when used for anesthesia in IO placement

Interactions
No significant interaction at therapeutic doses for IO placement. In larger doses, multiple interactions possible including potentiation of fentanyl and amiodarone.

Adverse Effects
None for IO use, high doses have been associated with increased risk of seizure

Prehospital Considerations
- This should be given pre-infusion if IV fluids or infusion of other medications through the IO on patients that are responsive to pain.
- Lidocaine 2% (preservative and epinephrine free) should be used.
- Slow infusion is necessary to ensure the lidocaine remains in the medullary space.
- A base order is not needed to administer lidocaine as part of the IO procedure.
Classification
Sedative, benzodiazepine

Prehospital Indications
- Agitated Delirium: patients requiring restraints for patient and provider safety
- Behavioral / Psychiatric Crisis: patients requiring restraints for patient and provider safety
- Cardiac Dysrhythmia: sedation prior to and/or during synchronized cardioversion or transcutaneous pacing
- Seizure - Active

Other Common Indications
Sedation and amnestic agent in patients undergoing mechanical ventilation or painful procedures

Adult Dose
- Agitated Delirium / Behavioral / Psychiatric Crisis
  - 5mg (1mL) IM/IN/IV, repeat x1 in 5 min prn, maximum total dose prior to Base contact 10mg for Agitated Delirium (Psychiatric Crisis requires Base order for any)
- Cardiac Dysrhythmia - sedation prior to synchronized cardioversion / transcutaneous pacing
  - 2mg (0.4mL) slow IV/IO push/IM/IN, may repeat ever 5 min, maximum total dose prior to Base contact 6mg
- Seizure - Active
  - 5mg (1mL) IM/IN/IV, repeat x1 in 2 min prn, maximum total dose prior to Base contact 10mg

Pediatric Dose
- Agitated Delirium / Behavioral / Psychiatric Crisis
  - 0.1mg/kg (5mg/mL) IM/IN/IV, dose per MCG 1309, repeat dosing every 5 min prn per Base order
- Cardiac Dysrhythmia - sedation prior to synchronized cardioversion / transcutaneous pacing
  - 0.1mg/kg (5mg/mL) IM/IN/IV/IO, dose per MCG 1309, repeat x1 in 2 min prn, maximum 2 doses prior to Base contact
- Seizure - Active
  - 0.1mg/kg (5mg/mL) IM/IN/IV/IO, dose per MCG 1309, repeat x1 in 2 min prn, maximum 2 doses, max single dose 5mg

Mechanism of Action
Binds to receptors at several sites within the CNS, potentiates GABA receptor system which produces anxiolytic, anticonvulsant, muscle relaxant, and amnesic effects.

Pharmacokinetics
- Onset 3-5 min IV, 15-20 min IM, 6-14 min IN
- Duration 1-6 hours IV/IM

Contraindications
- Acute alcohol intoxication with altered mental status
- Respiratory depression
- Shock / Poor perfusion

Interactions
Risk of respiratory or central nervous system depression, increases when used with diphenhydramine, fentanyl, morphine, or other opiate or sedative medications

Adverse Effects
- Hypotension
- Respiratory depression / arrest

Prehospital Considerations
- Closely monitor respiratory and cardiac function after administration
- For patients with agitated delirium and violent behavior, IM/IN administration is recommended over IV
for the initial dose for the safety of EMS personnel.

- If available, waveform EtCO₂ monitoring should be instituted after administration.
Classification
Opiate Analgesic

Prehospital Indications
Multiple provider impressions: pain management

Other Common Indications
None

Adult Dose
4mg (1mL) slow IV/IO push, repeat every 5 min prn, maximum total dose prior to Base contact 12mg
Contact Base for additional pain management after maximum dose administered: may repeat dose for a maximum total dose of 20mg

Pediatric Dose
0.1mg/kg (4mg/mL) slow IV/IO push, dose per MCG 1309, repeat in 5 min x1, maximum 2 total doses prior to Base contact
Contact Base for additional pain management after maximum dose administered: may repeat dose for a maximum 4 total doses

Mechanism of Action
Narcotic agonist- analgesic of opiate receptors; inhibits ascending pain pathways, thus altering response to pain.

Pharmacokinetics
Onset is immediate IV, 15-30 min IM; duration is 2-7 hr

Contraindications
Hypotension or evidence or poor perfusion
History of allergy to morphine or other narcotic medications

Interactions
Central nervous system depressants, sedatives, barbiturates, alcohol, benzodiazepines and tricyclic depressants may potentiate the central nervous system and respiratory depressant effects.

Adverse Effects
Decrease cough reflex
Disorientation
Hypotension
Nausea and vomiting
Respiratory depression

Prehospital Considerations
- Monitor vital signs at regular intervals
- Consider monitoring with EtCO₂ if available
- Use extreme caution in patient at risk for respiratory depression or ALOC
- Naloxone may be used for reversal of respiratory depression if needed
Classification
Opiate Antagonist

Prehospital Indications
Overdose / Poisoning/ Ingestion: suspected opiate overdose with altered mental status and hypoventilation/apnea

Other Common Indications
None

Adult Dose
2-4 mg IN (1mg per nostril or 4mg/0.1mL IN if formulation available) or 2mg IM or 0.8-2mg IV push
Maximum dose all routes 8mg, titrate to adequate respiratory rate and tidal volume

Pediatric Dose
0.1mg/kg (1mg/mL) IM/IN/IV, dose per MCG 1309, maximum dose all routes 8mg, titrate to adequate respiratory rate and tidal volume

Mechanism of Action
Competes for and displaces narcotic molecules from opiate receptors in the brain. Reverses the respiratory depression associated with overdose of narcotic agents.

Pharmacokinetics
Onset is < 2 min IV, 2-10min IM; duration is 20-120 min

Contraindications
Hypersensitivity

Interactions
None

Adverse Effects
Nausea and vomiting
Sweating
Tachycardia
Agitation
Hypertension
Abdominal pain
Acute pulmonary edema

Prehospital Considerations
• Give in small increments until the desired narcotic reversal is achieved (respiratory rate 12 and adequate tidal volume).
• Duration of action of some narcotics may exceed that of naloxone; therefore, patient must be closely observed for need for repeat doses.
• Naloxone causes acute withdrawal symptoms and can precipitate acute pulmonary edema when given in large boluses to narcotic addicts. Use only enough to reverse respiratory depression.
• Naloxone is not indicated in cardiac arrest though can be given after ROSC if narcotic overdose suspected.
Classification
Nitrates Vasodilator

Prehospital Indications
- Chest Pain – Suspected Cardiac
- Chest Pain – STEMI
- Pulmonary Edema / CHF

Other Common Indications
Rapid blood pressure lowering in hypertensive emergency

Adult Dose
- Chest Pain – Suspected Cardiac / Chest Pain – STEMI
  - 0.4 mg SL prn, repeat every 5 min prn x2, total 3 doses, hold if SBP < 100mmHg or patient has taken sexually enhancing medication within 48 hours
- Pulmonary Edema / CHF
  - 0.4mg SL, for SBP ≥ 100mmHg
  - 0.8mg SL, for SBP ≥ 150mmHg
  - 1.2mg SL, for SBP ≥ 200mmHg
  - Repeat every 3-5 min prn x2 for persistent dyspnea, assess blood pressure prior to each administration and determine subsequent dose based on SBP as listed above. Hold if SBP < 100mmHg

Pediatric Dose
Not recommended for pediatric administration

Mechanism of Action
Organic nitrate which causes systemic venous dilatation, decreasing preload. Cellular mechanism: nitrate enters vascular smooth muscle and is converted to nitric oxide leading to vasodilation. Relaxes smooth muscle via dose-dependent dilation of arterial and venous beds to reduce both preload and afterload, and myocardial oxygen demand. Also improves coronary collateral circulation. Lowers BP, increases heart rate and occasional paradoxical bradycardia.

Pharmacokinetics
Onset is 1-3 min SL or TM; duration is 20-30 min

Contraindications
- Use of sexually enhancing/erectile dysfunction medications such as sildenafil, tadalafil or vardenafil within the past 48 hours
- Hypotension with SBP < 90100mmHg
- Suspected cardiac tamponade

Interactions
- Alcohol, opiates and antihypertensive agents may compound hypotensive effects. Patients taking sexually enhancing/erectile dysfunction medications are at risk for severe, prolonged hypotension leading to death.

Adverse Effects
- Circulatory Collapse
- Dizziness
- Headache
- Hypotension / Postural Hypotension
- Syncope
- Weakness

Prehospital Considerations
- Caution advised in suspected intracranial hemorrhage or stroke patients
Classification
Antiemetic

Prehospital Indications
Multiple provider impressions: Nausea and/or vomiting, or prior to fentanyl or morphine administration to reduce potential for nausea/vomiting

Other Common Indications
None

Adult Dose
4 mg ODT/IV/IM

Pediatric Dose
4 mg ODT, only for 4 years of age or older

Mechanism of Action
Mechanism of action has not been fully characterized but believed to function via serotonin antagonism at central and/or peripheral receptors. Serotonin receptors of the 5-HT3 type are present both peripherally on vagal nerve terminals and centrally in the chemoreceptor trigger zone of the area of the medullary structure that controls vomiting.

Pharmacokinetics
Onset is 1-5 min; duration is 4-6 hr

Contraindications
Known allergy to Ondansetron
Pregnancy, regardless of gestational age

Interactions
Amiodarone and other QT prolonging drugs (additive prolongation of QT may produce torsade de pointes/polymorphic ventricular tachycardia)

Adverse Effects
Constipation
Headache
QT prolongation
Sedation

Prehospital Considerations
- May cause prolonged QT interval. Caution in patients with known prolonged QT syndrome or recent/simultaneous use of other QT-prolonging drugs.
- Should not be administered in patients known to be pregnant, regardless of gestational age.
- Peak activity is decreased by approximately 40% in oral administration, compared to IV, due to first pass metabolism in the liver.
Classification
Gas

Prehospital Indications
Multiple provider impressions: hypoxia SPO2 <94% on room air, respiratory or cardiac arrest, shock, anaphylaxis, traumatic brain injury, carbon Monoxide exposure/poisoning/toxicity, suspected pneumothorax

Other Common Indications
Chronic hypoxia in patients with restrictive lung disease

Adult and Pediatric Dose

<table>
<thead>
<tr>
<th>Delivery Device</th>
<th>Flow Rate</th>
<th>% Delivered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nasal Cannula</td>
<td>1-6 L/min</td>
<td>22-44%</td>
</tr>
<tr>
<td>Simple Face Mask</td>
<td>8-10 L/min</td>
<td>40-60%</td>
</tr>
<tr>
<td>Face Mask with O2 Reservoir</td>
<td>15 L/min</td>
<td>90%</td>
</tr>
<tr>
<td>Bag-Mask with O2 Reservoir</td>
<td>15 L/min</td>
<td>90%</td>
</tr>
<tr>
<td>ET with Bag with O2 Reservoir</td>
<td>15 L/min</td>
<td>100%</td>
</tr>
<tr>
<td>ET with T-Tube</td>
<td>15 L/min</td>
<td>70%</td>
</tr>
<tr>
<td>Supraglottic Airway (King LT)</td>
<td>15 L/min</td>
<td>90%</td>
</tr>
</tbody>
</table>

Mechanism of Action
Oxygen is a tasteless, odorless gas transported by hemoglobin in the blood to organ tissues. It is required for the breakdown of glucose into a useable energy form (aerobic metabolism). Therapeutic oxygen administration increases the oxygen concentration in the alveoli, which in turn increases the oxygen saturation of available hemoglobin.

Pharmacokinetics
Onset is immediate; duration is < 2 min

Contraindications
None

Adverse Effects
High flow O2 (100%) by mask may produce a 30% decrease in coronary blood flow in as little as 5 min, and may decrease the efficiency of nitroglycerin.
In patients with COPD or other chronic lung disease, high inspired O2 concentration may decrease respiratory drive and cause CO2 retention.
O2 will dry mucus membranes.
Classification
Cholinesterase Reactivator

Prehospital Indications
HAZMAT Exposure: nerve agent or organophosphate poisoning

Other Common Indications
Antidote to toxicity from agents (neostigmine, pyridostigmine) used in treatment of myasthenia gravis

Adult Dose
Given in conjunction with atropine as a DuoDote injection – Atropine 2.1mg and Pralidoxime Chloride 600mg (2PAMCI). Medications delivered sequentially by one syringe into 2 different areas of the muscle.

- Mild Exposure DuoDote™ IM x1
- Moderate Exposure DuoDote™ IM x2, one after another
- Severe Exposure DuoDote™ IM x3, one after another

Pediatric Dose
Pediatric patients longer than the length-based resuscitation tape (Broselow™) should receive adult dose
Pediatric patients between 3-36kg body weight, based on measurement using the length-based resuscitation tape (Broselow™), should be treated as follows:

- Mild Exposure Atropine (0.1mg/mL) 0.02mg/kg IV/IM, dose as per MCG 1309
- Moderate Exposure 1 DuoDote™ IM
- Severe Exposure 1 or 2 DuoDote(s)™ IM, one after the other when applicable, based on the table below:

<table>
<thead>
<tr>
<th>Avg. Wt. (kg)</th>
<th>Color</th>
<th>Initial Emergency Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Grey</td>
<td>1 DuoDote™</td>
</tr>
<tr>
<td>6.5</td>
<td>Pink</td>
<td></td>
</tr>
<tr>
<td>8.5</td>
<td>Red</td>
<td></td>
</tr>
<tr>
<td>10.5</td>
<td>Purple</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Yellow</td>
<td></td>
</tr>
<tr>
<td>16.5</td>
<td>White</td>
<td></td>
</tr>
<tr>
<td>20.5</td>
<td>Blue</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Orange</td>
<td>2 DuoDotes™</td>
</tr>
<tr>
<td>33</td>
<td>Green</td>
<td></td>
</tr>
</tbody>
</table>

Mechanism of Action
Reactivates cholinesterase by displacing the enzyme from its receptor sites. The free enzyme then can resume its function of degrading accumulated acetylcholine, thereby restoring normal neuromuscular transmission. Pralidoxime also detoxifies some organophosphates by direct chemical reaction.

Pharmacokinetics
Onset is 2-3 min; peak effect in 5-15 min; duration is 2-3 hr

Contraindications
Poisonings with carbamate insecticide Sevin, inorganic phosphates, organophosphates with no anticholinesterase

Interactions
None

Adverse Effects
Dizziness
Blurred vision
Hypertension
Laryngospasm
Tachycardia
Medical Control Guideline: DRUG REFERENCE – SODIUM BICARBONATE  

Classification  
Electrolyte / Alkalinizing Agent

Prehospital Indications  
Cardiac Arrest – Non-Traumatic: suspected hyperkalemia, patients with renal failure  
Cardiac Dysrhythmia: suspected hyperkalemia causing bradycardia  
Overdose / Poisoning / Ingestion: suspected tricyclic overdose with ECG changes  
Traumatic Injury: suspected hyperkalemia in the setting of crush injury or potential for development of crush syndrome (administer prior to release of crushed tissue)

Other Common Indications  
None

Adult Dose  
50mEq (50mL) slow IV/IO push  
For crush injury repeat x1 for persistent ECG abnormalities

Pediatric Dose  
1mEq/kg (1mEq/mL) slow IV push, dose per MCG 1309  
For crush injury, repeat x1 for persistent ECG abnormalities

Mechanism of Action  
Increases blood and urinary pH by releasing a bicarbonate ion, which in turn neutralizes hydrogen ion concentration.

Pharmacokinetics  
Onset is < 15 min (observed < 5 for tricyclic overdose); clinical effect in < 15 min; duration is 1-2 hr

Contraindications  
Evidence of pulmonary edema  
Hypernatremia or hypocalcemia

Interactions  
Precipitates to form calcium carbonate (chalk) when used with calcium chloride or calcium gluconate.  
Administer calcium chloride and sodium bicarbonate separately.  
Can reduce potency of epinephrine, flush line after administration.

Adverse Effects  
Extracellular alkalosis  
Tissue damage if IV infiltrates  
Pulmonary edema

Prehospital Considerations  
- Multiple doses may be needed in TCA overdose when indicated
Medical Control Guideline: LEVEL OF CONSCIOUSNESS

PRINCIPLE:

1. Evaluation and documentation of the patient’s level of consciousness are key components of a thorough patient assessment.

2. The patient’s baseline level of consciousness should be taken into consideration when evaluating whether the altered level of consciousness (ALOC) finding represents an acute change or is normal for the patient.

3. Signs and symptoms of ALOC may present as disorientation to person, place or time; confusion; lethargy; impaired cognition; coma; inappropriate aggressiveness; or hostility. These findings should alert EMS personnel to the possibility that the patient may have a serious underlying medical condition.

4. If the patient has ALOC, evaluation of past medical history, including history of ALOC reported by patient or family members, may provide clues to the cause of the patient’s ALOC.

GUIDELINES:

1. Assess orientation by asking the patient the following:
   a. Name
   b. Where they live/where they are
   c. Day of week/year/time of day
   Patients unable to reasonably answer one or more of the above shall be considered to have ALOC.

2. Utilize the appropriate Glasgow Coma Scale (GCS) to assess the neurological status of all patients. Report and document the GCS in the following order: eye opening, verbal response, and motor response.

<table>
<thead>
<tr>
<th>EYE OPENING</th>
<th>Adult</th>
<th>Child (1-4 yrs.)</th>
<th>Infant</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Spontaneous</td>
<td>Spontaneous</td>
<td>Spontaneous</td>
</tr>
<tr>
<td>3</td>
<td>To voice</td>
<td>To voice</td>
<td>To shout</td>
</tr>
<tr>
<td>2</td>
<td>To pain</td>
<td>To pain</td>
<td>To pain</td>
</tr>
<tr>
<td>1</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VERBAL RESPONSE</th>
<th>Adult</th>
<th>Child (1-4 yrs.)</th>
<th>Infant</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Oriented</td>
<td>Oriented</td>
<td>Smiles and coos appropriately</td>
</tr>
<tr>
<td>4</td>
<td>Confused</td>
<td>Confused</td>
<td>Cries and consolable</td>
</tr>
<tr>
<td>3</td>
<td>Inappropriate</td>
<td>Inappropriate</td>
<td>Persistent inappropriate crying and/or screaming</td>
</tr>
<tr>
<td>2</td>
<td>Incomprehensible</td>
<td>Incomprehensible</td>
<td>Grunts or is agitated or is restless</td>
</tr>
<tr>
<td>1</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MOTOR RESPONSE</th>
<th>Adult</th>
<th>Child (1-4 yrs.)</th>
<th>Infant</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Obedient</td>
<td>Obeys command</td>
<td>Spontaneous</td>
</tr>
<tr>
<td>5</td>
<td>Purposeful</td>
<td>Localizes to pain</td>
<td>Localizes to pain</td>
</tr>
<tr>
<td>4</td>
<td>Withdraws to pain</td>
<td>Withdraws to pain</td>
<td>Withdraws to pain</td>
</tr>
<tr>
<td>3</td>
<td>Flexion (decorticate)</td>
<td>Flexion (decorticate)</td>
<td>Flexion (decorticate)</td>
</tr>
<tr>
<td>2</td>
<td>Extension (decorticate)</td>
<td>Extension (decorticate)</td>
<td>Extension (decorticate)</td>
</tr>
<tr>
<td>1</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>
NOTE: For patients unable to communicate or patients with a language barrier, estimate appropriateness of motor response, obedience, and verbal response by consulting with the family and/or primary caregiver(s), if applicable.

3. If the patient has ALOC consider possible causes using AEIOU-TIPS:

   A – Alcohol, abuse of substances
   E – Electrolytes
   I – Infection
   O – Oxygen (hypoxia), overdose
   U – Uremia
   T – Trauma, tumor, child maltreatment, toxic substance (or adverse reactions to medications
   I – Insulin (hypoglycemia)
   P – Poisoning, Psych
   S – Seizures, Sepsis, Stroke, Subarachnoid Hemorrhage

4. Perform an on scene assessment, obtain history from caregivers including baseline functional status, and complete physical assessment including neurological exam to evaluate patient for signs of stroke.

5. Point of care testing should include pulse oximetry, glucose testing, and cardiac monitoring to include 12-lead ECG in patients with suspected cardiac ischemia or dysrhythmia.
Medical Control Guideline: MECHANICAL CIRCULATORY SUPPORT DEVICES

PRINCIPLES:

1. A Mechanical Circulatory Support (MCS) device is an implanted device that is used to partially or completely replace the function of a failing heart in adults and children. MCS devices may be used as a bridge to transplant or as destination therapy for those who are not transplant candidates.

2. There are several types of MCS devices. A ventricular assist device (VAD) can support the function of the left ventricle with a left ventricular assist device (LVAD), the right ventricle (RVAD), or both ventricles (biventricular device). A total artificial heart (TAH) replaces the heart itself. The most common device is currently a LVAD.

3. MCS patients have a coordinator available 24 hours a day who will provide direction on managing the device. Contact information for the device coordinator may be located on the device, refrigerator, medical-alert bracelet or on a card in the patient’s wallet.

4. The patient and family members receive extensive training on their specific MCS device and should be utilized in the care of the patient.

5. Many MCS device patients are on anticoagulants and prone to bleeding.

6. MCS device patients are preload dependent and may be harmed by vasodilators (e.g., nitrates).

7. Most MCS device patient emergencies will NOT be related to malfunction of the device.

Ventricular Assist Devices (VAD)

8. Due to the continuous (non-pulsatile) flow of VAD devices, vital signs such as blood pressure, heart rate, and pulse oximetry are unobtainable or unreliable and perfusion status should be based on the clinical exam. Capnography will read accurately and can provide valuable information on the patient’s perfusion status.

9. All VAD patients can be defibrillated and cardioverted, if indicated.

10. Chest compressions may dislodge the internal VAD tubes from the heart, causing the patient to bleed into the thoracic and/or abdominal cavities; however, chest compression can be performed if needed on VAD patients.

Total Artificial Heart (TAH)

11. The TAH produces pulsatile flow with a palpable pulse and measurable blood pressure.
12. TAH patients cannot be defibrillated or cardioverted and do not produce an ECG tracing.

13. Systolic hypertension increases afterload and may lead to pulmonary edema. In this situation, careful administration of vasodilators may be considered.

14. Chest compressions should not be performed on TAH patients because non-compressible mechanical chambers have replaced the ventricles.

GUIDELINES:

1. If there is concern for device malfunction, call the MCS device coordinator directly to assist with troubleshooting.

2. If the MCS coordinator is not reachable and/or additional orders are required, contact the Base hospital.

3. Treat MCS patients by the appropriate treatment protocol, based on your provider impression.

4. Attempt to locate an Advanced Healthcare Directive and/or a Standardized Patient-Designated Directives [e.g., Physician Orders for Life-sustaining Therapy (POLST), State DNR Form]. Most MCS device patients have made end-of-life care decisions.

5. Given that MCS devices are preload dependent, administer fluids early when directed by the Treatment Protocol.

6. All of the patient’s MCS device equipment must accompany them to the hospital. Make sure all equipment is safely secured prior to transport to ensure that the driveline is not pulled or cut during transport. Spinal motion restriction and/or splinting may be modified to protect the integrity of the MCS device equipment.

7. When a MCS patient is experiencing signs and symptoms related to the device, every effort should be made to transport the patient to their MCS hospital. Allow the family member or caregiver to ride with the patient if treatment and space permit.

Ventricular Assist Devices (VAD)

8. Do not administer nitroglycerin; give only aspirin and morphine or fentanyl when treating patients with provider impressions Chest Pain - Suspected Cardiac or Chest Pain - STEMI.

9. Utilize clinical parameters for patient assessment (e.g., skin color, capillary refill, level of consciousness and general appearance), because these patients will not have a blood pressure and/or palpable pulse.

10. The patient’s underlying rhythm only requires treatment if the patient has signs of poor perfusion. If external defibrillation or cardioversion is necessary, apply the pads as to avoid an internal Pacemaker/Implanted Cardioverter Defibrillator (ICD) and use the standard amount of energy. DO NOT disconnect the system controller from the percutaneous lead (driveline) or stop the pump prior to delivering the shock.
11. For patients in cardiac arrest, assess for VAD malfunction in consultation with the device coordinator. Chest compressions should only be initiated if the VAD is functioning and the patient remains in cardiac arrest or if the VAD cannot be fixed and resuscitation is in agreement with the patient’s Advanced Health Care Directive or Standardized Patient-Designated Directives (e.g., POLST, State DNR Form).

12. In an unconscious, pulseless patient with a VAD, a capnography reading of < 20 is an indicator of poor systemic perfusion and should prompt initiation of chest compressions.

**Total Artificial Heart (TAH)**

13. Do not administer epinephrine. The resulting increase in afterload may cause pulmonary edema and circulatory collapse.

14. For patients in respiratory distress with a systolic blood pressure >150mmHg, administration of nitroglycerin should be considered. Alternatively, the patient may be assisted in self-administration of their home dose of oral hydralazine.

15. For patients in cardiac arrest, assess for TAH malfunction in consultation with the device coordinator. Do not perform chest compressions or attempt defibrillation. The only therapeutic option is to restore the function of the device.
PRINCIPLES:

1. A complete and accurate medication order is essential for patient care.

2. Closed-loop communication (repeating orders back to the base hospital and to paramedic partner) reduces medication errors.

GUIDELINES:

1. Base hospitals must provide complete medication and fluid orders to include:
   a. Name of medication
   b. Dose (mg and mL to be delivered)
   c. Route of administration per L.A. County protocols
      i. Intravenous (IV)
      ii. Intramuscular (IM)
      iii. Intranasal (IN)
      iv. Intraosseous (IO)
      v. Nebulized (via neb)
      vi. Orally Disintegrating Tablet (ODT)
      vii. Per Os/Oral (PO)
      viii. Rapid infusion (IV/IO) – fluid administration as quickly as possible
      ix. Slow IV/IO push – dose administered over 60 seconds
      x. Sublingual (SL)
   d. Frequency of administration, if applicable

2. Paramedics shall repeat complete orders back to the base hospital.

3. Pro re nata (PRN) orders should have indications for administration.
**Medical Control Guideline: NEEDLE THORACOSTOMY**

**PRINCIPLES:**

1. Needle thoracostomy is an uncommon procedure that may provide life-saving treatment of a tension pneumothorax during prehospital care and transport.

2. Risk of tension pneumothorax increases significantly after initiation of positive pressure ventilation (e.g., bag-mask ventilation, placement of advanced airway), which can convert a simple pneumothorax into a tension pneumothorax.

3. Needle thoracostomy should be performed, if indicated as outlined in Guidelines 2.1 below, prior to Base contact on any of the following patients:
   a. PEA cardiac arrest with multisystem blunt trauma
   b. Penetrating trauma which includes the thorax and abdomen or who have evidence of chest trauma with profound shock and signs of tension pneumothorax.

4. PEA cardiac arrest maybe due to tension pneumothorax after positive pressure ventilation.

5. ALS and Paramedic Assessment Units shall carry an 8cm (3.0 – 3.5 inches) 14G commercial needle decompression device for the performance of emergency needle thoracostomy.

6. The procedure for needle thoracostomy in a pediatric patient is unchanged from that of adults. It is expected that a shorter distance will need to be traversed to enter the pleural space in children due to the thinner chest wall.

7. Maintenance of skills requires regular in-service training on recognition and treatment of tension pneumothorax. It is strongly recommended that this training be completed in a simulation environment, rather than through slide-based or didactic learning.

**GUIDELINES:**

1. Manage patient with traumatic injuries as per TP 1243/1243-P, Traumatic Arrest and/or TP 1244/1244-P, Traumatic Injury.

2. Consider tension pneumothorax in the following patients.

   2.1. Trauma patients with obvious chest trauma (e.g., open chest wounds, evidence of crush or flail segment) or with mechanism consistent with chest trauma who demonstrate:
       a. Decreased or absent breath sounds on affected side, and
       b. SBP < 90mmHg (adult), < 70mmHg (child and infant), and
       c. One or more of the following:
i. Altered mental status
ii. Severe respiratory distress, with RR > 30 breaths per minute or < 10 breaths per minute
iii. Severe hypoxia, with < 90% oxygen saturation
iv. Cool, pale, moist skin

2.2. Traumatic full arrest with PEA rhythm (bilateral needle thoracostomy should be performed if evidence of chest wall trauma)

2.3. Trauma patients requiring positive-pressure ventilation who develop hypoxia or severe hypotension (SBP < 90mmHg), without alternate cause, after initiation of positive pressure ventilation

2.4. PEA cardiac arrest that develops after initiating positive pressure ventilation

3. Immediately place all patients with suspected pneumothorax on high flow oxygen by non-rebreather mask.

4. If the patient is awake and alert, explain medical condition and rationale for the procedure to the patient.

5. Prepare skin of chest with alcohol or chlorhexidine prior to skin puncture.

6. Insert the needle-catheter perpendicular to chest just above the 3rd rib at the mid-clavicular line (second intercostal space) or just above the 5th rib (fourth intercostal space) anterior axillary line per training. Only place in sites for which paramedic has undergone specific training.

7. Attach a syringe to the thoracostomy needle for the procedure, if possible. Advance needle perpendicular to the chest wall while withdrawing on syringe until air is easily aspirated into the syringe (confirming penetration of lung pleura). Advance needle an additional 1cm, then advance catheter over the needle further before withdrawing needle and disconnecting the syringe.

8. Secure catheter to skin with tape or commercial device. Do not place a one-way valve on the catheter hub.

9. If the patient has an open or sucking chest wound, cover the wound with a commercially available vented chest seal or vented (3-sided) occlusive dressing. Placement of a vented dressing can prevent conversion of an open pneumothorax to a tension pneumothorax. However, tension pneumothorax may still develop in the presence of a vented dressing and should be treated with needle thoracostomy. Furthermore, needle thoracostomy in a patient with evidence of tension pneumothorax should not be delayed for placement of dressing.

10. If a patient does not improve after needle thoracostomy, or improves but later decompensates, and there is concern for catheter dislodgement or obstruction, needle thoracostomy may be repeated on the same side or at an alternate location.
Medical Control Guideline: ONLINE MEDICAL DIRECTION AND RECEIVING HOSPITAL NOTIFICATION

DEFINITIONS:

1. Online Medical Direction is provided to prehospital provider(s) via voice communication from qualified Base hospital personnel (MICN or Base Physician) for the purposes of real-time patient care.

2. Receiving hospital notification is communication of patient information by prehospital provider(s) or Base hospital personnel for the purpose of preparing the receiving hospital staff for patient arrival.

PRINCIPLES:

1. Online medical direction occurs when Base hospital contact is established by paramedics in order to obtain guidance on patient care from a designated paramedic Base hospital.

2. In general, for situations requiring base hospital contact, the time when Base hospital contact is established will be based on paramedic judgement unless otherwise specified.

3. The paramedic who provides direct patient care during transport shall have a means to establish communication with the Base hospital at all times.

4. Once Base hospital contact is made for medical direction, the overall authority for patient’s medical care lies with the Base. The treatment plan based on Provider Impression should be developed collaboratively by prehospital providers and Base personnel.

5. Treatments outlined in the applicable protocol may be administered by prehospital providers and communicated to the Base hospital.

6. Communication shall be maintained until the Base hospital ends the call.

7. If Base hospital contact is made, the Base hospital is responsible for notifying the receiving hospital.

GUIDELINES:

1. Paramedics shall establish Base hospital contact for online medical direction on all patients who meet Base hospital contact criteria as specified in Ref. 1200.1, Treatment Protocol General Instructions and when directed by the Treatment Protocols.

2. Utilize radios, the VMED28 radio frequency, or telephone to establish Base hospital contact.

3. Paramedics shall clearly indicate the reason for the contact:
   a. “Base Contact for online medical direction” or may simply state “Base Contact”
   b. “Providing notification of patient transport to your facility” or may simply state
4. When requesting online medical direction, paramedics shall report their field assessment to Base hospital personnel. Their report should include the following information:

   a. Sequence number
   b. Provider Code/Unit number
   c. Provider Impression
   d. Treatment Protocol name and number
   e. Patient age and gender
   f. For pediatric patients: Weight (kg) and Color Code from length-based resuscitation tape
   g. Pertinent patient assessment findings based on primary and secondary assessments
   h. Past medical history, medications and allergies
   i. Treatment provided prior to Base hospital contact
   j. Response to treatment or patient re-assessment
   k. Proposed hospital destination and estimated time of arrival
   l. Any further information pertinent to the field care of the patient

5. Paramedics shall repeat all Base hospital orders, especially complete medication orders (name of drug, dose and route) to confirm receipt of orders to decrease errors.

6. Maintain or re-establish online communications as directed by the Base hospital for critical or hemodynamically unstable patients.

7. If a patient refuses treatment and/or transport and meets Base hospital contact criteria, paramedics should establish Base hospital contact prior to having the patient sign out against medical advice.

8. Receiving hospital notification shall include but is not limited to the following:
   a. Sequence number
   b. Provider Code/Unit number
   c. Provider Impression
   d. Patient age and gender
   e. For pediatric patients: Weight (kg) and Color Code from length-based resuscitation tape
   f. Critical information that is needed for the receiving hospital to prepare for the patient
   g. Estimated time of arrival
Medical Control Guideline: PAIN MANAGEMENT

PRINCIPLES:

1. All patients should undergo pain assessment and management, regardless of age or ability to communicate in English.

2. Uncontrolled pain has been associated with both short-term and long-term adverse outcomes.

3. Measurement of a patient's pain is subjective; therefore, the patient who is able to communicate best determines the presence and severity of their pain.

4. Recording a pain level using a validated pain scale provides health care providers with a baseline against which to compare subsequent evaluations of the patient's pain.

5. Los Angeles County utilizes the “Numeric Pain Intensity”, “Facial Expression”, and FLACC (Face, Legs, Activity, Cry and Consolability) pain scales.

6. Pain management includes both pharmacologic and non-pharmacologic interventions, such as distraction, positioning, and medication administration which may be provided concurrently or in an escalating fashion.

GUIDELINES:

1. Pain assessment should be performed on patients of all ages as part of the initial patient assessment, and should include severity as measured on one of the 3 formal pain scales used by Los Angeles County.

2. For verbal patients 8 years of age or older, use the Numeric Pain Intensity scale by asking the patient to rate their pain on a 0-10 scale; zero (0) equals no pain and ten (10) equals the most severe pain. Document the number selected on the EMS Report Form.

3. For patients 3-7 years old, or for patients with limited English proficiency, use the Facial Expression pain scale.

![Facial Expression Scale]

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Pain</td>
<td>Some Discomfort</td>
<td>Having Discomfort</td>
<td>Mild Pain</td>
<td>Moderate Pain</td>
<td>Severe Pain</td>
<td>Most Severe Pain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. For children < 3 years of age or for patients who are non-verbal due to baseline medical conditions such as cognitive impairment or severe dementia, utilize the FLACC Behavioral Tool. The patient should be assessed in each of the 5 categories shown in the table below, with the pain severity determined based on the total score on a scale of 0-10.

<table>
<thead>
<tr>
<th>Behavior</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face</td>
<td>No particular expression or smile</td>
<td>Occasional grimace or frown, withdrawn, disinterested</td>
<td>Frequent to constant frown, clenched jaw, quivering chin</td>
</tr>
<tr>
<td>Legs</td>
<td>Normal position or relaxed</td>
<td>Uneasy, restless, tense</td>
<td>Kicking or legs drawn up</td>
</tr>
<tr>
<td>Activity</td>
<td>Lying quietly, normal position, moves easily</td>
<td>Squirming, tense, shifting back and forth, hesitant to move, guarding</td>
<td>Arched, rigid or jerking, fixed position, rubbing of body part</td>
</tr>
<tr>
<td>Cry</td>
<td>No cry/moan (awake or asleep)</td>
<td>Moans or whispers, occasional cries, sighs or complaint</td>
<td>Cries steadily, screams, sobs, moans, groans, frequent complaints</td>
</tr>
<tr>
<td>Consolability</td>
<td>Calm, content, relaxed, needs no consoling</td>
<td>Reassured by hugging, talking to, distractible</td>
<td>Difficult to console or comfort</td>
</tr>
</tbody>
</table>

5. Reassess the patient’s pain with each assessment of vital signs and after any intervention, including patient movement into the ambulance. Document pain reassessment on the Patient Care Record.

6. Administer pain medications to patients with severe pain ≥ 7 as measured on any 0-10 scale, if not controlled by non-pharmacologic methods, unless a contraindication is present. Absolute contraindications to use of narcotic medications include:
   a. Respiratory Rate <12
   b. Stated allergy to opiate pain medications
   c. Active labor

7. Use caution and consider smaller initial dosing when administering pain medications in the following patient situations:
   a. Elderly patients
   b. Adults with SBP <100; Pediatrics with SBP < 70 (Fentanyl preferred if pain medication necessary)
   c. Respiratory distress or failure
   d. Suspected drug/alcohol intoxication

8. Strongly consider administering ondansetron 4mg ODT or IV prior to administration of first dose of pain medications in patients 4 years of age or older or 15 kg or greater, as both fentanyl and morphine may cause nausea and vomiting.
9. Document and report all interventions performed for pain management, whether pharmacologic or non-pharmacologic. These may include, but are not limited to:
   a. Splinting
   b. Distraction with devices (e.g. video viewing)
   c. Cold pack application
   d. Positioning for comfort
   e. Medication administration

10. Contact Base for orders if patient’s condition requires additional dosing of medications beyond that permitted by Treatment Protocol
Medical Control Guideline: PEDIATRIC PATIENTS

**DEFINITION:** Pediatric patients in the prehospital setting are defined as children 14 years of age and younger or, in the case that the age is unknown, the patient can be measured on the length-based resuscitation tape (e.g., Broselow™).

**PRINCIPLES:**

1. Pediatric patients require special consideration in assessment, treatment and medication administration.

2. Pediatric assessment includes: pre-arrival preparation, scene size-up for hazards to patient or providers, assessment of scene for signs of child maltreatment, the Pediatric Assessment Triangle (PAT), vital signs, focused history using SAMPLE (signs and Symptoms, Allergies, Medications, Past Medical History, Last food or liquid intake, and Events leading to illness or injury), and a detailed physical exam as dictated by the patient’s presenting signs and symptoms and condition.

3. PAT is composed of three components Appearance, Work of Breathing and Circulation to the Skin (Figure 1).
   - The PAT is a “rapid Assessment Tool” that uses only visual and auditory clues and requires no equipment.
   - The PAT is intended to allow the EMS provider to:
     - Establish the child’s severity of illness
     - Determine sick or not sick
     - Recognize the general category of pathophysiology called the “general impression”
     - Determine the urgency of interventions
   - Appearance: Recalled by the mnemonic TICLS, an abnormality in any component:
     - Tone
     - Interactiveness
     - Consolability
     - Look/Gaze
     - Speech/Cry
   - Work of Breathing: Presence of any of the following implies abnormal work of breathing:
     - Stridor
     - Wheezing
     - Grunting
     - Tripod positioning
     - Retractions
     - Nasal flaring
     - Apnea/Gasping
e. Circulation to the Skin: Presence of any of the following indicates abnormal circulation to the skin or signs of poor perfusion.
   i. Pale
   ii. Mottled
   iii. Cyanotic

f. Combining the PAT assessment based on these components can be used to determine the general impression (i.e., what, if anything, is critically wrong with the patient in terms of pathophysiology) which will dictate immediate management priorities (Figure 2):
   i. Stable
   ii. Respiratory distress
   iii. Respiratory failure
   iv. Shock
   v. CNS/Metabolic disorder
   vi. Cardiopulmonary failure/Cardiopulmonary Arrest

4. Treatments, medication concentrations and drug dosages are weight-specific for the pediatric patient.

5. Accurate pediatric drug doses are obtained by:
   a. Measuring the patient against a pediatric length-based resuscitation tape (e.g., Broselow Tape™) to obtain the weight/color zone, and then
   b. Referring to the MCG 1309 EMS Agency Color Code Drug Doses L.A. County Kids for the medication doses appropriate to that weight/color zone.

6. Brief Resolved Unexplained Events (BRUE) is defined as a brief episode characterized by any of the following (for children 12 months of age or younger):
   a. Absent, decreased or irregular breathing
   b. Color change (usually cyanosis or pallor)
   c. Marked change in muscle tone (usually limness or hypotonia, may also include hypertonia)
   d. Altered level of consciousness
   e. Choking if associated with one or more of the above findings

GUIDELINES:

1. Assess using the PAT and initiate immediate treatment based on your general impression (Stable, Respiratory Distress, Respiratory Failure/Arest, Shock, Center Nervous System Disorder/Metabolic Disorder, or Cardiopulmonary Failure/Arrest).

2. Determine your Provider Impression and continue treatment per the corresponding Treatment Protocol.

3. Document findings of the PAT, your assessment, and your Provider Impression.

4. Obtain the patient’s estimated weight utilizing a pediatric length-based resuscitation tape and document the corresponding weight and color zone on the EMS Report Form.
5. Pediatric Airway Management:
   a. Bag Mask Ventilation (BMV), nasopharyngeal (NP) airway, or oropharyngeal (OP) airway are approved airway adjuncts for pediatric patients.
   b. King airway is approved as a rescue airway for patients who are 12 years of age or older AND at least 4 feet tall.
   c. Endotracheal Intubation (ETI) is approved for patients 12 years of age or older or height greater than the length of the length-based resuscitation tape.

6. Pediatric Cardiopulmonary Resuscitation (CPR):
   a. Use Neonatal CPR for newborns up to 1 month of age
   b. Use Infant CPR for patients greater than one month of age to less than 13 months of age
   c. Use Child CPR for patients greater than or equal to 13 months of age to the onset of puberty

7. Automatic External Defibrillators (AED):
   Pediatric self-adhering pads or a pediatric attenuator system are recommended for infants and children younger than 8 years of age. When pediatric pads and/or a pediatric attenuator is not available, use adult AED and place front to back for infants and children

Figure 1: Pediatric Assessment Triangle
Figure 2: Using the components of the PAT to form a General Impression

- Normal
- Abnormal
- +/- Abnormal

![Diagram showing PAT components]

- \( \triangle \) = STABLE
- \( \triangle \) = RESPIRATORY DISTRESS
- \( \triangle \triangle \) = RESPIRATORY FAILURE
- \( \triangle \) = CNS / METABOLIC
- \( \triangle \triangle \) = CARDIO-PULMONARY FAILURE
Medical Control Guideline: PERFUSION STATUS

PRINCIPLES:

1. Perfusion status is determined by a combination of parameters that includes heart rate, blood pressure, tissue color and mentation. No one parameter alone can be used to determine perfusion status.

2. Adequate perfusion is defined as adequate circulation of blood through organs and tissues, manifested by normal pulse, tissue color, level of consciousness and blood pressure.

3. Poor perfusion is defined as inadequate circulation of blood through organs and tissues manifested by vital sign abnormalities and/or signs and symptoms of organ dysfunction.

4. Patients with poor perfusion that are unresponsive to initial fluid resuscitation are in shock.

GUIDELINES:

1. EMS providers should evaluate for the following signs and use clinical judgement to determine poor perfusion status, which may include but not limited to one or more of the following findings:
   a. Bradycardia, tachycardia and/or poor pulse quality (weak/thready)
   b. Altered mental status (including anxiety, restlessness, lethargy, combative behavior)
   c. Adult systolic blood pressure (SBP) < 90mmHg, pediatric SBP < 70mmHg
   d. Delayed capillary refill time (> 2 seconds) and/or changes in tissue color including pallor, cyanosis or mottling
Medical Control Guideline: SPINAL MOTION RESTRICTION

DEFINITION: Spinal Motion Restriction (SMR) describes the procedure used to care for patients with possible unstable spinal injuries. SMR includes: Reduction of gross movement by the patient; prevention of additional damage to the spine; and regular reassessment of motor/sensory function.

PRINCIPLES:

1. SMR involves maintaining a neutral in-line position of the spine at all times during patient treatment and transport. SMR requires the patient’s head, neck and torso to be appropriately stabilized. This can be achieved manually or with the use of commercially available equipment.

2. There are multiple commercial devices that may be used to assist with SMR during patient movement. In addition, there are harmful side effects of these devices that must be considered.

3. Prehospital provider assessment will determine if SMR should be initiated.

4. Prehospital providers should use judgment and consider SMR for patients without neurologic findings, but in whom one is still concerned for unstable spinal injury.

5. A cervical collar alone does not provide adequate SMR. To provide appropriate SMR, the patient must be maintained in a neutral in-line position during movement and while on the gurney. Patients with potential thoracolumbar injury should be supine or reverse Trendelenburg.

6. The backboard is an extrication device. It may also be used to provide splinting during movement of patients with multiple traumatic injuries. While a backboard may be used to assist with SMR during the extrication phase, it is not required for SMR.

7. Once the patient is on the ambulance gurney, the backboard does not provide any advantage and may cause harm related to increased pain, increased lateral movement, and increased imaging at the hospital.

8. The backboard should not be maintained during transport for the purposes of SMR. Whenever possible, patients should be rolled off the backboard prior to transport. Exceptions include patients who are hemodynamically unstable or when there are scene safety concerns.

9. A backboard should not be used in the ambulatory patient (i.e., a patient who is standing and/or walking at the time of EMS arrival).

10. SMR is generally not indicated for penetrating injuries and transport must not be delayed to maintain SMR. Treatment of patients with penetrating trauma should not involve a backboard unless it is required as an extrication device.

11. Safe and proper removal of the helmet should be done by two people following steps outlined in an approved trauma curriculum.
12. Paramedic assessment, in accordance with guidelines below, will determine whether SMR is required. Whenever BLS has initiated SMR, paramedics should strongly consider maintaining c-collar and spinal precautions until hospital evaluation. Once SMR has been determined necessary based upon paramedic assessment, it should be maintained throughout the prehospital phase of care by whatever methods the provider deems appropriate. This does not include continuation of the backboard, which, if used to assist during extrication, should be removed once patient is on gurney.

13. The method by which SMR is maintained and devices used may be adjusted to meet the needs of the patient. In particular, management of the patient’s airway may necessitate alternate SMR methods and should take precedence.

14. For purposes of the assessment, an unreliable patient is anyone who is altered, intoxicated or nonverbal. Limited evaluation may be due to communication barrier, uncooperative patient or patient too distracted by other injuries and circumstances. An abnormal spine exam is any deformity or tenderness along the spine.

15. For the purposes of the pediatric assessment, an abnormal torso exam refers to evidence of substantial torso injury, defined as injuries thought to be potentially life threatening to the thorax including the chest wall, abdomen, flanks, back and pelvis with an unstable chest wall, abdominal distension or significant chest or abdominal tenderness.

GUIDELINES:

1. Every patient with trauma, including ambulatory patients, must receive an assessment. If any assessment component is positive, the patient requires SMR. (See age-appropriate SMR algorithm.)

2. Patients initially placed in SMR by BLS providers whose care is transferred to ALS providers, shall receive a paramedic assessment to determine if continuation of SMR is indicated.

3. Neurological examination includes:
   a. Test of sensation and abnormal sensation (parasthesias) in all 4 extremities
   b. Test of motor skills in all 4 extremities with active movements by the patient (avoid just reflexive movements like hand grasp) to include: wrist/finger extension and flexion, foot plantar and dorsiflexion
   c. Frequent reassessment.

4. All history and examinations pertinent to the decision for SMR, as outlined in the adult and pediatric algorithms, must be assessed and documented on the EMS Report Form or ePCR.

5. Padding may be necessary to maintain neutral alignment particularly in children <3 years old who have a large occiput forcing the head forward when supine.

6. Infants in rear facing car seats may be immobilized and extricated in the car seat as long as the patient is stable and does not exhibit signs of respiratory distress or shock.

7. Children restrained in a car seat with a high back should be extricated in the car seat and then be placed in SMR as appropriate. Children in booster seats (without a back) should be placed in SMR as appropriate.
ADULT ALGORITHM:

Potential for unstable spinal injury?

- Age
- Meets trauma criteria for mechanism
- Axial load injury
- Numbness or tingling in extremities

Strongly consider SMR in patient at high risk:

Perform a careful assessment on all patients:

Unreliable patient?
  - Altered
  - Uncooperative/limited evaluation
  - Intoxicated
- Abnormal spine exam?
- Abnormal sensory or motor exam?

No

Simple rear-end MVC or other low-energy mechanism
- Ambulatory on scene?
- No neck pain?

Yes

No

SMR REQUIRED

SMR not needed

Use Judgment
PEDIATRIC ALGORITHM:

Potential for unstable spinal injury?

Strongly consider SMR:
- Meets trauma criteria for mechanism

High Risk Mechanism
- Axial load injury

High Risk Complaint
- Numbness or tingling extremities
- Pain or decreased movement of neck (torticollis)

Patient Assessment
- Unreliable patient?
  o Altered
  o Uncooperative/limited evaluation
  o Intoxicated
- Abnormal spine or torso exam?
- Abnormal sensory or motor exam?
- >2 years old and unable to ambulate?

Simple rear-end MVC or other low-energy mechanism
- No predisposing condition

SMR REQUIRED

Yes

Use Judgment

No

SMR not needed

Predisposing conditions are any of the following: Family members who fracture bones easily, child with spinal deformity, dysmorphic features, or childhood rheumatoid arthritis.

Specific conditions include: Down syndrome, hydrocephalus, dwarfism (achondrodysplasia), Klippel-Feil syndrome, mucopolysaccharidosis, Ehlers-Danlos syndrome, Marfan syndrome, osteogenesis imperfecta, Larsen syndrome, juvenile rheumatoid arthritis, juvenile ankylosing spondylitis, renal osteodystrophy, rickets, scoliosis, history of cervical spine injury /surgery.
Medical Control Guideline: TRANSCUTANEOUS PACING

PRINCIPLES:

1. Transcutaneous Pacing (TCP) provides temporary external cardiac pacing for the treatment of symptomatic bradycardia.

2. TCP should not be initiated on patients in asystole.

3. Do not delay TCP for IV access if the patient has poor perfusion.

4. Strongly consider sedation for pacing discomfort. Refer to TP 1212 or 1212-P, Cardiac Dysrhythmia - Bradycardia for drugs and dosages.

5. All TCP equipment must be used and maintained in accordance with the manufacturer’s guidelines.

GUIDELINES:

1. Explain the procedure to the patient, family member, and/or caregiver.

2. Place pacing electrodes/pads and attach the pacing cable according to the manufacturer’s guidelines.

3. For awake patients, provide sedation and analgesia unless contraindicated. Contraindications include RR < 10 for adults (for pediatrics < lower limit for color code on MCG 1309) or unresponsiveness.

4. Activate the pacing device, set the initial pacing rate at 70 beats per minute (bpm) and the current at zero milliampere (mA). Slowly increase the mA until electrical and mechanical capture is achieved as evidenced by a palpable pulse that correlates with the paced heart rate on the monitor.

5. If the patient continues to exhibit signs and symptoms of poor perfusion, increase the rate by 10 bpm until adequate perfusion is achieved. Maximum rate is 100 bpm.
Medical Control Guideline: TRAUMATIC HEMORRHAGE CONTROL

PRINCIPLES:

1. Applying direct continuous pressure to the area of bleeding should be the first management technique to control external bleeding.

2. Tourniquets have been demonstrated to be safe and effective when used appropriately and can be lifesaving.

3. A hemorrhage control tourniquet should be used if external bleeding from an extremity cannot be controlled by direct pressure to an exposed wound.

4. Poorly perfusing patients with an isolated penetrating extremity injury and those with amputations or mangled extremities should have a tourniquet applied even if minimal to no visible bleeding.

5. Tourniquet application may be the initial method to control extremity bleeding when scene safety concerns, resource limitations, or patient positioning/entrapment preclude direct pressure application.

6. Tourniquet application frequently results in severe pain. Pain management should be provided as necessary.

7. Hemostatic Agents are only to be utilized by approved providers.

GUIDELINES:

1. First, remove any bandages applied by patient or bystanders, identify the area of bleeding, and apply continuous, firm, focused pressure directly to source of bleeding.

2. If unable to control hemorrhage with direct pressure, or if scene or patient safety precludes application of direct pressure, prepare for tourniquet application.

3. Explain usage of tourniquet to the patient if patient’s condition allows.

4. Follow manufacturer’s instructions for application of the tourniquet.

5. Apply tourniquet 2-3 inches proximal to the bleeding site but not over a joint or the hemorrhaging injury.

6. Ensure that bleeding is stopped and distal pulses are absent after the application of the tourniquet.

7. Once a tourniquet is applied, the patient should be reassessed at least every 5 minutes for continued absence of distal pulse and/or bleeding.

8. If bleeding is not controlled with one tourniquet, a second tourniquet may be applied proximal to the first tourniquet. Do not remove the first tourniquet after applying the second tourniquet.
9. Once a tourniquet is applied it should not be loosened or removed without physician approval.

10. Provide analgesia per MCG 1345 and refer to TP 1244 or 1244-P, Traumatic Injury and TP 1242 or 1242-P, Crush Injury/Syndrome as appropriate for dosing.

11. Paramedics shall make Base hospital contact and transport in accordance with Ref. 1200.1 and Ref. 502, Patient Destination. In general, patients requiring tourniquets should be transported to a Trauma Center.

12. Paramedic shall document the time tourniquet applied on the tourniquet and on the EMS electronic Patient Care Record (ePCR). Remaining patient documentation will be in accordance with Ref. 606, Documentation of Prehospital Care.
DEFINITION:

Fallout: a deviation from an established standard.

PRINCIPLES:

1. An EMS QI program incorporating the Treatment Protocols is essential to effectively evaluate the quality of prehospital care as well as the efficiency in providing emergency medical services.

2. A collaborative relationship between Base Hospitals and EMS Provider Agencies is necessary for a comprehensive and effective quality improvement (QI) program.

3. Base Hospitals and EMS Provider Agencies shall evaluate the appropriate utilization of the Treatment Protocols based on the fallouts outlined below.

GUIDELINES:

I. EMS PROVIDER AGENCY

1. ALL TREATMENT PROTOCOLS
   
a. Provider Impression (PI)
      - Primary PI not documented
      - Primary PI clinically incorrect
      - Secondary PI not documented when appropriate

b. Treatment Protocol (TP)
      - Designated TP for PI not used
      - Secondary TP for secondary PI not used when appropriate

c. Airway (AW)
      - Adult - Unresponsive requiring Bag-Mask-Ventilation (BMV) and oropharyngeal airway not used
      - Advanced airway (ET tube, King LTS-D) not used for ineffective BMV (age >12 years)
      - Capnography not used for any positive pressure ventilation
      - Positive pressure ventilation required and not performed

d. Oxygen (O2) (O2)
      - Does not receive O2 and O2 sat <94% (<88% COPD), unless newborn or pediatric congenital heart disease
      - Meets criteria for high flow O2 and patient does not receive
      - Receives O2 and O2 sat >94% and patient does not meet criteria for high flow O2
      - Pediatric – Newborn or pediatric congenital heart disease receive inappropriate O2 as per MCG 1302
e. Pain (PN)
   - Pain level not recorded
   - Pain score ≥ 7 and pain not addressed
   - Pain treated and not reassessed
   - Incorrect dose of pain medication administered

f. Base Contact (BA)
   - Base contact not made when specified by Ref. No. 1200.1 or by specific protocol used

g. Receiving Hospital Notification (NT)
   - No notification to receiving hospital as per Ref. No. 1200.1

h. Transport (TS)
   - Advanced Life Support (ALS) transport not made when indicated by Ref. No. 1200.1

i. Destination (DS)
   - Failure to transport to a specialty center when indicated
   - Transport to the wrong specialty center; includes Trauma Center, STEMI Receiving Center, Perinatal Center, Emergency Department Approved for Pediatrics, Pediatric Medical Center, Primary Stroke Center and Comprehensive Stroke Center.
   - Transport to the incorrect stroke center level based on mLAPSS, LAMS and Last Known Well Time

j. Documentation (DO)
   - Erroneous Provider Impression or Treatment Protocol documentation due to data entry error alone

k. Color Code Drug Doses (DD)
   - Pediatric – for children ≤ 14 years weight (kg) and Color Code not documented
   - Pediatric – for children ≤ 14 years weight (kg) or Color Code incorrect

l. Fluid Administration (FL)
   - Adult – Normal Saline 1L not administered for poor perfusion or other protocol-specific indication (unless contraindicated because of pulmonary edema or multi-system trauma patient)
   - Pediatric – Normal Saline 20mL/kg not administered for poor perfusion or other protocol-specific indication
   - Patient not reassessed after each Normal Saline 250mL and fluids continued

m. Ondansetron (ON)
   - Pediatric – Ondansetron 4mg ODT given to patient < 4 years old
   - Not administered when indicated

2. TP 1202 / 1202-P – GENERAL MEDICAL
   As per “All Treatment Protocols”

3. TP 1203 / 1203-P – DIABETIC EMERGENCIES
   a. Glucose (GL)
- Blood glucose not checked

b. Low Blood Glucose (LG)
   - Blood glucose < 60 and not treated

4. TP 1204 / 1204-P – FEVER / SEPSIS
   As per “All Treatment Protocols”

5. TP 1205 / 1205-P – GI/GU EMERGENCIES
   As per “All Treatment Protocols”

6. TP 1206 / 1206-P – MEDICAL DEVICE MALFUNCTION
   As per “All Treatment Protocols”

7. TP 1207 / 1207-P – SHOCK / HYPOTENSION
   a. Vascular Access (VA)
      - Vascular access not attempted for patient
      - Intraosseous line not attempted when Intravenous Line cannot be established and Intraosseous Line indicated per MCG 1375
      - Intraosseous Line placed without indication as per MCG 1375

b. Cardiac Monitoring (CM)
   - Cardiac monitoring not initiated

c. Fluid Administration (FL)
   - Any universal fallout as specified above
   - Additional Normal Saline 1L for adults or 20mL/kg for pediatrics not administered for persistent poor perfusion after initial NS infusion (unless contraindicated or withheld by Base order)

d. Push-Dose Epinephrine (PD)
   - Base contact not made to discuss or Push-Dose Epinephrine not initiated for persistent poor perfusion or poor perfusion with pulmonary edema

8. TP 1208 / 1208-P – AGITATED DELIRIUM
   a. Sedation (SE)
      - Adult – Midazolam not administered in patient requiring restraints or for provider safety
      - Pediatric – Base contact not made to discuss Midazolam administration in patients requiring restraints or for provider safety
      - Pediatric – Midazolam administered without Base order
      - Midazolam administered in patient not meeting criteria (not requiring restraints or not agitated with 2 or more of confusion, diaphoresis, tactile fever, tachycardia)

9. TP 1209 / 1209-P – BEHAVIORAL / PSYCHIATRIC CRISIS
   a. Sedation (SE)
      - Midazolam not administered in patient requiring restraints or for provider safety
      - Midazolam administered in patient not meeting criteria (not requiring restraints for patient or provider safety
      - Midazolam administered without Base order
10. TP 1210 / 1210-P – CARDIAC ARREST

a. Scene (SD)
   - Patient transported prior to at least 20 minutes of on-scene resuscitation

b. Vascular Access (VA)
   - Vascular Access not attempted for patient
   - Intraosseous Line not attempted when intravenous line cannot be established
     and Intraosseous Line indicated per MCG 1375

c. Capnography (WC)
   - Waveform capnography is not used throughout resuscitation

d. Defibrillation (DF)
   - Adult – Defibrillation biphasic at 200J not performed immediately for shockable rhythm
   - Pediatric – Defibrillation at 2J/kg not performed immediately for shockable rhythm
   - Pediatric – Repeat defibrillation at 4J/kg not performed when indicated
   - Defibrillation performed for non-shockable rhythm

e. Epinephrine (EP)
   - Epinephrine administered prior to defibrillation x 2 for shockable rhythm
   - Epinephrine not administered after defibrillation x 2 for shockable rhythm
   - Epinephrine not administered for PEA/Asystole

f. Amiodarone (AM)
   - Amiodarone not administered for persistent or recurrent V-Fib/V-Tach without pulses
   - Amiodarone administered for rhythm besides persistent V-Fib/V-Tach without pulses

g. 12-Lead ECG (EC)
   - 12-Lead ECG not performed after Return of Spontaneous Circulation (ROSC) per MCG 1308
   - 12-Lead ECG paramedic interpretation not documented
   - 12-Lead ECG software interpretation not documented

h. Fluid Administration (FL)
   - Normal Saline not administered for PEA/Asystole
   - Normal Saline not administered for SBP <90 after ROSC

i. Push-Dose Epinephrine (PD)
   - Adult – Push-dose epinephrine not administered for SBP <90mmHg after 250mL Normal Saline for ROSC
   - Pediatric – Push-dose epinephrine not administered for SBP <70mmHg after Normal Saline 20mL/kg for ROSC

11. TP 1211 – CARDIAC CHEST PAIN

a. Cardiac Monitoring (CM)
   - Cardiac Monitoring not initiated
b. 12-Lead ECG (EC)
   - 12-Lead ECG not performed as per MCG 1308
   - 12-Lead ECG paramedic interpretation not documented
   - 12-Lead ECG software interpretation not documented

c. Aspirin (AS)
   - Aspirin not administered for alert patient (unless documented that patient is allergic to Aspirin/has contraindication to receiving Aspirin)
   - Aspirin administered to a pediatric patient

d. Nitroglycerin (NG)
   - Nitroglycerin given for SBP <100mmHg
   - Nitroglycerin given when patient has taken sexually enhancing drugs within 48 hours
   - Nitroglycerin given without assessing for sexually enhancing drugs
   - Nitroglycerin not given despite chest pain and no documentation as to why withheld
   - Nitroglycerin given to a pediatric patient

12. TP 1212 / 1212P – CARDIAC DYSRHYTHMIA – BRADYCARDIA

a. Cardiac Monitoring (CM)
   - Cardiac Monitoring not initiated

b. 12-Lead ECG (EC)
   - 12-Lead ECG not performed as per MCG 1308
   - 12-Lead ECG paramedic interpretation not documented
   - 12-Lead ECG software interpretation not documented

c. Chest Compressions (CC)
   - Pediatric - Chest compressions not performed for pulse <60bpm with persistent poor perfusion after O2 and BMV
   - Pediatric - Chest compressions continued after pulse >60bpm

d. Epinephrine (EP)
   - Pediatric – Epinephrine administered without O2 and BMV/airway management for poor perfusion
   - Pediatric – Epinephrine not administered for persistent poor perfusion after O2 and BMV
   - Pediatric – Epinephrine not administered at correct dose

e. Atropine (AT)
   - Adult – Atropine not administered for poor perfusion (unless immediate Transcutaneous Pacing (TCP) is indicated and initiated)
   - Pediatric – Atropine not administered for suspected AV Block or increased vagal tone (unless immediate TCP indicated and initiated)

f. Transcutaneous Pacing (TCP) (TC)
   - TCP not initiated for HR ≤ 40 with continued poor perfusion as per MCG 1365

13. TP 1213 / 1213-P – CARDIAC DYSRHYTHMIA – TACHYCARDIA

a. Cardiac Monitoring (CM)
b. 12-Lead ECG (EC)
   - 12-Lead ECG not performed as per MCG 1308
   - 12-Lead ECG paramedic interpretation not documented
   - 12-Lead ECG software interpretation not documented

c. Valsalva (VL)
   - Valsalva not attempted for supraventricular tachycardia (SVT)/narrow complex with adequate perfusion

d. Adenosine (AD)
   - Adenosine not administered for SVT/narrow complex with adequate perfusion when Valsalva fails
   - Adenosine not administered for SVT/narrow complex in alert patient with poor perfusion
   - Adenosine not administered for Wide-Complex Regular Monomorphic Tachycardia with adequate perfusion
   - Adenosine dosing incorrect for poor perfusion
   - Adenosine given for Wide-Complex Irregular tachycardia

e. Synchronized Cardioversion (SC)
   - Synchronized Cardioversion not performed for SVT/narrow complex with persistent poor perfusion
   - Synchronized Cardioversion not performed for SVT/narrow complex with ALOC
   - Synchronized Cardioversion not performed for Wide-Complex Regular Monomorphic Tachycardia with poor perfusion if adenosine fails and IV not immediately available
   - Synchronized Cardioversion not performed for Wide-Complex Irregular Tachycardia with poor perfusion

14. TP 1214 – PULMONARY EDEMA / CHF

a. Continuous Positive Airway Pressure (CPAP) (CP)
   - CPAP not administered for moderate to severe respiratory distress (SBP ≥ 90mmHg and no contraindications)
   - CPAP administered to patient with contraindications

b. Cardiac Monitoring (CM)
   - Cardiac monitoring not initiated

c. Vascular Access (VA)
   - Vascular Access not attempted for patient
   - Intraosseous Line not attempted when intravenous line cannot be established and Intraosseous Line indicated per MCG 1375
   - Intraosseous Line placed without indication as per MCG 1375

d. Nitroglycerin (NG)
   - Nitroglycerin not administered
   - Nitroglycerin given for SBP <100mmHG
   - Nitroglycerin given when patient has taken sexually enhancing drugs within 48 hours
   - Nitroglycerin given without assessing for sexually enhancing drugs
- Nitroglycerin dose incorrect for SBP

e. Albuterol (AL)
   - Albuterol not given for patient with wheezing despite CPAP

15. TP 1215 / 1215-P – CHILDBIRTH MOTHER

a. Vascular Access (VA)
   - Vascular Access attempt delays transport

b. Amniotic Sac (AN)
   - Amniotic sac showing with presenting crown and sac rupture not performed and/or documented

c. Fundal Massage (FM)
   - Fundal massage not performed after placenta delivery

d. Destination (DS)
   - Incorrect transport destination based on gestational age

16. TP 1216-P – NEWBORN / NEONATAL RESUSCITATION

a. Amniotic Sac (AN)
   - Amniotic sac showing with presenting crown and sac rupture not performed and/or documented

b. Vascular Access (VA)
   - Vascular Access not attempted for a child who does not respond to initial resuscitation and BMV
   - Vascular Access attempt delays transport

c. Chest Compressions (CC)
   - Chest compressions not performed for pulse <60 bpm after BMV for 30 seconds
   - Chest compressions continued after pulse >60 bpm

d. Epinephrine (EP)
   - Epinephrine not administered for <60 bpm once chest compressions begun
   - Epinephrine not administered at correct dose

17. TP 1217 / 1217-P – PREGNANCY COMPLICATION

a. Vascular Access (VA)
   - Vascular Access not attempted
   - Vascular Access attempt delays transport

b. Amniotic Sac (AN)
   - Amniotic sac showing with presenting crown and sac rupture not performed and/or documented

c. Abnormal Delivery (AB)
   - Abnormal delivery not managed per protocol

18. TP 1218 / 1218-P – PREGNANCY LABOR
As per “All Protocols”

19. TP 1219 / 1219-P – ALLERGY

   a. Epinephrine (EP)
      - Epinephrine not administered for anaphylaxis
      - Epinephrine not administered at correct dose
      - Epinephrine not administered every 10min x 2 for persistent symptoms
      - Epinephrine administered by incorrect route
      - More than 3 doses of epinephrine administered

   b. Vascular Access (VA)
      - Vascular Access not attempted for patient with anaphylaxis
      - Intraosseous Line not attempted when Intravenous Line cannot be established in
        patients in anaphylactic shock
      - Intraosseous Line placed without indication as per MCG 1375

   c. Albuterol (AL)
      - Albuterol not given for patient with wheezing

20. TP 1220 / 1220-P – BURNS

   a. Clothing (CL)
      - Clothing (jewelry) not removed from affected area

   b. Burn Management (BM)
      - Burn type not identified
      - Burn not managed by protocol for type

   c. Warming Measures (WM)
      - Measures not taken to keep patient warm

21. TP 1221 / 1221-P – ELECTROCUTION

   a. Cardiac Monitoring (CM)
      - Cardiac Monitoring not initiated

   b. Clothing (CL)
      - Clothing (jewelry) not removed from affected area

22. TP 1222 / 1222-P – HYPERTERMIA (ENVIRONMENTAL)

   a. Cardiac Monitoring (CM)
      - Cardiac Monitoring not initiated

   b. Cooling Measures (CO)
      - Cooling measures not initiated

23. TP 1223 / 1223-P – HYPOTHERMIA / COLD INJURY

   a. Cardiac Monitoring (CM)
      - Cardiac Monitoring not initiated
b. Warming Measures (WM)
   - Warming measure not initiated

24. TP 1224 / 1224-P – STINGS / VENOMOUS BITES
   a. Venomous Bite (VB)
      - Bite not managed by protocol for type

25. TP 1225 / 1225-P – SUBMERSION
   a. Cardiac Monitoring (CM)
      - Cardiac Monitoring not initiated
   b. Warming Measures (WM)
      - Warming measures not initiated

26. TP 1226 / 1226-P – ENT / DENTAL EMERGENCIES
   a. Control Bleeding (CB)
      - Bleeding control with direct pressure not attempted when indicated
   b. Tooth Avulsion (TA)
      - Avulsed tooth not placed in Normal Saline

27. TP 1227 – Omitted

28. TP 1228 / 1228-P – EYE PROBLEM
   a. Shield Eye (SH)
      - Globe rupture suspected and eye not shielded
   b. Burn Management (BM)
      - Burn type not identified
      - Chemical burn not irrigated with Normal Saline 1L
      - Thermal burn not covered with dry dressing
   c. Ondansetron (ON)
      - Ondansetron not administered to nauseated patient with suspected globe rupture

29. TP 1229 / 1229-P – ALOC
   a. Cardiac Monitoring (CM)
      - Cardiac monitoring not initiated
   b. Vascular Access (VA)
      - Vascular Access not attempted for patient
      - Intraosseous Line not attempted when Intravenous Line cannot be established and Intraosseous Line indicated as per MCG 1375
      - Intraosseous Line placed without indication as per MCG 1375
   c. Glucose (GL)
      - Blood Glucose not checked
d. Modified Los Angeles Prehospital Stroke Screen (mLAPSS) (ML)
   - Adult – mLAPSS not performed when GCS is adequate for patient cooperation
   - Pediatric – Neurological exam not performed documented

30. TP 1230 / 1230-P – DIZZINESS / VERTIGO

a. Glucose (GL)
   - Blood Glucose not checked

b. Modified Los Angeles Prehospital Stroke Screen (mLAPSS) (ML)
   - Adult – mLAPSS not performed for vertigo
   - Pediatric – Neurological exam not performed documented

31. TP 1231 / 1231-P – SEIZURE

a. Midazolam (MD)
   - Midazolam not administered for active seizure
   - Midazolam dose incorrect
   - Midazolam frequency incorrect

b. Glucose (GL)
   - Blood Glucose not checked for persistent ALOC

32. TP 1232 / 1232-P – STROKE / CVA / TIA

a. Cardiac Monitoring (CM)
   - Cardiac Monitoring not initiated

b. Vascular Access (VA)
   - Vascular Access not attempted for patients with Los Angeles Motor Score (LAMS) 4 or 5

c. Glucose (GL)
   - Blood Glucose not checked

d. Modified Los Angeles Prehospital Stroke Screen (mLAPSS) (ML)
   - mLAPSS not performed
   - mLAPSS not documented

e. Los Angeles Motor Score (LAMS) (LA)
   - LAMS not performed for positive mLAPSS
   - LAMS not documented for positive mLAPSS

f. Last Known Well Time (LK)
   - Last Known Well Time not documented

33. TP 1233 / 1233-P – SYNCOPE / NEAR SYNCOPE

a. Cardiac Monitoring (CM)
   - Cardiac monitoring not initiated

b. 12-Lead ECG (EC)
- 12-Lead ECG not performed as per MCG 1308
- 12-Lead ECG paramedic interpretation not documented
- 12-Lead ECG software interpretation not documented

34. TP 1234 / 1234-P – AIRWAY OBSTRUCTION

a. Obstructed Airway (OA)
   - > 1 year old - abdominal thrusts not performed in conscious patient who is unable to speak
   - < 1 year old – back blows/chest thrusts not performed in conscious patient
   - Chest compressions not initiated on patient that loses consciousness
   - Laryngoscopy not performed to visualize potential obstruction if chest compressions fail to dislodge foreign body
   - Visible foreign body removal not attempted with McGill forceps if laryngoscopy performed

b. Unmanageable Airway (UA)
   - Immediate MAR transport not initiated

c. Cardiac Monitoring (CM)
   - Cardiac Monitoring not initiated

d. Epinephrine (EP)
   - Epinephrine neb not administered for stridor with respiratory distress
   - Epinephrine IM not administered for visible airway/tongue swelling
   - Epinephrine not administered at correct dose
   - Epinephrine not administered by correct route for indication
   - Epinephrine not administered at correct frequency
   - Epinephrine neb administered more than 2 times

e. Tracheostomy Management (TM)
   - Suctioning not attempted
   - Inner cannula not removed and cleaned if present
   - Tracheostomy not removed and replaced when indicated

35. TP 1235-P – BRUE

   Cardiac Monitoring (CM)
   - Cardiac monitoring not initiated

36. TP 1236 / 1236-P – INHALATION INJURY

a. Remove from Environment (RE)
   - Patient not removed from environment for ongoing exposure

b. Epinephrine (EP)
   - Epinephrine neb not administered for stridor with respiratory distress
   - Epinephrine not administered at correct dose
   - Epinephrine not administered at correct frequency
   - Epinephrine neb administered more than 2 times

c. Albuterol (AL)
   - Albuterol not given for patient with wheezing/bronchospasm
d. Continuous Positive Airway Pressure (CPAP) (CP)
   - CPAP not administered for moderate to severe respiratory distress (SBP ≥ 90mmHg, no contraindications, and patient size > length-based resuscitation tape)
   - CPAP administered to patient with contraindications

37. TP 1237 / 1237-P – RESPIRATORY DISTRESS

   a. Continuous Positive Airway Pressure (CPAP) (CP)
      - CPAP not administered for moderate to severe respiratory distress (SBP ≥ 90mmHg, no contraindications, and patient size > length-based resuscitation tape)
      - CPAP administered to patient with contraindications

   b. Albuterol (AL)
      - Albuterol not given for patient with wheezing

   c. Epinephrine (EP)
      - Epinephrine IM not administered for deteriorating respiratory status despite albuterol
      - Epinephrine not administered at correct dose

   d. Needle Thoracostomy (NE)
      - Needle Thoracostomy not performed when indicated as per MCG 1335
      - Needle Thoracostomy performed when not indicated as per MCG 1335

38. TP 1238 / 1238-P – CARBON MONOXIDE EXPOSURE

   a. Remove from Environment (RE)
      - Patient not removed from environment for ongoing exposure

39. TP 1239 / 1239-P – DYSTONIC REACTION

   a. Diphenhydramine (DP)
      - Dystonic reaction not recognized
      - Diphenhydramine not administered

40. TP 1240 / 1240-P – HAZMAT

   a. Clothing (CL)
      - Clothing not removed

   b. Decontaminate (DC)
      - Decontamination not performed as indicated

   c. Irrigation (IR)
      - Eyes not flushed when indicated
      - Eye not irrigated with at least 1L Normal Saline

   d. Cardiac Monitoring (CM)
      - Cardiac Monitoring not initiated
e. Nerve Agent Exposure (NA)
   - DuoDote not administered per protocol

f. Organophosphate Exposure (OG)
   - Atropine not administered as indicated per protocol

g. Radiologic Exposure (RA)
   - Detection device not utilized for suspected contamination
   - Cause of contamination not determined (if contamination confirmed)
   - Treatment not initiated for life threatening conditions in conjunction with decontamination (treatment delayed for decontamination)

41. TP 1241 / 1241-P – OVERDOSE / POISONING / INGESTION

   a. Naloxone (NL)
      - Naloxone not administered for hypoventilation/apnea in suspected opiate overdose
      - Incorrect dose used for administration route

   b. Glucose (GL)
      - Blood Glucose not checked

   c. Antidote (AE)
      - Correct antidote not administered when available for suspected exposure

42. TP 1242 / 1242-P – CRUSH INJURY / SYNDROME

   a. Hospital Emergency Response Team (HERT) (HT)
      - HERT not activated for anticipated prolonged entrapment (>30 minutes) or when otherwise indicated

   b. Vascular Access (VA)
      - Vascular Access not attempted
      - No discussion with base for Intraosseous Line if unable to establish Intravenous Line
      - Intraosseous Line placed without indication as per MCG 1375

   c. Fluid Administration (FL)
      - Adult – Normal Saline not administered as soon as possible prior to release
      - Adult – Less than 2L Normal Saline administered (unless contraindicated or hospital arrival prior to completion)
      - Pediatric – Normal Saline 20mL/kg not administered as soon as possible and prior to release
      - Pediatric – greater than 40mL/kg Normal Saline administered without base order
      - Patient not assessed after each Normal Saline 250mL and fluids continued unless contraindicated

   d. Cardiac Monitoring (CM)
      - Cardiac monitoring not initiated

   e. Warming Measures (WM)
      - Measures not taken to keep patient warm
f. Hyperkalemia (HK)
   - Calcium Chloride not administered when evidence of hyperkalemia
   - Sodium Bicarbonate not administered when evidence of hyperkalemia
   - Albuterol not administered when evidence of hyperkalemia
   - Medications administered at wrong dose and/or route

g. Crush Syndrome (CS)
   - Potential for Crush Syndrome not identified
   - Calcium Chloride not administered when risk for crush syndrome
   - Sodium Bicarbonate not administered when risk for crush syndrome
   - Albuterol not administered when risk for crush syndrome
   - Medications administered at wrong dose and/or route
   - Medications administered at wrong time (not administered just prior to release of entrapment)

43. TP 1243 / 1243-P – TRAUMATIC ARREST

   a. Scene (SD)
      - Patient transport delay

   b. Control Bleeding (CB)
      - Bleeding control not attempted when indicated
      - Tourniquet not applied when indicated as per MCG 1370

   c. Needle Thoracostomy (NE)
      - Needle Thoracostomy not performed when indicated as per MCG 1335
      - Needle Thoracostomy performed when not indicated as per MCG 1335

   d. Defibrillation (DF)
      - Adult - Defibrillation biphasic at 200J not performed immediately for shockable rhythm
      - Pediatric – Defibrillation not performed immediately for shockable rhythm as per MCG 1309
      - Defibrillation performed for non-shockable rhythm

   e. Spinal Motion Restriction (SMR) (SR)
      - Backboard used solely for purpose of SMR
      - Transport delayed for SMR

   f. Vascular Access (VA)
      - Vascular Access not attempted
      - Intraosseous Line not attempted when Intravenous Line cannot be established as per MCG 1375
      - Transport delayed for vascular access

   g. Fluid Administration (FL)
      - Normal Saline not administered by rapid infusion
      - Less than 2L Normal Saline initiated

44. TP 1244 / 1244-P – TRAUMATIC INJURY

   a. Scene (SD)
      - Patient transport delayed
b. Control Bleeding (CB)
   - Bleeding control not attempted when indicated
   - Tourniquet not applied when indicated as per MCG 1370

c. Needle Thoracostomy (NE)
   - Needle Thoracostomy not performed when indicated as per MCG 1335
   - Needle Thoracostomy performed when not indicated as per MCG 1335

d. Spinal Motion Restriction (SMR) (SR)
   - Backboard used solely for the purpose of SMR
   - Transport delayed for SMR
   - SMR not performed when indicated as per MCG 1360
   - SMR performed when not indicated and potentially harmful as per MCG 1360
   - Alert patient not rolled off backboard for transport (unless safety concern)

e. Ondansetron (ON)
   - Ondansetron not administered to nauseated patient with suspected traumatic brain injury

II. BASE HOSPITAL

1. ALL BASE CONTACTS

a. Provider Impression (PI)
   - Primary PI in discussion with paramedics is clinically incorrect and/or not supported with documented data
   - Primary PI not documented
   - Secondary PI not documented when appropriate

b. Treatment Protocol (TP)
   - Designated TP for PI not used
   - Secondary TP for secondary PI not used when appropriate
   - Base hospital orders deviate from treatment protocol standards without documented clinical rationale

c. Critical Interventions

i. Synchronized Cardioversion (SC)
   - Inappropriate cardioversion (indication, energy, timing)
   - Cardioversion not ordered when indicated

ii. Push-Dose Epinephrine (PD)
   - Inappropriate administration of push-dose epinephrine (indication, dose, timing)
   - Push-dose epinephrine not ordered when indicated

iii. Transcutaneous Pacing (TCP) (TC)
   - Inappropriate administration of TCP (indication, settings, timing)
   - TCP not ordered when indicated

iv. Fluid Administration (FL)
   - Inappropriate fluid administration for patient condition
- Fluids not ordered when indicated or inadequate volume of fluids ordered

v. Pain (PN)
   - Inappropriate pain management treatment (indication, dose, frequency)
   - Pain management not ordered when indicated

d. Transport (TS)
   - Advanced Life Support (ALS) transport not made when indicated by Ref. No. 1200.1 (i.e. inappropriate BLS downgrade)

e. Destination (DS)
   - Not directing transport to a specialty center when indicated
   - Directing transport to the wrong specialty center; includes Trauma Center, Perinatal Center, STEMI Receiving Center, Primary and Comprehensive Stroke Centers, Emergency Department Approved for Pediatrics and Pediatric Medical Center.
   - Directing transport to the incorrect stroke center level based on mLAPSS, LAMS and Last Known Well Time

f. Termination of Resuscitation (TR)
   - Cardiac Resuscitation terminated without meeting Ref. 814 criteria
   - Cardiac arrest transported when meets Ref. 814 criteria and judgement for transport not described
**Medical Control Guideline: VASCULAR ACCESS**

**PRINCIPLES:**

1. Vascular access is a catheter inserted intravenously (IV) or a needle inserted intraosseously (IO), through which medications and/or fluids can be administered.

2. Not all patients will require vascular access.

3. Peripheral IV, placed by EMS, is the preferred vascular access method for patients requiring parenteral therapy.

4. Intraosseous (IO) placement or use of a pre-existing vascular access device (PVAD) may be necessary for patients requiring emergent prehospital vascular access in whom an IV cannot be readily placed.

**GUIDELINES:**

**Intravenous Lines**

1. Paramedics should first attempt placement of an IV saline lock for patients requiring parenteral access for medications or fluid volume.

2. In patients whose clinical condition allows, a minimum of two attempts at IV insertion should be made prior to consideration of IO placement.

**Intraosseous Lines**

3. IO access is indicated for adult and pediatric patients in cardiopulmonary arrest, shock/poor perfusion, severe burns and extremis when intravenous (IV) access is not possible or cannot be achieved quickly.

   a. IO contraindications:
      - Deformity, suspected fracture, or infection at the placement site
      - Inability to identify landmarks
      - Knee replacement site

   b. The most common complication of IO placement is local infiltration of fluid resulting in tissue damage or compartment syndrome. Other, rare complications include skin or bone infection, fat embolism into the patient’s circulation, and growth plate injury in pediatric patients.

   c. If the patient requires vascular access for medication/fluid administration, but does not meet the indications above, CONTACT BASE to discuss IO placement.

   d. If an IO is in place, IV medications may be given by IO route even if not specifically stated in the Treatment Protocol.

4. IO placement is approved for all Provider Agencies for placement at the flat surface of the proximal medial tibia, utilizing the tibial tuberosity (pediatric and adult patients) as the landmark for proper placement. It may also be placed in the greater tuberosity of the
humeral head (adults only - with prior Provider Agency approval by the EMS Agency). The preferred IO site should be free from signs of infection or trauma.

a. Explain the plan to use the IO as a vascular access site to the patient, family or caregiver if present during the resuscitation.

b. IO placement may be attempted once on each tibia and/or each proximal humerus. Note that the proximal humerus site may be more effective for delivering resuscitation medications. However, humeral IO placement should not be attempted unless the paramedic has been trained in use of this location.

c. Prior to using the IO line slowly flush with 10mL normal saline. The IO site can be used if it flushes easily without signs of swelling in the soft tissues around or behind the bone.

d. Document all sites where IO access is attempted and/or achieved.

e. If swelling occurs or infiltration is suspected, stop infusion, remove IO needle, and apply pressure bandage to the IO site.

5. Pain management: If utilizing IO for conditions other than cardiopulmonary arrest, lidocaine should be instilled to decrease pain associated with medication/fluid administration, prior to administration of any other medications/fluids. Infuse lidocaine 2% at the dosage listed below. Slow infusion is necessary to ensure the lidocaine remains in the medullary space of the bone. Allow lidocaine to dwell in space for 60 seconds prior to flushing with normal saline. If patient experiences pain on medication or NS flush after initial dose of lidocaine, repeat with half of the initial dose.

- Adults: **Lidocaine 2% 40mg** slow IO push
- Pediatric: **Lidocaine 2% (20 mg/ml) 0.5mg/kg** slow IO push, dose per MCG 1309. Not to exceed the adult dose.

### Pre-existing Vascular Access Devices (PVAD)

6. PVADs (e.g. PICC lines, ports) provide access to the central circulation through a long catheter inserted beneath the skin, allowing rapid, pain-free administration of medications and intravenous fluid.

- Patients and caregivers can often provide valuable information regarding PVAD.

7. EMS personnel should consider other routes of medication administration such as intramuscular (IM) or intranasal (IN) before using pre-existing vascular access devices in patients without cardiopulmonary arrest.

8. EMS personnel may utilize the following PVADs with externally visible access ports without base order for patients in cardiopulmonary arrest or shock requiring immediate treatment, if unable to place IV or IO successfully at other sites.

a. **Peripherally Inserted Central Catheters (PICC lines)** – Figure 1

- Swab ports with alcohol swabs twice, utilizing two separate alcohol swabs
- Withdraw 5-10 mL of blood into a syringe to clear any small clots that may have formed before infusing medications/fluids
b. *Tunneling catheters such as Broviac, Hickman, and Groshong* – Figure 2

c. *Non-tunneled, dual lumen catheters used for temporary dialysis access, i.e., Quinton catheters*

9. Base hospital order is required to use any PVADs for patients not in cardiopulmonary arrest or shock.

10. **Devices that require puncture of the skin (those without visible external access ports) may be accessed ONLY IN CARDIAC ARREST AND WITH BASE ORDER.**

   a. Arteriovenous shunts (synthetic bridges between the arterial and venous circulation used for dialysis; located under the skin of the forearm) – Figures 3 and 4

   b. Subcutaneous internal access devices that require access through the skin (often found in the upper chest or forearm) for example, Port-a-Cath – Figure 5

11. Observe adherence to sterile technique when handling PVADs. Contamination of these devices may cause severe infection or dysfunction requiring surgical removal.

12. Do not introduce air or allow IV fluids to run dry; these are direct lines into the central circulation.

13. Use padded hemostats to clamp the catheter if catheter gets damaged during access.
Images: ACCESSIBLE DEVICES – devices with externally visible access ports

Figure 1: Peripherally Inserted Central Catheter Line (PICC)

Figure 2: External and internal views: Tunneling Catheter, e.g., Groshong, Hickman, Broviac, and Quinton Cath™.
Images: DEVICES ACCESSIBLE ONLY IN CARDIAC ARREST AND WITH BASE ORDER – no visible external access ports; require skin puncture for subcutaneous internal access.

Figures 3 and 4: Arteriovenous fistula and arteriovenous graft used for dialysis

Figure 5: Port-a-Cath
Medical Control Guideline: VITAL SIGNS

PRINCIPLE:

1. Vital signs are a key component of the patient assessment utilized in determining the patient’s physiological status, and the treatment options that best meet their needs.

GUIDELINES:

1. Normal Vital Signs
   a. Adult
      i. SBP 90-139 mmHg
      ii. DBP <90 mmHg
      iii. HR 60-100 bpm
      iv. RR 12-20 bpm
      v. O2 sat ≥ 94% (if patient on home O2, measured on O2 at usual flow rate)
   b. Pediatric as per MCG 1309
   c. Circumstances should also be considered when assessing for and determining cause for concern regarding abnormal vital signs

2. Obtain and document the following vital signs on all patients:
   a. Blood pressure (for patients < 3 years, document capillary refill instead)
   b. Pulse
   c. Respiratory rate and tidal volume
      • Adults – count respirations for 15 seconds and multiply by 4
      • Pediatrics – count respirations for 30 seconds and multiply by 2
   d. Oxygen saturation
   e. Level of consciousness
   f. Pain level using appropriate pain scale
   g. End-tidal CO2 level for any patient receiving positive pressure ventilation
   h. Skin signs

3. Document additional vital signs if measured:
   a. Temperature
   b. Carbon monoxide level

4. Repeat and document vital signs:
   a. On any patient whose initial vital signs were not within normal limits
   b. When patient’s clinical condition changes
   c. After any treatment
   d. After administration of medications
   e. Upon transfer of care

5. The paramedic should report the initial vital signs, the most recent vital signs if different, and any intervening treatments to the Base Hospital and to the Receiving Hospital personnel critical information that is needed for the receiving hospital to prepare for the patient.