Overview

The Orange County EMS System Protocols are intended to provide uniform treatment for all patients who receive prehospital care within the county. These protocols apply exclusively to agencies that formally participate in centralized medical oversight provided by the Orange County EMS System Medical Director. While attempts have been made to address all patient care scenarios, unforeseen circumstances and patient care needs will arise. For those instances medical personnel should follow the “General Approach” protocols (or other appropriate protocol), exercise their own judgment and contact Medical Control for additional physician orders as needed. The patient's best interest should be the final determinant for all decisions.

Acknowledgments & Authorization

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• Robert Faber M.D.
• Apopka Fire Department
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• Ocoee Fire Department
• Orange County Fire Rescue Department
• Orlando Fire Department
• Reedy Creek Emergency Services
• Rural Metro Corporation
• Winter Garden Fire Rescue Department

The following medical treatment protocols are authorized by the Medical Director for use in the Orange County EMS System. Changes to these protocols can be made only with the authorization of the Medical Director.

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General Principles of Medical Care

The following measures shall be applied to promote prompt and efficient emergency medical care to all patients:

1. The safety of EMS personnel is paramount. Each scene must be evaluated for hazards upon arrival, and throughout patient care. Assess the need for additional resources as soon as possible after arrival.
2. Proper personal protective equipment and body substance isolation must be utilized according to agency and industry standards.
3. A patient shall be considered any person who is requesting and/or in need of medical attention or medical assistance of any kind.
4. A patient encounter shall be considered any event when signs and symptoms, or a patient complaint, results in evaluation or treatment.
5. All patients in the care of EMS shall be offered transport by ambulance to the nearest appropriate hospital or other protocol based destination. In the event a patient refuses transport, a properly executed refusal process must be completed.
6. An EMS patient care report will be generated at the conclusion of each patient encounter. A complete copy, or the approved abbreviated report, must be left with the receiving facility at the time of transport. No copies or patient information will be given to anyone other than those covered by Florida Statute, and other applicable laws, without written permission from the patient or their surrogate.
7. Crews must be prepared for immediate medical interventions, appropriate for the call level (e.g., defibrillation, airway management, etc.), upon initial patient contact.
8. Upon arrival at a scene where patient care is being rendered by an initial EMS responding crew, all subsequent arriving EMS crews should immediately engage the on scene crew. The goal is to determine the status of assessment and seamlessly assist in patient care.
9. Prior to the transfer of patient care between crews, the EMT/paramedic rendering initial care should directly interface with the EMT/paramedic assuming care, to ensure all pertinent information is conveyed.
10. For all 911 calls where EMT’s and paramedics are in attendance, patient care decisions shall be performed by the paramedic.
11. The paramedic should decide within 3 minutes after patient contact if advanced life support (ALS) measures will be needed. Perform a more comprehensive exam after the patient has been stabilized.
12. Generally, initial assessment and therapy should be completed within 10 minutes after patient contact. Except for extensive extrication, or atypical situations, trauma patients should be en route to a receiving facility within 10 minutes; medical patients should be en route to the receiving facility within 20 minutes.
13. For all patients in cardiac arrest, call into your dispatcher the “patient contact time” at the time of initial patient contact, and “first shock time” at the time of initial defibrillation.
General Principles of Medical Care

14. Whenever possible, obtain verbal consent prior to initiating treatment; respect the patient's privacy and dignity.

15. Prior to the administration of any medication, assess for allergies. If any questions arise in reference to medication allergies, contact Medical Control prior to giving any medication.

16. Nontransport agency personnel shall provide information pertinent to the patient’s identification, patient assessment and medical care to the transporting agency personnel at the time patient care responsibilities are turned over. The mini-SOAPP format is preferred when time allows:
   - **Subjective** - document the patient’s chief complaint (in their own words) and history of present illness (including history of events surrounding call)
   - **Objective** - document vital signs, (normal and abnormal), pertinent physical findings (e.g. document normal or abnormal heart and lung exam if chest pain, normal or abnormal abdominal exam if abdominal pain, normal or abnormal neurologic exam if neurologic complaint etc.)
   - **Assessment** – document the EMT/paramedic’s impression of the problem and/or working diagnosis. This can be the chief complaint, e.g. "chest pain"
   - **Plan** – document which protocols and treatments were administered
   - **Prehospital course** – document pertinent events that occur prior to ED arrival, as well as the patient’s response to treatments administered

17. Expanded SOAPP information will be provided to the receiving facility by the transporting agency. This more detailed note will include the first responder information, and shall be documented on a run report for every patient.

18. The agency or authority having jurisdiction of the EMS incident location (when on scene) is responsible for scene safety, scene command and control, as well as resource management decisions. Patient care and patient movement decisions shall be made in coordination with the scene supervisor or incident commander.

19. When caring for pediatric patients, use a weight or length based system to determine medication dosages and equipment sizes.

20. For trauma situations, a pediatric patient has the anatomical and physical characteristics of a person fifteen (15) years or younger.

21. Following training and successful competency assessment by their respective agencies, EMT’s are authorized to apply pulse oximetry and capnography monitoring devices, perform blood glucose evaluations, perform bag-valve-mask ventilation, perform Laryngeal Tube Airway (LTA) insertion and ventilation, and perform bag-valve ventilation of paramedic inserted endotracheal tubes.

22. To perform as an EMT/Paramedic, personnel must be knowledgeable and proficient in the scope of practice described and taught in the Department of Transportation National Standardized Curriculum, and maintain active State certificates.
General Principles of Medical Care

23. Perform all procedures as per the Orange County EMS System Procedures Manual. If a procedure that is not addressed in this manual is deemed necessary, contact Medical Control or the receiving hospital physician for orders prior to proceeding.

24. If Medical Control gives orders to perform a procedure that is not covered in the Orange County EMS System Procedures Manual, but is within the scope of practice of an EMT/Paramedic, perform the procedure in accordance with standards set for the level of certification.

25. For all cases where patients require parenteral narcotics or sedative agents, continuous cardiac, oxygen saturation and ETCO2 monitoring shall be performed.

26. The Regional Poison Control Center (800-222-1222) should be contacted when handling calls involving poisonous/hazardous material exposures, overdoses or suspected envenomations. In the event that the RPCC gives recommendations or orders that are not contained within these protocols, EMS providers are authorized to carry out the RPCC’s instructions.

27. When using supplemental oxygen in accordance with adult or pediatric treatment protocols adhere to the following:
   • In patients who are noncritical, and have no evidence of respiratory distress use only the concentration of oxygen needed to achieve oxygen saturations over 95%. In most cases this can be accomplished using a nasal cannula.
   • For patients with serious respiratory symptoms, persistent hypoxia, or where otherwise specified in protocol, use 100% supplemental oxygen via nonrebreather mask or BVM.

28. Monitor/Defibrillators used under the scope of these protocols must be able to provide:
   • Escalating energy, biphasic defibrillation (includes AED’s)
   • Continuous ECG waveform and ETCO2 waveform simultaneously on the screen

Medical Transport Destination

All patients should be transported to the hospital of their choice (when operationally feasible) unless the patient is unstable.

• Unstable patients:
  • All patients whose condition is judged to be unstable will be transported to the closest appropriate receiving facility (see exceptions below)
  • If several hospitals are within the same approximate distance from the scene, allow the patient, and/or patient’s family, to select the receiving facility of their choice
  • For transport destination of Cardiac Arrest-Post Resuscitation, STROKE, STEMI ALERT, TRAUMA or OB (>20 week) patients, refer to appropriate protocol
General Principles of Medical Care

**Physician/Nurse on Scene**

Occasions will arise when a physician on the scene will attempt to direct or assist prehospital care.

The physician must be willing to accept the following conditions:

- Provide documentation of her/his status as a physician (copy of medical license)
- Assume responsibility for outcomes related to his/her oversight of patient care
- Agree to accompany the patient during transport if accompaniment is deemed necessary
- The Medical Control physician must relinquish the responsibility of patient care to the physician on scene for the scene physician to take control
- All interactions with physicians on the scene must be well documented in the Patient Care Report, including the physicians name and contact information

Orders provided by the physician should be followed unless, in the judgment of the paramedic, they endanger the patient. The paramedic may request the physician to attend the patient during transport if the suggested treatment varies significantly from standing orders.

If the physician's care is judged by the paramedic to be potentially harmful:

- Politely voice his or her concerns and immediately contact Medical Control
- If the conflict remains unresolved, follow the directives of the Medical Control Physician
- If the physician on scene continues to carry out the intervention in question, offer no assistance and enlist aid from law enforcement

Licensed Nurses present at an emergency scene who wish to participate in administering care must function in accordance with Florida law (F.S. 401 and F.S. Chapter 464)

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“Green Card” to be given to physician on scene offering assistance:
Patient Care During Transport

The following situations shall require more than one attendant in the back of the ALS unit:
- Medical or trauma cardiac arrest or post-resuscitation care
- Patients requiring active airway assistance (e.g. endotracheal tube, LTA, or BVM)
- Imminent delivery of a fetus
- For scenarios not covered above:
  - If either the nontransporting or the transporting agency request a 2nd attendant in the back of the ALS transporting unit, a 2nd attendant should accompany the patient
  - A 2nd attendant is not required if there will be an unacceptable delay in transport
  - A paramedic student or EMT can assist in attending ALS patients, but shall only be counted as the “second attendant” when determined appropriate by the primary paramedic attendant

Interfacility Transport

Interfacility transport requires unique skills and capabilities, both in clinical care and operational coordination. Adhere to the following standards for all interfacility transports:
- Interfacility transport decisions (including staffing, equipment and transport destination) should be made based on the patient’s medical needs
- Coordination between hospitals and interfacility transport agencies is essential, before transports are initiated, to ensure that patient care requirements do not exceed the capabilities of the patient attendant
- If EMS crew members are not capable of managing devices or medications that must be continued during transport, an adequately trained care provider from the transferring facility must accompany the patient during transport

Radio Report Format

For all EMS transported patients radio contact should be made with the receiving center at least 5 minutes prior to arrival to provide general patient information and estimated time of arrival.
- Select the appropriate receiving facility talk-group on the 800 Mhz radio
  - All receiving facilities in Orange County have an individual talk-group
  - Listen before transmitting to determine if the talk-group is in use; the system does not allow for two radios to transmit on the same talk-group at the same time
General Principles of Medical Care

**Radio Report Format**

Begin each transmission with the following:
- Agency name and unit number
- Paramedic / EMT Orange County number
- Triage category and triage level (e.g. trauma red, STEMI alert, cardiac arrest)
- Estimated time of arrival
- After the receiving facility acknowledges the initial information, give a concise report, including repeat triage category/level, age and gender, chief complaint, vital signs, Glasgow Coma Score, treatment provided or under way, and any anticipated delay in transport (e.g. extrication)

**Medical Control Base Station**

Using the Medical Control talk-group, raise On-line Medical Control (OLMC) for any additional orders needed to meet the patient’s needs during on-scene care or transport. If any problems arise in raising OLMC:
- Hail Med-Com on the same channel; Med-Com will then contact the OLMC by phone (407) 296-1150 and advise that a unit is awaiting medical orders
- If still unable to reach the OLMC, medical orders can be requested from the receiving emergency department
  - When preferred, medical orders can be obtained from the receiving ED
  - This should not occur if contact has been made with the OLMC and orders given

Any concerns or issues involving the OLMC should be forwarded to the Office of the Medical Director for review as soon as possible.
## General Principles of Medical Care

### Triage Categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trauma</strong></td>
<td>Indicates a trauma patient</td>
</tr>
<tr>
<td><strong>Medical</strong></td>
<td>Indicates a medical patient</td>
</tr>
<tr>
<td><strong>Red</strong></td>
<td>High acuity, but does not meet ALERT criteria</td>
</tr>
<tr>
<td><strong>Yellow</strong></td>
<td>Serious, but not critical</td>
</tr>
<tr>
<td><strong>Green</strong></td>
<td>Low acuity of illness</td>
</tr>
<tr>
<td><strong>Trauma Alert</strong></td>
<td>Meets Trauma Alert criteria</td>
</tr>
<tr>
<td><strong>STEMI Alert</strong></td>
<td>Meets STEMI Alert criteria</td>
</tr>
<tr>
<td><strong>Stroke Alert</strong></td>
<td>Meets Stroke Alert criteria</td>
</tr>
<tr>
<td><strong>Sepsis Alert</strong></td>
<td>Meets Sepsis Alert criteria</td>
</tr>
<tr>
<td><strong>HAZMAT Alert</strong></td>
<td>Suspected Hazardous Material exposure</td>
</tr>
<tr>
<td><strong>Code</strong></td>
<td>Cardiopulmonary arrest</td>
</tr>
</tbody>
</table>

### Authorized Pharmaceuticals

- Adenosine
- Albuterol
- Amiodarone
- Aspirin
- Atropine Sulfate
- Calcium Chloride
- Dextrose
- Diazepam
- Diltiazem
- Diphenhydramine
- Dopamine
- Epinephrine 1:1000
- Epinephrine 1:10,000
- Fentanyl
- Glucagon
- Glucose
- Hydroxocobalamin (Cyanokit)
- Ipratropium Bromide
- Magnesium Sulfate
- Methylprednisolone
- Midazolam
- Naloxone
- Nitroglycerin
- Ondansetron
- Oxygen
- Sodium Bicarbonate
- Thiamine
- Ziprasidone

Unless otherwise specified in protocol, give individual IV medication doses over 1-2 minutes. When treating cardiac arrest patients medications can be given more rapidly.

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Transfer of Care at Hospitals

Once on hospital property, the receiving facility assumes responsibility for all further medical care delivered to EMS transported patients. OCEMS personnel are not authorized to follow prehospital protocols after arrival at an ED, and OCEMS Medical Control should not be contacted for orders.

Exceptions to this should occur only in the following circumstances:

- Life threatening situations such as cardiac arrest, airway emergencies or imminent delivery of a fetus
- Continuation of treatments started prior to arrival (e.g. nebulizers, CPAP, IV fluids)
- When specifically instructed to continue care by the ED physician (when possible, document the physician’s name and time verbal order was given)

To assure all pertinent information is conveyed to the hospital staff, crews should interface with the charge nurse within 2 minutes of arrival to give a verbal report. Transporting personnel shall provide the receiving facility with any available patient identification, as well as all pertinent incident and patient care information at the time of transfer. In addition to the abbreviated report required by the Florida Administrative Code, turn over all prehospital 12 lead ECGs to the ED staff.

Important Considerations:

- If offload cannot be completed in a timely manner refer to Delayed Offload Procedure (Orange County EMS Procedure Manual)
- EMS agency supervisor contact should occur before making a final decision to leave a patient during an extended delayed offload scenario
- The method of physical transfer should be safe, and not require the discontinuation medically indicated immobilization procedures
- Document the event well for quality review purposes
- Document the patient condition (including pain level when appropriate) at time of transfer
- Document the name of the ED staff-member who was given final report, and the time report was given
General Approach to All Patients

The following measures will apply to the management of all patients:

**Basic Life Support**
- Establish patent airway
- Supplemental oxygen if any respiratory signs or symptoms present
- Record and monitor vital signs
- Record blood glucose level if any weakness, altered mental status or history of diabetes
- Nothing by mouth, unless patient is a known diabetic with hypoglycemia and is able to self-administer oral glucose paste, or a glucose containing beverage

**Advanced Life Support**
- When condition warrants (specified as “Full ALS Assessment and Treatment” in individual protocols):
  - Advanced airway/ventilatory management as needed
  - Perform cardiac monitoring
  - Evaluate 12-lead ECG if chest pain, dyspnea, abdominal pain above the umbilicus or ischemic equivalent symptoms
    - If STEMI criteria present on 12 lead ECG, transmit ECG to PCI capable hospital and expedite transport (see Chest Pain protocol)
  - Record & monitor continuous O2 saturation and microstream capnography
  - IV 0.9% NaCl KVO or IV lock
    - If evidence of dehydration (tachycardia, dry mucous membranes, poor skin turgor) administer boluses of 0.9% NaCl at 250 ml (hold at 500 ml total if no hypotension)
    - If BP < 90 mm Hg systolic, administer boluses of 0.9% NaCl at 250 ml until systolic BP > 90 mm Hg
      - Contraindicated if evidence of congestive heart failure (e.g. rales)
  - If hypoglycemic (Blood glucose < 70 mg/dL [<50mg/dL if stroke]):
    - Dextrose 50% 25 gm slow IV
    - If the patient appears malnourished administer Thiamine 100 mg IV
    - If no IV available:
      - Glucose paste or other oral glucose containing agent (e.g. orange juice) if patient alert enough to self administer oral agent
      - If unable to take oral glucose administer Glucagon 1 mg IM
    - If hypoglycemia persists:
      - Repeat blood glucose check with a different glucometer
      - Repeat Dextrose 50% 25 gm once if blood glucose < 70 mg/dl after 10 minutes
  - For patients with severe nausea or vomiting:
    - Ondansetron (Zofran), 4 mg slow IV or 4 mg Oral Disintegrating Tablet (ODT) by mouth
  - Transport patient to nearest appropriate Emergency Department
  - Minimize on scene time when possible

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Abdominal Pain/GI Bleeding

**Basic Life Support**
- Nothing by mouth

**Advanced Life Support**
- If pain above the umbilicus perform cardiac monitoring and 12 lead ECG
- IV 0.9% NaCl KVO or IV lock
  - If evidence of dehydration (tachycardia, dry mucous membranes, poor skin turgor) administer boluses of 0.9% NaCl at 250 ml (hold at 500 ml total if no hypotension)
- For patients with severe nausea or vomiting
  - Ondansetron (Zofran), 4 mg slow IV or 4 mg Oral Disintegrating Tablet (ODT) by mouth

**Kidney Stone Highly Suspected**
- Limit treatment to patients meeting the following criteria:
  - Age ≤ 55 years
  - Not known to be currently pregnant
  - Prior history of kidney stone
  - Pain consistent with prior kidney stone episodes
  - Pain isolated to the flank with or without radiation to the groin
  - No history of fever (> 100.4 F)
  - Systolic blood pressure ≥ 120
  - No abdominal mass or significant tenderness
- For patients with severe pain meeting the Kidney Stone criteria above:
  - Fentanyl (Sublimaze) 1 mcg/kg (maximum 50 mcg) slow IV; repeat once after 5 minutes as needed (maximum 100 mcg total dose) OR 100 mcg intranasal via MAD (divide dose equally between nostrils)
Airway Emergencies - Adult Dyspnea

**Basic Life Support**

- Supplemental 100% oxygen

**Advanced Life Support**

- Full ALS Assessment and Treatment
- Observe for signs of impending respiratory failure; refer to **Respiratory Failure** section if needed
  - Hypoxia (O2 sat < 90) not improved with 100% Oxygen
  - Poor ventilatory effort (increasing ETCO2 not improved with treatment)
  - Altered mental status/ decreased level of consciousness
  - Inability to maintain patent airway
- Begin CPAP if initial symptoms severe
  - Based on presentation, use manufacturer settings for Asthma/COPD or CHF
  - Brief interruptions to administer medications are acceptable

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**Acute Bronchospasm (wheezing or history of asthma or COPD)**

- **Albuterol** (Proventil) 2.5 mg/3 ml and **Ipratropium Bromide** 0.02% (Atrovent) 0.5 mg/2.5 ml via nebulizer
  - Repeat **Albuterol** (Proventil)/**Ipratropium Bromide** (Atrovent) X 2 if wheezing persists
- **Methylprednisolone** (Solupred) 125 mg IV if wheezing persists after 1st nebulizer
- If not improving, **Magnesium Sulfate** 2 grams IV in 100 ml NS over 10-15 minutes
  - Contraindicated if history of renal failure
  - Do not use if CHF suspected
- If **SEVERE** respiratory distress and wheezing persists after above:
  - **Epinephrine** 1:1,000 0.3 mg IM (prior permission from Medical Control if patient >55 years old or known to be on B blockers)

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**Acute Pulmonary Edema (history of CHF, pedal edema, elevated SBP)**

- **Nitroglycerin** 0.4 mg spray or tablet SL, every 5 minutes
  - Contraindicated if systolic BP < 90 mm Hg
  - Contraindicated if use of a Phosphodiesterase-5 (PDE5) inhibitor use within last 24 hours (Viagra or Levitra); 48 hours for Cialis
- For bronchospasm (wheezing) associated with Acute Pulmonary Edema
  - **Albuterol** (Proventil) 2.5 mg/3 ml and **Ipratropium Bromide** 0.02% (Atrovent) 0.5 mg/2.5 ml via nebulizer
    - Repeat **Albuterol** (Proventil)/**Ipratropium Bromide** (Atrovent) X 2 if wheezing persists
- For hypotension (systolic BP < 90 mmHg)
  - **Dopamine** infusion at 5-20 mcg/kg/min titrated to maintain systolic BP > 90 mm Hg

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[Contact Medical Control for Additional Orders if Needed]
Airway Emergencies - Adult Dyspnea

Drowning

- Spinal immobilization if indicated
- Consider CPAP for patients with significant dyspnea or hypoxia
- Protect from heat loss
- Patients may develop delayed onset respiratory symptoms
- Refer to appropriate protocol if cardiac arrest present

Foreign Body Obstruction Suspected

- Perform obstructed airway procedures per BLS standard
  - Attempt suction and removal with Magill forceps using direct visualization
  - Observe for signs of impending respiratory failure
  - If unconscious or unresponsive:
    - Give a series of 30 chest compressions then inspect for object in mouth prior to attempting breaths
    - If unsuccessful after one series of compressions and ventilations, attempt to directly view object with laryngoscope and remove with Magill forceps
Airway Emergencies - Adult Dyspnea

Respiratory Failure

**Basic Life Support**
- If suspicion of trauma, maintain C-spine immobilization
- Suction all debris, secretions from airway
- Supplemental 100% oxygen, then BVM ventilate if indicated

**Advanced Life Support**
- Monitor end-tidal CO2 (capnography) and oxygen saturation continuously
- Follow algorithm if invasive airway intervention is indicated (ETT or LTA):
  - Apnea
  - Decreased level of consciousness with respiratory failure (i.e. hypoxia [O2 sat <90] not improved by 100% oxygen, and/or respiratory rate < 8)
  - Poor ventilatory effort (with hypoxia not improved by 100% oxygen)
  - Unable to maintain patent airway

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**Bag mask ventilate (BVM)**
Goal is to keep oxygen saturation ≥ 90 for 1-2 minutes pre-attempt when possible

- Endotracheal Intubation (ETT)
  - Only 2 attempts for **MEDICAL**
  - Only 1 attempt for **TRAUMA**
- Laryngeal Tube Airway (LTA)
  - Only 2 attempts for **MEDICAL**
  - Only 1 attempt for **TRAUMA**

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**Unsuccessful**
- Resume BVM
- Attempt LTA

**Successful**
- Continue Ventilation and Monitoring

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As a last resort, if unable to ventilate by any other means, consider cricothyrotomy

- Effective bag valve mask ventilation is an acceptable endpoint
- Place oral-gastric tube via insertion port on LTA; attach to low continuous suction
- **Attempt cricothyrotomy only after all other ventilation methods have failed**

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Airway Emergencies - Adult Dyspnea

Confirmation of Placement and Effectiveness of Ventilation (ETT or LTA)

Capnography/ETCO2 Monitoring:
- Digital capnography (waveform) is the system standard for ETCO2 monitoring and continuous ETCO2 monitoring is a mandatory component of invasive airway management.
- Immediately after placing an ETT or LTA capnography shall be applied to confirm proper placement:
  - Proper placement is indicated by the presence of a continuous alveolar waveform on capnography.
  - If an alveolar waveform is not initially present, or disappears after 3-5 breaths (i.e. flat-line), remove the ETT or LTA and proceed to the next step in the algorithm.
- With the exception of on-scene equipment failure, patients should not be switched from digital capnography to a colorimetric device for monitoring end-tidal CO2.
- If capnography is not available due to serious on-scene equipment failure, apply a colorimetric ETCO2 detector capable of continuous ETCO2 monitoring (much less reliable).
- If continuous expired ETCO2 cannot be detected by either of the above methods, the invasive airway device must be removed, and the airway managed noninvasively.

Additional Measures:
- Assess epigastric sounds, breath sounds, and chest rise and fall.
- Record tube depth and secure in place using a commercial tube holder.
- Utilize head restraint devices (i.e. “head-blocks”) or rigid cervical collar and long spine board immobilization as needed to help secure airway device in place.
Allergic Reactions

Basic Life Support

- Assist patient in self-administration of previously prescribed epinephrine (via auto injector)

Advanced Life Support

Mild Reaction (Itching/Hives)

- **Diphenhydramine** (Benadryl) 1 mg/kg IV (Maximum 50 mg)
  - May be administered IM if no IV access available

Moderate Reaction (Dyspnea, Wheezing, Chest tightness)

- **Albuterol** (Proventil) 2.5 mg/3 ml and **Ipratropium Bromide** 0.02% (Atrovent) 0.5 mg/2.5 ml via nebulizer
  - Repeat Albuterol (Proventil)/Ipratropium Bromide (Atrovent) X 2 if wheezing persists
- **Diphenhydramine** (Benadryl) 1 mg/kg IV (Maximum 50 mg)
  - May be administered IM if no IV access available
- **Methylprednisolone** (Solumedrol) 125 mg IV

Severe Reaction (BP < 90 mm Hg, stridor, severe respiratory distress)

- **Epinephrine** 1:1,000 0.3 mg IM for rapidly progressive worsening of symptoms
  - Repeat Epinephrine if signs of severe reaction or shock persist after initial dose
- **Albuterol** (Proventil) 2.5 mg/3 ml and **Ipratropium Bromide** 0.02% (Atrovent) 0.5 mg/2.5 ml via nebulizer
  - Repeat Albuterol (Proventil)/Ipratropium Bromide (Atrovent) X 2 if wheezing persists
- **Diphenhydramine** (Benadryl) 1 mg/kg IV (Maximum 50 mg)
  - May be administered IM if no IV access available
- **Methylprednisolone** (Solumedrol) 125 mg IV

Cardiac Arrest or Cardiopulmonary Arrest Imminent

- **Epinephrine** 1:10,000 0.5 mg IV (instead of 1:1,000 IM)
- For cardiac arrest, refer to the appropriate protocol based on presenting rhythm
- In the setting of cardiac arrest, the following items should be performed in the post resuscitative phase, when time allows:
  - **Albuterol** (Proventil) 2.5 mg/3 ml and **Ipratropium Bromide** 0.02% (Atrovent) 0.5 mg/2.5 ml via nebulizer
    - Repeat Albuterol (Proventil)/Ipratropium Bromide (Atrovent) X 2 if wheezing persists
  - **Diphenhydramine** (Benadryl) 1 mg/kg IV (Maximum 50 mg)
  - **Methylprednisolone** (Solumedrol) 125 mg IV

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Altered Mental Status

Advanced Life Support

- Full ALS Assessment and Treatment
- If hypoglycemic (Blood glucose < 70 mg/dL [<50mg/dL if stroke]):
  - Dextrose 50% 25 gm slow IV
- If the patient appears malnourished administer Thiamine 100 mg IV
- If no IV available:
  - Glucose paste or other oral glucose containing agent (e.g. orange juice) if patient alert enough to self administer oral agent
  - If unable to take oral glucose administer Glucagon 1 mg IM
- If hypoglycemia persists:
  - Repeat blood glucose check with a different glucometer
  - Repeat Dextrose 50% 25 gm once if blood glucose < 70 mg/dl after 10 minutes
- If Opioid overdose suspected (significantly altered mental status or respiratory depression):
  - Naloxone (Narcan) 2 mg IV (start at 0.4 mg for patients over 65 years old)
  - Naloxone (Narcan) can be given in 0.4 mg increments, titrated to mental status and respiratory drive (monitor respiratory status with continuous capnography)
  - If respiratory depression persists, repeat every 3 minutes to a maximum of 8 mg
  - If IV access has not been established, Naloxone (Narcan) can be given IM or via Mucosal Atomizer Device
- If Stroke suspected see Stroke Protocol
- If Sepsis suspected (advanced age, high risk for infection, febrile), see Sepsis Protocol
- If Head Injury suspected see Trauma/Head Injury Protocol
- If severely agitated and/or violent see Behavioral Emergencies Protocol
- If cardiac arrhythmia present see appropriate Cardiac Arrhythmia Protocol

Note: Patients presenting with altered mental status, who respond to Narcan are not candidates for informed refusal. Due to the relatively short half-life of Narcan, these patients are medically incapacitated, and should be transported, regardless of the presence of an apparently normal mental status.
Behavioral Emergencies

**Basic Life Support**
- Apply physical restraints if needed to ensure patient/crew safety
- Restrain patients in supine or lateral recumbent position only, using no excessive force
- Never allow patients to be restrained in the "hog-tied" position

**Advanced Life Support**
- When chemical or physical restraints are used perform Full ALS Assessment and Treatment
- For patients with severe agitation compromising patient care or patient/crew safety, or for patients who continue to struggle against physical restraints:
  - Ziprasidone (Geodon) 10 mg IM if < 60 kg and 20 mg IM if > 60 kg
    - Avoid if history of long QT-syndrome or dementia-related psychosis
  - Midazolam (Versed) 5 mg IM or intranasal via MAD
  - If cocaine/sympathomimetic toxicity strongly suspected:
    - Midazolam (Versed) 5 mg IM or intranasal via MAD OR 2.5 mg IV
    - Repeat Midazolam (Versed) 5 mg IM or intranasal via MAD OR 2.5 mg IV if adequate sedation not achieved on initial dose

**Patients requesting transport directly to a psychiatric facility:**

Patients with mild psychiatric decompensation, who are requesting transport to a psychiatric facility, may be released into the custody of Law Enforcement for transport directly to a psychiatric receiving center when the following criteria are met:
- Preexisting psychiatric history
- Calm and cooperative, exhibiting no severe psychiatric symptoms (e.g. agitation, violent, uncooperative for exam)
- Have no other medical complaint or obvious medical necessity noted after a thorough assessment
- Full set of normal vital signs
- 1° and 2° survey reveal no acute injuries or abnormalities
- Denies ingestion or other attempt at self-harm
- Required no sedation or restraint at any point during the assessment
- Not requesting transport to a hospital emergency department
- LEO is willing to transport the patient to the psychiatric facility

If the LEO is unwilling to transport the patient to the psychiatric facility, ambulance transport to the nearest ED shall be offered. If the patient refuses hospital transport, all refusal criteria must be met (see Refusal of Medical Care protocol).
Bites and Envenomations

**Basic Life Support**
- Irrigate/Cleanse wound with 0.9% NaCl (remove any large debris)
- Remove stinger if wasp or bee (if easily removed)
- Mark initial edematous area with pen and note time
- Immobilize affected part and remove distal jewelry
- Attempt to identify what caused bite and bring to Emergency Department if dead (use caution when handling animals)

**Advanced Life Support**
- For signs of allergic reaction or anaphylaxis, refer to the appropriate Allergic Reactions protocol, page 16
- For Black Widow spider or Scorpion envenomations with severe muscle spasms
  - *Midazolam* (Versed) 5 mg IM or intranasal via MAD OR 2.5 mg slow IV
- For patients with severe pain if systolic blood pressure $\geq 120$ mmHg:
  - *Fentanyl* (Sublimaze) 1 mcg/kg (maximum 50 mcg) slow IV; repeat once after 5 minutes as needed (maximum 100 mcg total dose) OR 100 mcg intranasal via MAD (divide dose equally between nostrils)
  - Preferentially use intranasal delivery via MAD for those where IV access may be difficult to obtain in a timely fashion or not indicated for chief complaint
Cardiac Arrest General Approach

In the event a patient suffers cardiac arrest in the presence of EMS, the absolute highest priority is to apply the AED/Defibrillator and deliver a shock immediately if indicated. In the setting of cardiac arrest not witnessed by EMS, perform CPR immediately and continuously while setting up for rhythm analysis and delivery of shocks. If shockable rhythm present, deliver shock without delay.

Mechanical CPR devices can be used as the initial compression delivery mode only if there is no delay in applying the device. If a delay in applying the device occurs, begin manual compressions immediately.

**Basic Life Support**
- Check responsiveness
- Call “Patient Contact” time to dispatch
- Open airway, check breathing, and feel for carotid pulse
- If a pulse is not definitely felt within 10 seconds immediately begin chest compressions while preparing to apply AED or Monitor/Defibrillator
- Assist ventilation with minimal interruptions chest compressions
  - 30:2 compression to ventilation ratio for BLS
  - EMT’s are authorized to place Laryngeal Tube Airways (LTA)
- Apply AED and follow directions
- If shockable rhythm identified by AED:
  - Administer shock and call “first shock” time to dispatch
  - Resume CPR immediately after shock is delivered for 2 minutes
  - Do not wait for pulse or rhythm check
- Re-analyze rhythm using AED and follow directions
- Continue assisted ventilation without chest compressions if pulse present

**Advanced Life Support**
- Advanced airway/ventilatory management
  - Ventilation rate of 8-10 per minute (avoid hyperventilation)
- If unwitnessed arrest, immediately begin CPR and continue until ready for rhythm analysis
- Follow algorithm for specific rhythm
- Establish peripheral IV or Adult Intraosseous access
  - All medications listed for IV use can be given IO
  - Endotracheal delivery of Epinephrine, Naloxone, and Atropine is an acceptable last resort if peripheral IV or IO access cannot be achieved
    - When delivered via endotracheal tube, administer 2-2.5 times the IV dose diluted in 5-10 mL of 0.9% NS or sterile water
Cardiac Arrest General Approach

Important Principles for Cardiac Arrest Management

- **Minimize interruptions in chest compressions**
  - Compressions should begin immediately upon identifying pulselessness
  - Compressions should be continuous (no pause for ventilations)
- **Minimize time between ceasing compressions and delivering shocks in VF/VT**
  - Whenever possible, continue CPR while defibrillator is charging
- **Avoid hyperventilation (use rate of 8-10 breaths/minute)**
- **Capnography is required on every patient with an ETT or LTA in place**
  - Allows rapid assessment of ROSC (marked by a sudden increase in ETCO2 value)
- **Consider the H’s and T’s that may have caused the arrest**

<table>
<thead>
<tr>
<th>H’s</th>
<th>T’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypoxia</td>
<td>Toxins</td>
</tr>
<tr>
<td>Hypovolemic</td>
<td>Tamponade (Cardiac)</td>
</tr>
<tr>
<td>Hydrogen Ion (Acidosis)</td>
<td>Tension pneumothorax</td>
</tr>
<tr>
<td>Hyperkalemia</td>
<td>Thrombosis, pulmonary</td>
</tr>
<tr>
<td>Hypothermia</td>
<td>Thrombosis, coronary</td>
</tr>
</tbody>
</table>

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Cardiac Arrest General Approach

Witnessed Pulseless Arrest

YES

Shockable Rhythm?

VF/VT
- CPR until defibrillator charged

Give 1 Shock (200 J)
- Resume CPR immediately and continue for 2 min.
- Do not wait for rhythm check or pulse check

NO

Unwitnessed Pulseless Arrest

- CPR while setting up for rhythm analysis
- Minimize interruptions in compressions

Asystole/PEA

Resume CPR immediately and continue for 2 min.
- Establish IV/IO
- Epinephrine 1 mg IV/IO every 3-5 min.

Give 1 Shock (360 J)
- Resume CPR immediately
- Establish IV/IO
- Epinephrine 1 mg IV/IO every 3-5 min

NO

Shockable rhythm after 2 min. of CPR?

YES

Give 1 Shock (360 J)
- Resume CPR immediately
- Amiodarone 300 mg IV/IO
- Consider additional 150 mg once on second round
- Magnesium 2 grams IV/IO if Torsades highly suspected (single dose)

NO

Asystole/PEA

Resume CPR immediately and continue for 2 min.
- Establish IV/IO
- Epinephrine 1 mg IV/IO every 3-5 min.

Give 1 Shock (360 J)
- Resume CPR immediately
- Amiodarone 300 mg IV/IO
- Consider additional 150 mg once on second round
- Magnesium 2 grams IV/IO if Torsades highly suspected (single dose)

NO

ROSC?

YES

Post Resuscitation Care

NO

Witnessed Pulseless Arrest

YES

Shockable Rhythm?

NO

Unwitnessed Pulseless Arrest

- CPR while setting up for rhythm analysis
- Minimize interruptions in compressions

Asystole/PEA

Resume CPR immediately and continue for 2 min.
- Establish IV/IO
- Epinephrine 1 mg IV/IO every 3-5 min.

Give 1 Shock (360 J)
- Resume CPR immediately
- Establish IV/IO
- Epinephrine 1 mg IV/IO every 3-5 min

NO

Shockable rhythm after 2 min. of CPR?

YES

Give 1 Shock (360 J)
- Resume CPR immediately
- Amiodarone 300 mg IV/IO
- Consider additional 150 mg once on second round
- Magnesium 2 grams IV/IO if Torsades highly suspected (single dose)

NO

Asystole/PEA

Resume CPR immediately and continue for 2 min.
- Establish IV/IO
- Epinephrine 1 mg IV/IO every 3-5 min.

Give 1 Shock (360 J)
- Resume CPR immediately
- Amiodarone 300 mg IV/IO
- Consider additional 150 mg once on second round
- Magnesium 2 grams IV/IO if Torsades highly suspected (single dose)

NO

ROSC?

YES

Post Resuscitation Care

NO
Cardiac Arrest - Asystole

When asystole is seen on the cardiac monitor confirmation of the rhythm shall include a printed rhythm strip, as well as interpretation of the rhythm in more than one lead. Low amplitude V-Fib or PEA may be difficult to distinguish from asystole when using only the cardiac monitor display for interpretation.

Advanced Life Support
• Follow Cardiac Arrest-General Approach protocol
• Consider and treat possible causes:

<table>
<thead>
<tr>
<th>Potential Cause of Asystole</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypoxia</td>
<td>• Secure airway and ventilate</td>
</tr>
<tr>
<td>Hyperkalemia (end stage renal disease)</td>
<td>• Sodium Bicarbonate 1 mEq/kg IV/IO</td>
</tr>
<tr>
<td></td>
<td>• Calcium chloride 1 gram IV/IO</td>
</tr>
<tr>
<td>Hypothermia</td>
<td>• Active rewarming</td>
</tr>
<tr>
<td>Toxins (drug overdose)</td>
<td>• See below</td>
</tr>
</tbody>
</table>

- Epinephrine 1:10,000 1 mg IV/IO every 3-5 min during arrest
- Drug overdoses (see specific drug OD/toxicology section)
  - Glucagon 5 mg IV/IO for calcium channel and B blocker OD
  - Calcium Chloride 1 gram IV/IO for calcium channel blocker OD
  - Avoid if patient on Digoxin / Lanoxin
  - Sodium Bicarbonate 1 mEq/kg IV/IO for Tricyclic antidepressant OD
  - Naloxone (Narcan) 2 mg IV
    - When narcotic overdose is likely repeat every 3-5 minutes (Maximum 8 mg)
    - May be given IM if no IV/IO available
- If no response to resuscitative efforts in 20 minutes (at least 2 rounds of drugs) consider discontinuation of efforts (see “Termination of Resuscitation” protocol)

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
# Cardiac Arrest - Pulseless Electrical Activity

## Advanced Life Support
- Follow Cardiac Arrest-General Approach protocol
- Consider and treat possible causes:

<table>
<thead>
<tr>
<th>Potential Cause of PEA</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypovolemia (most common cause)</td>
<td>Normal Saline 1-2 Liters IV/IO</td>
</tr>
<tr>
<td>Hypoxia</td>
<td>Secure airway and ventilate</td>
</tr>
<tr>
<td>Hydrogen ion, acidosis</td>
<td>Sodium Bicarbonate 1 mEq/kg IV/IO</td>
</tr>
<tr>
<td>Hyperkalemia (end stage renal disease)</td>
<td>Sodium Bicarbonate 1 mEq/kg IV/IO, Calcium Chloride 1 g IV/IO</td>
</tr>
<tr>
<td>Hypothermia</td>
<td>Active rewarming</td>
</tr>
<tr>
<td>Toxins (drug overdose)</td>
<td>See below</td>
</tr>
<tr>
<td>Tamponade, cardiac</td>
<td>Normal Saline 1-2 Liters IV/IO, Expedite transport</td>
</tr>
<tr>
<td>Tension pneumothorax</td>
<td>Needle thoracostomy</td>
</tr>
<tr>
<td>Thrombosis, coronary</td>
<td>Expedite transport</td>
</tr>
<tr>
<td>Thrombosis, pulmonary</td>
<td>Expedite transport</td>
</tr>
</tbody>
</table>

- **Epinephrine 1:10,000** 1 mg IV/IO every 3-5 min during arrest
- Drug overdoses (see specific drug OD/toxicology section)
  - **Glucagon 5 mg IV/IO** for calcium channel and B blocker OD
  - **Calcium Chloride 1 g IV/IO** for calcium channel blocker OD
    - Avoid if patient on Digoxin / Lanoxin
  - **Sodium Bicarbonate 1 mEq/kg IV/IO** for Tricyclic antidepressant OD
  - **Naloxone (Narcan) 2 mg IV/IO** for possible narcotic OD
    - When narcotic overdose is likely repeat every 3-5 minutes (Maximum 8 mg)
    - May be given IM if no IV/IO available

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Cardiac Arrest - Ventricular Fibrillation

**Advanced Life Support**

- Follow Cardiac Arrest-General Approach protocol
- Defibrillate for persistent VF/VT:
  - 200 J for initial biphasic shock, 360 J for subsequent shocks
  - Continue CPR immediately after shock (do not stop to check pulse or rhythm)
  - Call first defibrillation time to dispatch (if not done above)
- Analyze rhythm after 2 minutes of good CPR; If VF/VT persists:
  - Defibrillate at 360 J
  - Continue CPR immediately after shock (do not stop to check pulse or rhythm)
  - *Epinephrine* 1:10,000 1 mg IV/IO every 3-5 min during arrest
- Analyze rhythm after 2 minutes of good CPR; If VF/VT Persists:
  - Defibrillate at 360 J
  - Continue CPR immediately after shock (do not stop to check pulse or rhythm)
  - *Amiodarone* 300 mg IV/IO bolus
    - For persistent VF/VT give *Amiodarone* 150 mg IV/IO bolus on second round
- Continue cycle of CPR & Drug ➔ Rhythm Check ➔ CPR ➔ Shock ➔ CPR and Drug ➔ Rhythm Check ➔ CPR ➔ Shock as needed
- For persistent VF without interuption despite at least 5 shocks at 360 J
  - If a second monitor/defibrillator is available, perform Double Sequential Defibrillation as described in the Orange County EMS System Procedure Manual
  - Continue CPR immediately after shock (do not stop to check pulse or rhythm)
  - Transport to the nearest Emergency Department
- Additional interventions to consider in special circumstances:
  - *Magnesium Sulfate* 2 g IV/IO push over 1-2 minutes only if suspected Polymorphous VT (torsades de pointes) or hypomagnesemic state (chronic alcohol, diuretic use)
  - *Sodium Bicarbonate* 1 mEq/kg IV/IO if suspected hyperkalemia (e.g. dialysis patient) or tricyclic antidepressant OD
Cardiac Arrest - Post Resuscitation Care

**Basic Life Support**
- Maintain assisted ventilation as needed
- Supplemental 100% oxygen

**Advanced Life Support**
- Full ALS Assessment and Treatment
  - Obtain a 12 lead ECG and initiate STEMI Alert if criteria exists
  - For hypotension (systolic BP < 90 mmHg) not improved by fluid boluses, or when fluid boluses are contraindicated
    - *Dopamine* infusion at 5-20 mcg/kg/min titrated to maintain systolic BP > 90 mm Hg
  - Administer supplemental oxygen with a target oxygen saturation of 94-98%
  - For patients with assisted ventilation, provide 10-12 breaths per minute with a target ETCO2 of 35-40 mmHg
  - Treat arrhythmias as directed by appropriate Cardiac Arrhythmias protocol
  - If cardiac arrest reoccurs refer to appropriate algorithm based on presenting rhythm:
    - Total cumulative dose of *Amiodarone* should not exceed 450 mg (300 mg + 150 mg)
  - If patient becomes combative, administer *Midazolam* (Versed) 2.5 mg slow IV or 5 mg IM
    - Repeat *Midazolam* (Versed) 2.5 mg slow IV or 5 mg IM if patient still combative
- **Transport to the nearest PCI (Percutaneous Coronary Intervention) capable hospital**
  - PCI capable hospital campuses in and around Orange County:
    - Dr. P. Phillips Hospital
    - Florida Hospital Altamonte
    - Florida Hospital Celebration Health
    - Florida Hospital Orlando
    - Health Central Hospital
    - Orlando Regional Medical Center
    - Osceola Regional Medical Center
  - The following hospitals function as part of the Florida Hospital STEMI receiving network, and can arrange rapid interfacility transport of STEMI Alert patients when primary transport by EMS is not operationally feasible:
    - Florida Hospital (FH) Apopka, FH East and FH Kissimmee

Contact Medical Control for Additional Orders if Needed
Cardiac Arrest - Termination of Resuscitation Medical

The paramedic has the discretion to continue resuscitation efforts in any case despite Termination of Resuscitation criteria being met if scene safety, location, patient’s age, time of arrest, or bystander input compels this decision.

When asystole is seen on the cardiac monitor confirmation of the rhythm shall include a printed rhythm strip, as well as interpretation of the rhythm in more than one lead. Low amplitude V-Fib or PEA may be difficult to distinguish from asystole when using only the cardiac monitor display for interpretation.

Medical Control Contact Not Required

The paramedic may terminate resuscitative efforts in nonhypothermic adults provided all 6 of the following criteria exist:

- **Initial rhythm is asystole** confirmed in two leads and on printed rhythm strip
- **Terminal rhythm is asystole** confirmed in two leads and on printed rhythm strip
- **Secure airway** confirmed by digital capnography (ETT or LTA)
- At least **four doses of Epinephrine** have been administered (given every 3-5 min)
- Cardiac arrest refractory for at least **20 minutes of ACLS**
- Quantitative **ETCO2 value is < 10 mmHg** with effective CPR, after 20 minutes of ACLS

▶ **Do not terminate resuscitation if transport has been initiated** ◀

Medical Control Required

Medical Control contact for "termination of resuscitation" orders is appropriate if cardiac arrest persists after at least 20 minutes of aggressive ACLS. Provide the Medical Control Physician with the following information:

- Initial rhythm and terminal rhythm
- Method of airway management and vascular access
- Medications given during the arrest
- ETCO2 value
- Total amount of time working the arrest

The decision to continue efforts and transport is at the sole discretion of the Medical Control Physician. If termination orders are given, document the time the order was given as the "time of death".

▶ **Do not terminate resuscitation if transport has been initiated** ◀

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Cardiac Arrest - No Resuscitation Attempt

No resuscitation attempt is indicated for cardiac arrest in the following scenarios:

**Obvious signs of death:**
- Pulseless, apneic and no other signs of life present **AND** any of the following:
  - Rigor mortis
  - Decomposition of body tissues
  - Dependent lividity
  - Injuries incompatible with life (e.g. incineration, decapitation, hemicorporectomy)

**Blunt or penetrating trauma (all criteria must be met):**
- Pulseless, apneic and no other signs of life present
- Lack of pupillary reflexes and spontaneous movement
- Asystole or agonal rhythm < 20 on cardiac monitor
- Patients who become pulseless after severe traumatic injury when transport to the nearest ED cannot be accomplished within 15 minutes (i.e. prolonged extrications) provided that all other signs of life are absent and transport has not been initiated

"Do Not Resuscitate" (DNR Order)
- When presented with a State of Florida **DO NOT RESUSCITATE** order (Form 1896)
  - Must be on YELLOW Paper and signed by the patient’s physician

Use caution in the following scenarios:
- When mechanism of injury is inconsistent with traumatic cardiac arrest
- Lightning or other high voltage electrical injuries
- Drowning
- Suspected hypothermia

In order to preserve trace evidence at a death scene, avoid covering the body when it is prudent and reasonable to do so. In the scenario when a person is deceased at a residence or other private area, partition off, or otherwise restrict access to, the area where the body is as opposed to covering the body. Law Enforcement Officers on the scene should be involved in the decision to how best respect the patients dignity without compromising investigative needs.

There is no strict contraindication on covering the deceased, especially when the crews are trying to protect the dignity of the deceased or the mental state of their family.
Cardiac Arrhythmias - Atrial Fibrillation/Flutter

Atrial Fibrillation or Flutter

Basic Life Support
• Supplemental oxygen

Advanced Life Support
• Full ALS Assessment and Treatment
• Do not delay treatment by obtaining 12 lead ECG if patient is unstable unless diagnosis is in question

Stable or borderline (systolic blood pressure > 90 mmHg):
• Rate < 150 beats/min
  • No anti-arrhythmic indicated
  • Provide supportive care and expedite transport
• Rate ≥ 150 beats/min AND symptomatic (chest pain, palpitations, dyspnea)
  • Administer Diltiazem (Cardizem) 0.25 mg/kg IV (maximum dose 20 mg) over two minutes if available
    • If BP < 90 mm Hg systolic, administer boluses of 0.9% NaCl at 250 ml until systolic BP > 90 mm Hg
    • Contraindicated if wide complex (QRS > 120 msec) or history of Wolf-Parkinson-White (WPW) syndrome

Unstable with serious signs and symptoms (Ventricular rate > 150):
• Unstable is defined as systolic blood pressure less than 90 mmHg, acutely altered mental status and signs of shock
• Synchronized cardioversion
  • 1st energy level 100 Joules
  • If no response 200 J
  • If no response 300 J
  • If no response 360 J
Cardiac Arrhythmias - Bradycardia

Bradycardia (Heart Rate less than 50)

Basic Life Support
- Supplemental oxygen

Advanced Life Support
- Full ALS Assessment and Treatment
  - Administer boluses of 0.9% NaCl at 250 ml until systolic BP > 90 mm Hg
    - Contraindicated if evidence of congestive heart failure (e.g. rales)
  - Do not delay treatment if patient is unstable by obtaining 12 lead ECG unless diagnosis is in question
  - If the patient is normotensive, with no signs of shock, provide supportive care and expedite transport.

Unstable with serious signs and symptoms (Heart rate < 50):
- Unstable is defined as systolic blood pressure less than 90 mmHg, acutely altered mental status and signs of shock
- Atropine 0.5 mg IV
  - Repeat every 3 minutes as needed (Maximum 3 mg)
- If symptoms persist after Atropine, or any delay in establishing IV, initiate transcutaneous pacing using Demand Mode:
  - Start at lowest MA's; increase until electrical capture with pulses achieved
  - Start rate at 70 or default and increase rate to achieve systolic BP ≥ 90 mm Hg (Maximum 100 beats/minute)
  - If systolic BP returns to ≥ 90 mmHg consider sedation, Midazolam 2.5 mg slow IV
- For hypotension (systolic BP < 90 mmHg) not improved by the above:
  - Dopamine infusion at 2-10 mcg/kg/min titrated to maintain systolic BP > 90 mm Hg
- If above unsuccessful:
  - Epinephrine infusion at 2-10 mcg/minute IV
- If drug induced, treat for specific drug overdose:
  - Beta blocker OD, administer Glucagon 5 mg IV
  - Calcium channel blocker OD, administer Calcium Chloride 1 gram IV/IO
    - Contraaindicated if patient on Digoxin / Lanoxin
    - Glucagon 5 mg IV if no response to Calcium Chloride
  - Opioid OD, administer Naloxone (Narcan) 2 mg IV (start at 0.4 mg for patients over 65 years old)
    - Naloxone (Narcan) can be given in 0.4 mg increments titrated to mental status and respiratory drive
    - If IV access has not been established, give IM or intranasal via MAD
  - Tricyclic Antidepressant OD, administer Sodium Bicarbonate 1 mEq/kg IV

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Cardiac Arrhythmias - Supraventricular Tachycardia

**Supraventricular Tachycardia**

**Basic Life Support**
- Supplemental oxygen

**Advanced Life Support**
- Full ALS Assessment and Treatment
- Do not delay treatment if patient is unstable by obtaining 12 lead ECG unless diagnosis is in question

**Stable or borderline (Ventricular rate > 150):**
- Vagal maneuvers (Valsalva or cough)
  - Ice water contraindicated in patients with ischemic heart disease
- *Adenosine Phosphate* (Adenocard) 6 mg rapid IV over 1-3 seconds
  - If no response in 2 minutes, 12 mg rapid IV over 1-3 seconds
  - If no response in 2 minutes, repeat 12 mg IV over 1-3 seconds

**Unstable with serious signs and symptoms (Ventricular rate > 150):**
- Unstable is defined as systolic blood pressure less than 90 mmHg, acutely altered mental status and signs of shock
- May give brief trial of *Adenosine* 6 mg rapid IV over 1-3 seconds
- Synchronized Cardioversion
  - 1st energy level 100 Joules
  - If no response 200 J
  - If no response 300 J
  - If no response 360 J
Cardiac Arrhythmias - Wide Complex Tachycardia

Basic Life Support
• Supplemental oxygen

Advanced Life Support
• Full ALS Assessment and Treatment
• Do not delay treatment if patient is unstable by obtaining 12 lead ECG unless diagnosis is in question
• In general, assume unknown wide complex tachycardias, at rates over 150, represent ventricular tachycardia

Stable and SVT highly likely (rate > 150):
• Adenosine Phosphate (Adenocard) 6 mg rapid IV over 1-3 seconds
  • If no response in 2 minutes, 12 mg rapid IV over 1-3 seconds
  • If no response in 2 minutes, repeat 12 mg rapid IV over 1-3 seconds

Stable wide complex or ventricular tachycardia likely (rate > 150):
• Amiodarone 150 mg IV Piggyback over 10 minutes
  • Repeat Amiodarone 150 mg IV Piggyback over 10 minutes every 10-15 minutes
    (Maximum of 450 mg total)

Unstable wide complex tachycardia (rate > 150):
• Unstable is defined as systolic blood pressure less than 90 mmHg, acutely altered mental status and signs of shock
• Synchronized cardioversion
  • 1st energy level 100 Joules
  • If no response 200 J
  • If no response 300 J
  • If no response 360 J
• If delays in synchronization occur and clinical condition is critical, go immediately to unsynchronized shocks
• If wide complex tachycardia re-occurs following electrical cardioversion:
  • Amiodarone 150 mg IV Piggyback over 10 minutes
    • Repeat Amiodarone 150 mg IV Piggyback over 10 minutes every 10-15 minutes
      (Maximum of 450 mg total)
• If hyperkalemia suspected in any wide complex tachycardia (e.g. renal failure patient) administer the following medications:
  • Calcium Chloride 1 gram IV
  • Contraindicated if patient on Digoxin/Lanoxin
  • Sodium Bicarbonate 1 mEq/kg IV

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Cardiac Arrhythmias - Polymorphous VT (Torsades)

**Basic Life Support**
- Supplemental oxygen

**Advanced Life Support**
- Full ALS Assessment and Treatment
- Do not delay treatment by obtaining 12 lead ECG unless diagnosis is in question

<table>
<thead>
<tr>
<th>Stable:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Magnesium Sulfate 2 g slow IV in 10 ml NS over 1-2 minutes</td>
</tr>
<tr>
<td>• If no response, Amiodarone 150 mg IV Piggyback over 10 minutes</td>
</tr>
<tr>
<td>• Repeat Amiodarone 150 mg IV Piggyback over 10 minutes every 10-15 minutes (Maximum of 450 mg total)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Unstable – or if no response to the above measures:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Unstable is defined as systolic blood pressure less than 90 mmHg, acutely altered mental status and signs of shock</td>
</tr>
<tr>
<td>• Unsynchronized Cardioversion</td>
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<tr>
<td>• 1st energy level 100 Joules</td>
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<td>• If no response 200 J</td>
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<tr>
<td>• If no response 300 J</td>
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<tr>
<td>• If no response 360 J</td>
</tr>
</tbody>
</table>

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Chest Pain - Suspected Cardiac Ischemia

**Basic Life Support**
- Supplemental oxygen
- Assist patient in self-administration of previously prescribed Aspirin
- Assist patient in self-administration of previously prescribed Nitroglycerin
  - Contraindicated if systolic BP < 90 mm Hg
  - Contraindicated if use of a Phosphodiesterase-5 (PDE5) inhibitor within last 24 hours (Viagra or Levitra); 48 hours for Cialis
- Repeat patient assisted Nitroglycerin administration every 5 minutes as needed for continued chest pain (provided SBP remains > 90 mm Hg) with assessment of patient before and after each NTG dose

**Advanced Life Support**
- Full ALS Assessment and Treatment
- Perform **12 lead ECG** immediately:
  - Identify the presence of ECG changes suggestive of Acute Myocardial Infarct (AMI)
  - If STEMI criteria are present initiate STEMI Alert (see following page)
- Aspirin 324 mg PO, chewed if patient is able to swallow
  - Aspirin is contraindicated if allergic
- Nitroglycerin 0.4 mg spray or tablet SL, every 5 minutes as needed for chest pain
  - Contraindicated if systolic BP < 90 mm Hg
  - Contraindicated if use of a Phosphodiesterase-5 (PDE5) inhibitor within last 24 hours (Viagra or Levitra); 48 hours for Cialis
  - Use with caution in Acute Inferior Wall MI, or Right Ventricular infarct (ST elevation in V4R)
  - Be prepared to administer NS 250 ml boluses IV if hypotension develops
- Fentanyl (Sublimaze) 1 mcg/kg (maximum 50 mcg) slow IV; repeat once after 5 minutes as needed (maximum 100 mcg total dose) if no chest pain relief after 3rd Nitroglycerin dose
  - Contraindicated if systolic BP < 90 mm Hg
  - Use with caution if right ventricular or posterior wall MI (ST elevation in posterior leads with marked depression V1 thru V4)
- If runs of Ventricular Tachycardia occur:
  - Amiodarone 150 mg IV Piggyback over 10 minutes
  - Isolated PVC’s do not require treatment
- For patients with severe nausea or vomiting:
  - Ondansetron (Zofran), 4 mg slow IV or 4 mg Oral Disintegrating Tablet (ODT) by mouth

Contact Medical Control for Additional Orders if Needed
Chest Pain - Suspected Cardiac Ischemia

**STEMI Alert (ST Elevation Myocardial Infarction)**

A STEMI Alert will be instituted for patients having chest pain or ischemic equivalent symptoms for < 12 hours, and any of the following:

- ST segment elevation ≥ 1mm in two or more contiguous leads
- Computer interpretation of “Meets ST Elevation MI criteria” on 12 lead ECG
- New Left Bundle Branch Block (confirmed by comparing to prior ECG)

**Accomplish the following as part of the STEMI Alert process:**

- Determine if the patient has a Cardiologist and a hospital preference
- Based on patient preference or proximity, transmit the 12 lead ECG to the appropriate hospital destination
  - During the radio call to the ED, convey the name of the patient’s Cardiologist
- Transport STEMI Alert patients to a PCI (Percutaneous Coronary Intervention) capable hospital based on patient preference or proximity (if patient has no preference)
  - **PCI capable hospital campuses** in and around Orange County:
    - Dr. P. Phillips Hospital
    - Florida Hospital Altamonte
    - Florida Hospital Celebration Health
    - Florida Hospital Orlando
    - Health Central Hospital
    - Orlando Regional Medical Center
    - Osceola Regional Medical Center
- The following hospitals function as part of the Florida Hospital STEMI receiving network, and can arrange rapid interfacility transport of STEMI Alert patients when primary transport by EMS is not operationally feasible:
  - Florida Hospital (FH) Apopka, FH East and FH Kissimmee

Contact Medical Control for Additional Orders if Needed
Hazardous Materials Exposure-HAZMAT ALERT

Chemical Burns and Dermal Exposure

**Basic Life Support**
- Stop the burning process
- Remove all clothing prior to irrigation
- If a caustic liquid is involved, flush with copious amounts of water
- If a dry chemical is involved, brush it off, then flush with copious amounts of water
- Do not use water for elemental metals (sodium, potassium, lithium) and phenol:
  - Remove obvious metallic fragments from skin and cover the burn with mineral oil or cooking oil
  - As a last resort use extremely large amounts of soap and water with continuous irrigation until all phenols are removed
- For chemical burns with eye involvement, immediately begin flushing the eye with normal saline and continue throughout assessment and transport
- Apply a burn sheet or dry sterile dressing to burn areas

**Advanced Life Support**
- For inhaled toxin with acute bronchospasm:
  - **Albuterol (Proventil)** 2.5 mg/3 ml and **Ipratropium Bromide 0.02% (Atrovent)** 0.5 mg/2.5 ml via nebulizer
    - Repeat **Albuterol (Proventil)/Ipratropium Bromide (Atrovent) X 2** if wheezing persists
  - For persistent burning sensation of the airways (after Albuterol/Atrovent) administer **Sodium Bicarbonate (4.2%)** 5 ml via nebulizer
- Observe for signs of impending respiratory failure

**HAZMAT Alert**

**Purpose:** Improve management of patient care scenarios involving HAZMAT exposures by creating a standard method to accomplish the following:
- Early notification of receiving hospitals of an incoming HAZMAT patient
- Early involvement of HAZMAT Teams in decision making
- Early involvement of the Regional Poison Control Center or Medical Control when needed
- Assignment of an EMS Liaison to assist the ED in preparing for arrival of the patient
- Establishment of unified command between EMS and hospital
- Preparing for EMS systems *Status Black*, when needed, to redirect EMS transport traffic until the HAZMAT Alert has been cleared

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Hazardous Materials Exposure-HAZMAT ALERT

Initiation of a HAZMAT ALERT

- HAZMAT Alert should be initiated for the following:
  - At the time of dispatch, when a caller reports a medical emergency involving a chemical smell, or hazardous material exposure
  - Do not otherwise interfere with the standard dispatch process
  - When the first arriving crew suspects a hazardous material exposure due to odor, history or other source if information
  - By Hospital Emergency Department staff in the event a hazardous material exposure is suspected in a walk-in patient and additional resources are needed

Action Steps After a Hazardous Material Exposure is Recognized

- Immediately contact the dispatch center and initiate a HAZMAT Alert
- Advise the Comm Center of the EMS transport destination as soon as determined
- Employ all agency standards to protect crew members from avoidable exposure
- After acknowledgement of the HAZMAT Alert, the Comm Center will:
  - Notify the agency HazMat Team
  - Dispatch a single unit to the receiving hospital to assist in transfer of care (EMS Liaison)
  - Provide a “heads up” notification to the intended receiving hospital
  - **If requested by the ED**, place the ED on Status Black (EMSSystems) until it is determined safe to resume EMS transports
- Once notified of the HAZMAT Alert, the agency HazMat Team will contact the on scene crew to accomplish the following (may or may not require a HazMat Team scene response):
  - Determine the nature of the exposure and advise on PPE level
  - Provide input on appropriate decontamination strategy
  - Advise on treatment in coordination with Medical Control or Poison Control
  - Determine when transport can be safely initiated
  - **Initial responding crews should await input from the HazMat Team prior to initiating transport**

Transfer of Care

- Prior to ED arrival, transporting crews should contact the ED or EMS Liaison to convey pertinent SOAPP information, and specifics of the decon strategy employed on scene
- Before entering ED, allow hospital staff to assess need for additional decon
  - EMS Liaison or hospital staff will meet arriving crews outside the ED entry door
  - Once on hospital property, all further medical care is directed by the ED staff

Contact Medical Control for Additional Orders if Needed
Hazardous Materials Exposure-HAZMAT ALERT

General Approach to HAZMAT Alert

Susicion of a hazardous material exposure

Advise Comm Center of HAZMAT Alert and transport destination (ED)

Comm Center

1. Notify agency HAZMAT team
2. Dispatch single unit to ED
3. Give ED a “heads up” & place on Status Black (EMS Systems)

HAZMAT team contacts providers to discuss nature of exposure and recommend decon strategy

Decon prior to moving from scene and provide updated ETA to ED

Single unit responds to destination hospital to assist in communication with transport unit (EMS Liaison)

Upon arrival coordinate with hospital staff and HAZMAT Team to determine need for additional decon prior to entering ED

Supportive

Transfer care to ED staff

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Hazardous Materials Exposure-HAZMAT ALERT

Cyanide Toxicity and Smoke Inhalation

Cyanide poisoning may result from inhalation, ingestion or dermal exposures to cyanide containing compounds, including smoke from closed-space fires. The presence and extent of the poisoning are often unknown initially. Treatment decisions must be made on the basis of clinical history and signs and symptoms of cyanide intoxication. Not all patients who have suffered smoke inhalation from a closed space fire will have cyanide poisoning. Other conditions such as burns, trauma or other toxic inhalations (e.g. carbon monoxide) may be the cause of symptoms. When smoke inhalation is the suspected source of cyanide exposure assess the patient for the following:

- Exposure to fire or smoke in an enclosed space
- Presence of soot around the mouth, nose or oropharynx
- Altered mental status

Common Signs and Symptoms of Cyanide Toxicity

- Headache
- Altered mental status
- Confusion
- Seizures
- Coma
- Dyspnea
- Respiratory distress/apnea
- Tachypnea
- Chest pain or tightness
- Nausea/vomiting
- Hypertension (early)
- Hypotension (late)
- Cardiovascular collapse/cardiac arrest

Advanced Life Support

- Supplemental 100% Oxygen
- Perform Full ALS Assessment and Treatment
- When clinical suspicion of Cyanide poisoning is high:
  - Hydroxocobalamin (Cyanokit) 5 grams (two 2.5 grams vials) IV/IO over 15 minutes
  - Use NaCl 0.9% as diluent for Cyanokit as per manufacturer instructions
  - Contraindicated in patients with known anaphylactic reactions to hydroxocobalamin or cyanocobalamin
  - If severe symptoms persist, contact Medical Control for consideration of additional dose of Cyanokit 5 gram IV/IO over 15 minutes (only if patient in extremis)
- Expedite transport and treat other conditions as per appropriate protocols

Contact Medical Control for Additional Orders if Needed
Hypertensive Emergencies

A Hypertensive Emergency can be defined as systolic BP > 220 mm Hg and/or Diastolic BP > 120 mm Hg. Prehospital treatment of isolated hypertension may result in critical reductions in target organ perfusion due to uncontrolled lowering of blood pressure. Focus on addressing the manifestations of hypertensive emergencies, such as chest pain or heart failure.

Basic Life Support
• Supplemental oxygen

Advanced Life Support
• Full ALS Assessment and Treatment

Chest Pain Present
• Aspirin 324 mg PO, chewed if patient is able to swallow
  • Aspirin is contraindicated if allergic
• Nitroglycerin 0.4 mg spray SL, every 5 minutes as needed for chest pain
  • Contraindicated if use of a Phosphodiesterase-5 (PDE5) inhibitor within last 24 hours
    (Viagra or Levitra); 48 hours for Cialis
  • Be prepared to administer IV NS boluses at 250 ml if hypotension develops
• Fentanyl (Sublimaze) 1 mcg/kg (maximum 50 mcg) slow IV; repeat once after 5 minutes as needed (maximum 100 mcg total dose) if no chest pain relief after 3rd Nitroglycerin dose

No Chest Pain Present
• Provide supportive care only
• For patients with altered mental status, signs of stroke or pulmonary edema refer to the specific protocol

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Hyperthermia

Basic Life Support
- Move patient to cooler environment

Heat Cramps
- Painful spasms of the extremities or abdominal muscles, normal mental status and vital signs
  - Oral fluids as tolerated
  - Sponge with cool water

Heat Exhaustion
- Dizziness, light-headedness, headache, irritability, normal or slightly decreased LOC, normal or decreased BP, tachycardia, normal or slightly elevated temperature
  - Keep patient supine
  - Supplemental 100% oxygen
  - Remove clothing
  - Sponge with cool water and fan

Heat Stroke
- Marked alteration in LOC, extremely high temperature (often > 104), may be sweating or have red/hot/dry skin
  - Position semi-reclining with head elevated 15-30°
  - Supplemental 100% oxygen
  - Rapid cooling:
    - Cold packs to axilla, groin and neck
    - Sponge with cool water and fan
    - If significant shivering occurs remove cold packs but continue fanning

Advanced Life Support
- If symptoms moderate to severe perform Full ALS Assessment and Treatment
- Hyperthermia may result from cocaine or other sympathomimetic toxicity:
  - If cocaine/sympathomimetic toxicity strongly suspected give Midazolam (Versed) 5 mg IM or intranasal via MAD OR 2.5 mg IV
    - Repeat Midazolam (Versed) 5 mg IM or intranasal via MAD OR 2.5 mg IV if adequate sedation not achieved
  - Expedite transport

Contact Medical Control for Additional Orders if Needed
Left Ventricular-Assist Devices - LVADs

General Approach to Patients with LVADs

Left Ventricular-Assist Devices (LVADs) are surgically implanted circulatory support devices designed to assist the pumping action of the heart. Caring for these patients is complicated, and every effort should be made to contact the patient’s primary caretaker (spouse, guardian, etc) and LVAD coordinator during your evaluation. Patients with properly functioning LVADs may not have a detectable pulse, normal blood pressure or oxygen saturation.

- Treat non-LVAD associated conditions in accordance with the appropriate Orange County EMS System protocol
- If patient meets Trauma or Stroke Alert criteria, transport them to the appropriate receiving facility
- If a patient meets STEMI Alert criteria, transport them to a PCI capable LVAD Center
- Contact the patient’s LVAD coordinator (if patient or caretaker does not have this information, look on the device for a phone number)
- For any condition that is suspected to be related to the LVAD, transport to the patient’s requested LVAD Center
- Always bring all available LVAD equipment to the Emergency Department with the transported patient

Basic Life Support

- Establish patent airway
- Supplemental 100% oxygen
- Record blood glucose level if any weakness, altered mental status or history of diabetes
- Assist patient in replacing the device’s batteries or cables

Advanced Life Support

- Full ALS Assessment and Treatment
  - Monitor capnography to assess ventilation and perfusion
  - Administer boluses of 0.9% NaCl at 250 ml if signs of hypoperfusion
- Evaluate unresponsive patients carefully for reversible causes prior to initiation of CPR - chest compressions may cause irreversible damage to devices
- Expedite transport and treat other conditions as per appropriate protocols

Contact Medical Control for Additional Orders if Needed
# Left Ventricular-Assist Devices - LVADs

## General Approach to Patients with LVADs

1. **Assess Patient’s Mental Status**

   - **Responsive**
     1. Determine type of device
     2. Assess alarms

   - **Unresponsive**
     1. Determine type of device
     2. Assess alarms
     3. Change batteries
     4. Reconnect cables
     5. Auscultate for pump sound

_after the above assessments are completed, consider CPR if:_

- Patient is completely unresponsive, apneic, and has blood glucose of > 60 mg/dL with non-functioning LVAD (no pump sound) or properly functioning LVAD (all cables are connected and no alarms are sounding)

**Refer to standard cardiac arrest protocols (LVADs are not a contraindication for defibrillation or advanced cardiac life support medications)**

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Contact Medical Control for Additional Orders if Needed

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Authorization Date: 9/4/2013
Obstetric & Gynecological Emergencies

General Considerations for Pregnant Patients
- Determine the date of the last menstrual period (LMP) and approximate weeks gestation
- Patients in the late 2nd or 3rd trimester (>28 weeks) should be transported in a left lateral recumbent position (including those immobilized on a back board) to avoid compression of the inferior vena cava by the gravid uterus

Childbirth

Basic Life Support
- Supplemental oxygen
- Do not place fingers or hand inside birth canal for assessment
- If presenting part is not the head (i.e. foot, arm, or buttock first) immediately begin transport to the nearest OB receiving facility; continue supportive care en route
- Delivery:
  - Slow, controlled delivery of head; apply gentle perineal pressure
  - If the umbilical cord is wrapped around the child’s neck, gently unwrap prior to completion of delivery
  - Observe for meconium staining
  - If present, suction oral pharynx and nose as soon as head is delivered
  - Following delivery, follow newborn resuscitation protocol
  - Double clamp cord 10-12 inches from abdomen
  - Cut cord between clamps
  - Maintain body temperature
  - Allow spontaneous delivery of placenta; do not apply traction to umbilical cord for placental delivery
  - If placental delivery occurs, package in biohazardous waste bag and hand over to hospital staff upon arrival
- Postpartum:
  - For newborn, see newborn resuscitation protocol
  - Assess for postpartum hemorrhage
  - Gently massage abdominal wall overlying the uterine fundus until firm

Advanced Life Support
- Transport to nearest OB receiving facility
- See newborn resuscitation protocol

Contact Medical Control for Additional Orders if Needed
Obstetric & Gynecological Emergencies

Pre-eclampsia & Eclampsia

Pregnancy induced hypertension, pre-eclampsia and eclampsia are conditions typically encountered in late 2nd or 3rd trimester pregnancy, and less commonly in the postpartum period. Clinical manifestations may include elevated blood pressure (SBP > 160 mmHg or DBP > 120 mmHg), headache, confusion, agitation or seizures.

Advanced Life Support

• Full ALS Assessment and Treatment
• If the patient is ≥ 20 weeks pregnant, administer Magnesium Sulfate 4 grams IV over 10 minutes for either of the following:
  • Active seizures
  • Systolic BP > 160 mmHg or Diastolic BP > 120 mmHg on two readings
• If the patient is < 20 weeks pregnant or post-partum, and Magnesium is being considered, contact Medical Control for orders
• For active seizures administer Midazolam (Versed) 5 mg IM or intranasal via MAD OR 2.5 mg IV
  • If seizures continue or re-occur repeat Midazolam (Versed) 5 mg IM or intranasal via MAD OR 2.5 mg IV; wait at least 5 minutes from initial dose
  • Do NOT delay treatment to obtain intravenous access, begin with IM dose unless IV is already established
• Blood glucose measurement
  • If < 70 mg/dL administer Dextrose 50% 25 gm Slow IV
  • See General Illness protocol for additional detail

Vaginal Bleeding

• A visual inspection of the vaginal area to look for crowning or presenting parts is appropriate, but do not place fingers or hand inside birth canal during assessment
• 1st or 2nd Trimester or unknown pregnancy status
  • Position of comfort
• 3rd Trimester Bleeding (>28 weeks)
  • Lateral recumbent position

Advanced Life Support

• If bleeding moderate or heavy perform Full ALS Assessment and Treatment
• If gestational age known to be < 20 weeks transport to closest hospital
• If gestational age known or possibly > 20 weeks transport to closest OB receiving facility
• Transport any products of conception or fetal material present at the scene to the receiving facility

Contact Medical Control for Additional Orders if Needed
Obstetrical Transport Destination

If delivery is not imminent, transport to patient’s requested obstetric (OB) receiving facility.

Patient known to be < 20 weeks gestation:
- 1st day of last menstrual period < 20 weeks ago
- Available information verifying gestational age < 20 weeks (e.g. known due date)
- Transport to closest emergency department

Patient known or possibly ≥ 20 weeks gestation:
- Imminent delivery or medically unstable mother
- Transport to nearest ED
- *Non-traumatic* abdominal, pelvic or back complaints, vaginal bleeding/spotting or any vaginal fluid leak or discharge
- Transport to closest OB receiving facility
  - Patient’s preference should be considered if condition allows
  - Includes minor trauma patients

Pregnancy & Trauma:
- Transport all pregnant patients meeting Trauma Alert criteria or Trauma RED to Orlando Regional Medical Center (or other State Approved Trauma Center)
- Trauma Yellow or Green can be transported to ED of closest OB receiving facility
- If < 20 weeks gestational age, minor trauma patients can be transported to nearest ED

Central Florida OB Receiving Facilities as of 08/01/2013
- Health Central
- Florida Hospital Altamonte (Seminole County)
- Florida Hospital Celebration (Osceola County)
- Florida Hospital Orlando
- Florida Hospital Waterman (Lake County)
- Florida Hospital Winter Park
- Osceola Regional (Osceola County)
- Winnie Palmer Hospital

Contact Medical Control for Additional Orders if Needed
Overdose and Poisonings

Determine the agent involved, the time of the ingestion/exposure, and the amount ingested. Bring empty pill bottles, etc., to the receiving facility. Give nothing by mouth unless specified in protocol or directed by the Regional Poison Control Center.

**Anticholinergic Poisoning/Organophosphates**

Organophosphates cause acetylcholinesterase inhibition, resulting in signs and symptoms such as pinpoint pupils, eye pain, sweating, drooling, tearing, vomiting, seizures, and respiratory distress. Examples of commonly used organophosphate pesticides:

- Acephate (Orthene®)
- Azinphos-methyl (Azinphos®, Guthion®)
- Chlorpyrifos (Govern®, Lorsban®, Nufos®, Warhawk®, Whirlwind®)
- Diazinon
- Dimethoate (Cygon®)
- Disulfoton (Di-Syston®)
- Ethoprop (Mocap®)
- Fenamiphos (Nemacur®)
- Malathion (Fyfanon®)
- Methamidophos (Monitor®)
- Methidathion (Supracle®)
- Methyl parathion (Penncap-M®)
- Naled (Dibrom®)
- Oxydemeton-methyl (MSR®)
- Phorate (Thimet®)
- Phosmet (Imidan®)
- Profenofos (Curacron®)

Nerve agent chemical weapons such as Sarin, Soman, Tabun, and VX are also organophosphates and should be treated accordingly.

**Basic Life Support**

- Initiate HAZMAT Alert if indicated
- Wear protective clothing including masks, gloves, and eye protection
- Toxicity to ambulance crew may result from inhalation or topical exposure
- Remove all clothing and contain run-off of toxic chemicals when flushing
- Supplemental 100% oxygen

**Advanced Life Support**

- Full ALS Assessment and Treatment
- If signs of severe toxicity, (severe respiratory distress, bradycardia, heavy respiratory secretions – do not rely on pupil constriction to diagnose or to titrate medications):
  - Atropine 2 mg IV every 5 min; titrate dosing by assessing improvement in respiratory/bronchial secretions
- For hypotension (systolic BP < 90 mmHg) not improved by fluid boluses, or when fluid boluses are contraindicated:
  - Dopamine infusion at 5-20 mcg/kg/min titrated to maintain systolic BP > 90 mm Hg
- If any of the following conditions occur, refer to the appropriate protocols:
  - Altered Mental Status
  - Seizures

*Contact Medical Control for Additional Orders if Needed*
# Overdose and Poisonings

## Antipsychotics/Acute Dystonic Reaction
Example of commonly used medications that may result in acute dystonic reactions:
- Haloperidol
- Prolixin
- Thorazine
- Prochlorperazine (Compazine)
- Promethazine (Phenergan)
- Ziprasidone (Geodon)

## Advanced Life Support
- Full ALS Assessment and Treatment
- For Dystonic reactions administer Diphenhydramine (Benadryl) 1 mg/kg IV (Max. 50 mg)
  - May be administered IM if no IV access available

## Beta Blocker Toxicity
Examples of commonly used Beta-Blocker medications:
- Atenolol (Tenormin)
- Corzide (Nadolol/bendroflumethlazide)
- Esmolol (Brevibloc)
- Inderide (Propranolol/HCTZ)
- Inderide LA (Propranolol/HCTZ)
- Labetolol (Trandate)
- Lopressor HCT (Metoprolol/HCTZ)
- Metroprolol (Lopressor)
- Nadolol (Corgard)
- Propranolol (Inderal)
- Tenoretic (Atenolol/Chlorthalidone)
- Timolide (Timolol/HCTZ)
- Timolol (Blocadren)
- Ziac (Bioprolol/HCTZ)

## Advanced Life Support
- Full ALS Assessment and Treatment
- For patients with cardiovascular toxicity, defined by:
  - SBP < 90 mm Hg
  - Altered mental status
  - Bradycardia
  - 2nd or 3rd degree heart blocks
  - Administer the following agents:
    - NS 250 ml boluses IV
    - If no response, Atropine 0.5 mg IV
      - Repeat every 3 minutes as needed (Maximum 3 mg)
    - Glucagon 5 mg IV
  - If vomiting occurs after Glucagon, administer Ondansetron (Zofran), 4 mg slow IV or 4 mg Oral Disintegrating Tablet (ODT) by mouth
  - If no response, begin Transcutaneous Pacing

*Contact Medical Control for Additional Orders if Needed*

Authorization Date: 9/4/2013
Overdose and Poisonings

**Calcium Channel Blockers**
Examples of commonly used Calcium Channel Blocker medication:
- Amlodipine (Norvasc)
- Nifedipine (Procardia, Adalat)
- Felodipine (Plendil, Renedil)
- Verapamil (Calan)
- Isradipine (DynaCirc)
- Diltiazem (Cardizem)
- Nicardipine (Cardene)

**Advanced Life Support**
- Full ALS Assessment and Treatment
- For patients with cardiovascular toxicity, defined by:
  - SBP < 90 mm Hg
  - Altered mental status
  - Bradycardia
  - 2nd or 3rd degree heart blocks
- Administer the following agents:
  - NS 250 ml boluses IV
  - Atropine 0.5 mg IV
    - Repeat every 3 minutes as needed (Maximum 3 mg)
  - If no response, Calcium Chloride 1 gram IV
    - Contraindicated if patient taking digoxin (Lanoxin)
  - If no response, may repeat Calcium Chloride 1 gram IV
  - If no response, Glucagon 5 mg IV
  - If vomiting occurs after Glucagon, administer Ondansetron (Zofran), 4 mg slow IV or 4 mg Oral Disintegrating Tablet (ODT) by mouth
  - If no response, begin transcutaneous pacing

**Carbon Monoxide**

**Basic Life Support**
- Remove the patient from the contamination source
- Supplemental 100% oxygen; document time oxygen started

**Advanced Life Support**
- Full ALS Assessment and Treatment
- For smoke inhalation patients also consider Cyanide poisoning (see Hazardous Material-Basic Approach protocol)
Overdose and Poisonings

Clonidine (Alpha-2 Adrenergic agonist) Overdose
Example of commonly used alpha-2 adrenergic agonists:
• Clonidine (Catapres)
  • Imidazoline

Advanced Life Support
• Full ALS Assessment and Treatment
• Toxidrome includes central nervous system depression, bradycardia, hypotension, respiratory depression, and small pupil size. For severe central nervous system or respiratory depression:
  • *Naloxone* (Narcan) 2 mg IV (start at 0.4 mg for patients over 65 years old)
  • *Naloxone* (Narcan) can be given in 0.4 mg increments, titrated to mental status and respiratory drive (monitor respiratory status with continuous capnography)
  • If respiratory depression persists, repeat every 3 minutes to a maximum of 8 mg
  • If IV access has not been established, *Naloxone* (Narcan) can be given IM or via Mucosal Atomizer Device

Cocaine and Sympathomimetic Overdose

Advanced Life Support
• Full ALS Assessment and Treatment
• For patients with sympathomimetic toxidrome (hypertension, tachycardia, agitation):
  • *Midazolam* (Versed) 5 mg IM or intranasal via MAD OR 2.5 mg IV
    • Repeat *Midazolam* (Versed) 5 mg IM or intranasal via MAD OR 2.5 mg IV if adequate sedation not achieved on initial dose
  • If seizures occur, refer to Seizure Protocol

Tricyclic and Tetracyclic Antidepressant Overdose

Advanced Life Support
• Full ALS Assessment and Treatment
• If wide QRS complex (≥0.10 sec), hypotension, or any arrhythmias:
  • *Sodium Bicarbonate* 1 mEq/kg IV
    • Repeat *Sodium Bicarbonate* 1 mEq/kg IV in 5 to 10 minutes
  • For hypotension (systolic BP < 90 mmHg) not improved by fluid boluses, or when fluid boluses are contraindicated:
    • *Dopamine* infusion at 5-20 mcg/kg/min titrated to maintain systolic BP > 90 mm Hg
  • If any of the following conditions occur, refer to the appropriate protocols:
    • Polymorphous Ventricular Tachycardia
    • Altered mental status
    • Seizures

☆ Contact Medical Control for Additional Orders if Needed
Pain Management - Adult

Basic Life Support

• Assess baseline pain level (0-10 scale, 0 = No pain, 10 = Worst pain)

Advanced Life Support

Analgesic agents may be administered under standing orders for patients experiencing severe pain from any one of the following:

• Isolated extremity injury:
  • Fractures/dislocations of the shoulder and upper extremity
  • Fractures/dislocations of the hip and lower extremity
  • Animal bites or envenomations to the extremities
• Burn without airway, breathing, or circulatory compromise
• Sickle cell crisis with pain that is typical for that patient’s disease
• Dental pain
• Severe back pain
• Acute chest pain, in accordance with Chest Pain protocol
• Kidney stone highly suspected, in accordance with Abdominal Pain protocol

Agents for pain control

• Fentanyl (Sublimaze) 1 mcg/kg (maximum 50 mcg) slow IV; repeat once after 5 minutes as needed (maximum 100 mcg total dose) OR 100 mcg intranasal via MAD (divide dose equally between nostrils)
• Contraindicated if systolic blood pressure < 90 mmHg
• Preferentially use intranasal delivery via MAD for those where IV access may be difficult to obtain in a timely fashion (extremity burns/injuries) or not indicated for chief complaint (stable dental or back pain)
• After each drug dosage administration:
  • Reassess the patient’s pain
  • Note adequacy of ventilation and perfusion
  • Assess vital signs
  • Monitor oxygen saturation & end-tidal CO2
Police Custody/Patient Care Standards

When called to a scene to assess a person in police custody perform all assessments and treatment consistent with the standards set for the typical, non-detained patient. EMS personnel are not equipped to perform formal medical clearance for patients in police custody prior to jail transport.

- After assessing the patient, and treating any obvious conditions, transport to the ED should be offered in a manner consistent with the OCEMS General Guidelines
- If the detained patient refuses transport, execute a standard refusal process as detailed in protocol
- Advise the Law Enforcement Officer (LEO) of the patient’s decision, and if all criteria are met, release the patient to the LEO
- If the patient does not meet refusal criteria, advise the LEO that transport is indicated and coordinate a safe transport of the detained patient in accordance with agency SOPs
- If the LEO requests EMS transport in a scenario where the patient has refused, comply with the LEO’s request and transport the patient to the nearest appropriate ED
- In scenarios where a LEO is unwilling to allow transport of a detained patient after EMS personnel have determined transport is indicated (i.e. requested transport, obvious medical necessity or not a candidate for refusal) adhere to the following:
  - Assure that the LEO understands transport is indicated and that medical clearance prior to incarceration is not a process performed by EMS
  - Contact Medical Control for further input and assistance as needed
  - If unable to resolve the issue, defer to the officer’s legal authority to retain custody of the patient
  - Document the interaction well, including the law enforcement agency and officer involved

Taser

For patients who have been controlled by law enforcement using a Taser device; also refer to any protocol that applies to underlying conditions (e.g. behavioral emergencies, cocaine/sympathomimetic toxicity, etc).

Basic Life Support

- Confirm scene safety with law enforcement
- Turn patient supine if found in a prone position
- Secure the Taser prongs in place if not removed by law enforcement
  - Do not remove the prongs if lodged in the patient and left in place by law enforcement unless there is interference with important patient care measures

Contact Medical Control for Additional Orders if Needed
Police Custody/Patient Care Standards

**Advanced Life Support**

- If the patient requires Chemical or Physical restraints perform Full ALS Assessment and Treatment
- For patients with severe agitation resulting in interference with patient care or patient/crew safety, or for patients who continue to struggle against physical restraints refer to the Behavioral Emergencies protocol
- Transport patient supine or lateral recumbent position only
  - *Patient transport in the prone position is contraindicated*

**DUI Blood Draw**

In accordance with Florida Statute 316.1933, law enforcement officers are authorized to use reasonable force if necessary to obtain a DUI blood test from a driver involved in a motor vehicle collision resulting in death or serious bodily injury. *Paramedics are authorized to act on a LEO’s request for a blood draw, regardless of patient consent, provided there is no delay in patient care and/or transport.*

When asked to draw blood for this purpose, use the DUI blood kit provided by the officer. These scenarios are considered patient encounters, and all EMS documentation requirements and protocols are to be observed.
Refusal of Medical Care

General Guidelines for Patient Refusal of Treatment and/or Transport

- A patient shall be considered any person who is requesting and/or in need of medical attention or medical assistance of any kind
- All patients shall be assessed and offered transport by ambulance to the nearest appropriate hospital, regardless of the nature of the complaint
- In the event a patient, or their custodian, refuses transport to the hospital, a properly executed refusal process must be completed

To provide "informed refusal of medical care" a person must be one of the following:

- ≥ 18 years of age
- A court emancipated minor
- A legally married person of any age
- An unwed pregnant female < 18 yo, when the medical issue relates to her pregnancy
- A parent (of any age) on behalf of their child when the refusal of care does not put the child at risk
- Other relatives who may refuse care on behalf of a minor when parent unavailable:
  - Step-parent
  - Grandparent
  - Adult sibling
  - Adult aunt or uncle
- Consider Medical Control contact in cases when the parent cannot be contacted
- Assure patients understand the risks of refusal, which may include death or disability

Assessing Decision Making Capacity

Decision making capacity is a clinical judgment that must be made, and documented, on every refusal. Many conditions can alter decision making capacity, including intoxication, poisoning, hypoxia, closed head injuries, stroke and psychiatric disease. When conducting the assessment, take the patient's normal baseline into account. The goal is to be reasonably certain the patient can make an informed decision at the time they refuse EMS care or transport.

- In addition to vital signs, all of the following must be assessed and documented:
  - **Orientation:** All patients undergoing the refusal process must be awake, alert and oriented to time, person, place and situation. Even if the patient is at their baseline, failure at this step necessitates transport, or involvement of a surrogate.
  - **Gait and/or Coordination:** Staggering gait, or inability to stand and ambulate may indicate an impairment that alters decision making capacity.
  - **Speech Pattern:** Slurred, incoherent or otherwise inappropriate speech patterns may indicate an impairment that alters decision making capacity.
  - **Insight & Judgment:** Determine if the patient expresses good insight into the nature of their condition, and conveys a reasonable plan to deal with their condition.
  - **Evidence of Psychiatric Decompensation:** Determine if the patient is experiencing suicidal or homicidal thoughts. Assess for hallucinations or other forms of delusional behavior. Assess speech for signs of thought disorder.

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Refusal of Medical Care

Medical Incapacitation

When it is determined that a patient’s decision making capacity is impaired the patient shall be deemed *medically incapacitated* and should be transported to the hospital for further assessment and treatment.

- When a patient is deemed medically incapacitated, paramedics are authorized to transport against the patient’s will, using no unreasonable force
- Contact Medical Control if questions about medical incapacitation arise
- Refer to Florida Statute 401.445 for more details

Pediatric Refusals

In the event of a pediatric refusal, the assessment lies in the decision making capacity of the parent or custodian, taking into consideration the well being of the child. The goal is to be reasonably certain the parent or custodian can make an informed decision at the time they refuse EMS care or transport. The following scenarios require Medical Control contact prior to completing the refusal process:

- Refusals involving patients *less than 6 months old*
- Pediatric refusals where significant vital sign abnormalities are present

- In the event a parent or custodian refuses medical care for a minor when there is reasonable concern that the decision poses a threat to the well being of the minor:
  - Contact Medical Control for physician input
  - Enlist the aid of law enforcement personnel for patient and crew safety
  - If an immediately life threatening condition exists, transport the patient to the nearest appropriate emergency department

Refusal of Transport After ALS Initiated

Contact Medical Control for refusal situations that arise after advanced life support has been initiated.

- Exception to this requirement are:
  - Bronchospasm resolved after nebulizer treatment (see page 56)
  - Insulin induced hypoglycemia-resolved after glucose or glucagon administration (see page 56)
Refusal of Transport After Treatment Given

**Bronchospasm Resolved After Nebulizer Treatment**

After treatment of bronchospasm, and return to an asymptomatic state, some patients will refuse transport to the hospital. The following items should be accounted for and included in the assessment and documentation:

- The presentation is consistent with a mild exacerbation of asthma
- No severe dyspnea at onset
- Not initially hypoxic (oxygen saturation < 90%)
- No pain, fever or hemoptysis
- Significant improvement after a single nebulizer treatment, with complete resolution of symptoms
- Vital signs within normal limits after treatment given (BP, pulse, respiratory rate, end-tidal carbon dioxide, and oxygen saturation)

**Insulin Induced Hypoglycemia-Resolved**

This protocol applies only to *Insulin dependant* diabetic patients who are refusing hospital transport after the resolution of insulin-induced hypoglycemia by the administration of oral glucose, intravenous dextrose, or intramuscular glucagon. After correction of blood sugar and return to an asymptomatic state, some patients will refuse transport to the hospital. The following items should be accounted for and included in the assessment and documentation:

- The patient is on Insulin only (*does not take oral diabetes medication*)
- The presentation is consistent with hypoglycemia:
  - Rapid improvement, and complete resolution of symptoms, after correction of blood sugar
  - Vital signs within normal limits after correction of blood sugar (BP, pulse, respiratory rate, oxygenation, and blood sugar > 70)
  - There is no indication of an intentional overdose or dosing error

- Additional patient safety measures that should be considered:
  - A family member or caregiver should be available to stay with the patient and assist if a relapse occurs
  - Assure the patient understands transport has been offered, and subsequently refused
  - Inform the patient to follow-up with their physician as soon as possible to recontact 911 if symptoms re-occur
  - If the above items are accounted for, a properly executed refusal can be accepted from the patient or custodian without contacting Medical Control


Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Refusal of Medical Care/Transport Checklist

☐ Patient/Custodian is awake, alert and oriented to person, place, time and events

☐ Patient/Custodian is not exhibiting signs or symptoms of a medical condition that may impair their capacity to make an informed decision:
  • Does not appear intoxicated, or under the influence of any substance that would impair their ability to make an informed decision

☐ Gait and coordination are apparently normal, or at baseline

☐ Speech is clear and appropriate, or at baseline

☐ Expresses good insight into the nature of their condition, and has a plan to deal with the problem

☐ Patient is not exhibiting evidence of a psychiatric decompensation:
  • No suicidal or homicidal thoughts or actions
  • No delusions, hallucinations, or bizarre behavior

☐ Patient/Custodian has been advised of the risks of refusing transport to the hospital or specific treatments offered (including permanent disability and death when appropriate)

☐ Patient/Custodian understands and accepts the risks of refusal

☐ Patient/Custodian understands to re-contact 911 should he/she change their mind and desire transportation to the hospital

☐ Patient/Custodian has been advised to contact their primary care physician, or otherwise seek medical attention, as soon as possible

☐ If indicated in the protocol, Medical Control contact was made

Patient Name (Print): ______________________________________________________

Patient Signature: _________________________________________________________

If patient is a minor, obtain the following:

Parent or Custodian Name (print): ___________________________________________

Parent or Custodian Signature: ______________________________________________

Contact Medical Control for Additional Orders if Needed
Sedation / Sedative Agent Use

It is not always possible to predict how patients will respond to receiving a sedative medication. This protocol is to be used in conjunction with any protocol that involves the use of medication which may result in sedation. Authorized medications that may result in sedation are Fentanyl, Midazolam/Diazepam, Ziprasidone, and Diphenhydramine.

Minimal sedation

A drug induced state in which patients respond normally to verbal commands. Although cognitive function and coordination may be impaired, ventilatory and cardiovascular functions are unaffected.

Moderate sedation

A drug-induced depression of consciousness during which patients respond purposefully to verbal commands, either alone or accompanied by light tactile stimulation. Airway patency, spontaneous ventilations, gag reflex and cardiovascular function are maintained.

Deep sedation

A drug induced depression of consciousness, during which patients cannot be easily aroused but respond purposefully after repeated or painful stimulation. The ability to independently maintain ventilatory function may be impaired. Patients may require assistance in maintaining a patent airway and spontaneous ventilations may be inadequate.

Sedative agent use should ideally result in minimal or moderate sedation only.

Advanced Life Support

• Continuously monitor the following:
  • Patency of airway
  • Vital signs
  • Oxygen saturation and capnography
  • Cardiac rhythm
  • Level of consciousness and ability to follow commands
• Assure that appropriate equipment and personnel are immediately available for care and resuscitation if problems arise
• Document of the indications for sedation

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Seizure

**Basic Life Support**
- Supplemental 100% oxygen if active seizures
- Nasal cannula is sufficient if no active seizures and no respiratory signs or symptoms
- Protect patient from injury

**Advanced Life Support**
- Full ALS Assessment and Treatment
- Blood glucose measurement
  - If < 70 mg/dL, treat per Altered Mental Status/Hypoglycemia Protocol
- For active seizures do NOT delay treatment to obtain intravenous access, begin with IM dose unless IV is already established
- Administer Midazolam (Versed) 5 mg IM or intranasal via MAD OR 2.5 mg IV
  - If seizures continue or re-occur repeat Midazolam (Versed) 5 mg IM or intranasal via MAD OR 2.5 mg IV; wait at least 5 minutes from initial dose
  - If hypoxic seizures, drug induced seizures, seizures from head trauma, stroke or eclampsia suspected treat as above and refer to appropriate protocol for further care
- If patient becomes combative or agitated in the post-ictal state (after seizure resolution)
  - Apply physical restraints as needed to ensure patient/crew safety (only as directed in Behavioral Emergencies protocol)
- If chemical restraints are required:
  - Midazolam (Versed) 5 mg IM or intranasal via MAD OR 2.5 mg IV (total maximum dose including treatment for seizures is 10 mg IM/intranasal or 5 mg IV)
  - Do NOT treat with Ziprasidone (Geodon), use is contraindicated in these patients
  - Contact Medical Control for further orders

**Diazepam rectal gel (Diastat®)**
Some patients with a diagnosed seizure disorder will have their own Diazepam rectal gel (Diastat®) prescribed by their physician. When available, Diastat can be given if no IV is available. Use the patients prescribed dose or refer to the table below. If an IV is readily available, Midazolam (Versed) is the preferred medication.

<table>
<thead>
<tr>
<th>Weight (kg)</th>
<th>Dose (lbs)</th>
<th>58-111</th>
<th>167-244</th>
</tr>
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<tbody>
<tr>
<td>14-27</td>
<td>30-60</td>
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<tr>
<td>28-50</td>
<td>61-111</td>
<td>10</td>
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<tr>
<td>51-75</td>
<td>112-166</td>
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</tr>
<tr>
<td>76-111</td>
<td>167-244</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Sepsis

Sepsis is a rapidly progressing, life threatening condition due to systemic infection. Sepsis must be recognized early and treated aggressively to prevent progression to shock and death. Sepsis can be identified when the following markers of the Systemic Inflammatory Response Syndrome (SIRS) are present in a patient with suspected infection:

- Temperature > 38° C (100.4° F) OR < 36° C (96.8° F)
- Respiratory Rate > 20 breaths/min
- Heart Rate > 90 beats/min

In addition to physiologic markers of SIRS, severe sepsis may cause hypoxia and inadequate organ perfusion, resulting in metabolic acidosis marked by elevated blood lactate levels and decreased ETCO2 levels (measured by capnography)

Sepsis Alert

The purpose of a Sepsis Alert is to provide pre-arrival Emergency Department notification in order to facilitate rapid assessment and treatment of a suspected severe sepsis patient.

A Sepsis Alert will be instituted for patients meeting the following 3 criteria:

1. Suspected infection
2. Two or more of the following:
   - Temperature > 38° C (100.4° F) OR < 36° C (96.8° F)
   - Respiratory Rate > 20 breaths/min
   - Heart Rate > 90 beats/min
3. ETCO2 ≤ 25 mmHg OR Lactate > 4 mMol

Basic Life Support

- Supplemental 100% Oxygen

Advanced Life Support

- Full ALS Assessment and Treatment
- Notify hospital of incoming Sepsis Alert prior to arrival
- IV 0.9% NaCl en route
  - Administer 250 ml boluses until systolic BP > 90 mmHg
  - Total amount of IVF should not exceed 2000 ml
  - Boluses may be given in rapid succession if systolic remains < 90 mmHg
- If systolic BP remains < 90 mmHg after 4th fluid bolus (1000 ml):
  - Dopamine infusion at 5-20 mcg/kg/min titrated to maintain systolic BP > 90 mm Hg
Shock

Shock is defined as a state of inadequate organ perfusion and tissue oxygenation. It is evidenced by the presence of any of the following signs and symptoms:

- Hypotension
- Narrow pulse pressure
- Tachypnea
- Tachycardia
- Delayed capillary refill
- Mottled skin appearance
- Diaphoresis
- Cool clammy skin
- Pallor
- Altered mental status

Signs and symptoms vary depending upon the stage of shock, which may be compensated (normal perfusion maintained) or decompensated (unable to maintain normal perfusion).

Categories of shock

- **Obstructive shock**: Caused by an obstruction that interferes with return of blood to the heart. Examples include tension pneumothorax, cardiac tamponade, and massive pulmonary embolus.
- **Hypovolemic shock**: Caused by decreased blood or water volume. Hypovolemic shock may be hemorrhagic or non-hemorrhagic.
- **Distributive shock**: Caused by abnormal distribution of blood resulting from vasodilation, vasopermeability or both. Distributive shock may result from anaphylactic reactions (anaphylactic shock), sepsis (septic shock), or spinal cord injury (neurogenic shock).
- **Cardiogenic shock**: Cardiogenic shock is a result of cardiac pump failure, usually caused by severe Left Ventricular failure. May result due to massive MI.

Perform the following in conjunction with protocols that apply to the specific etiology of the shock state (e.g. allergic reaction, sepsis, STEMI, trauma, etc.):

**Advanced Life Support**

- Full ALS Assessment and Treatment
  - Record & monitor continuous O2 saturation and microstream capnography
- Do not delay transport for IV insertion
- IV 0.9% NaCl en route
  - Administer 250 ml boluses until systolic BP > 90 mmHg
  - Total amount of IVF should not exceed 2000 ml (1000 ml for chest trauma)
  - Boluses may be given in rapid succession if systolic remains < 90 mmHg
- If systolic BP remains < 90 mmHg after 4th fluid bolus (1000 ml):
  - Dopamine infusion at 5-20 mcg/kg/min titrated to maintain systolic BP > 90 mm Hg
Spinal Immobilization - Indications

Determining the need for spinal immobilization requires a careful assessment of the patient’s:

- Mechanism of injury
- Mental status and ability to recognize the presence of spinal injury symptoms
- Physical complaints and overall condition

The following algorithms (Blunt and Penetrating Trauma) can be used to assist paramedics in making the most appropriate decision about the need for spinal immobilization.

Blunt Trauma with Concerning Mechanism of Injury

Concerning mechanism of injury defined as:
- Any mechanism that produces a violent impact on the head, neck, torso or pelvis
- Incidents that produce sudden acceleration or deceleration, including lateral bending forces
- Any fall, especially in the elderly
- Ejection or fall from a moving mode of transportation

Immobilize if any of the following exist:
- Altered level of consciousness or inability to communicate:
  - Abnormal GCS
  - Evidence of significant intoxication
  - Dementia
  - Speech or hearing impairment
  - Age (young children)
  - Language barrier
- Complaints suggestive of spinal injury:
  - Spinal pain or tenderness, including paraspinal musculature
  - Neurologic deficit or complaint, including parasthesia, paralysis or weakness
  - Anatomical deformity of the spine
- Distracting Injuries:
  - Long bone fractures
  - Joint dislocations
  - Abdominal or thoracic pain, or obvious visceral injury
  - Large lacerations, degloving injuries or crush injuries
  - Serious burns
  - Any injury producing acute functional impairment

❖ IF IN DOUBT, IMMOBILIZE ❖

Contact Medical Control for Additional Orders if Needed
# Spinal Immobilization - Indications

## Penetrating Trauma

**Immovilize if any of the following exist:**
- Altered level of consciousness
- Any neurological deficits* or complaints
  - Test motor function in both upper and lower extremities (entire extremity)
  - Test sensation in both upper and lower extremities (start proximal and work towards hands and feet)
  - Ask about numbness or tingling in extremities

* Examples are numbness, focal weakness, focal sensory deficit, parasthesias. Identifying the presence of neurological signs and symptoms requires careful assessment and history taking.

 IF IN DOUBT, IMMobilize

## Other Situations

- Spinal precautions can be maintained by application of a cervical collar and securing patient firmly to the stretcher *without* a long backboard if all 4 of these criteria are met:
  - Patient is ambulatory at the scene
  - Patient does not demonstrate an altered level of consciousness or inability to communicate
  - Patient does not have complaints suggestive of spinal injury
  - Patient does not have distracting injuries

- Immobilize all patients with the following conditions:
  - High voltage electrical injuries (does not include Taser use)
  - Shallow water drowning or diving injuries

- If spinal immobilization is indicated but refused by the patient:
  - Advise the patient of the indication for immobilization, and the risks of refusing the intervention
  - If the patient allows, apply the cervical collar even if backboard is refused
  - Maintain spinal alignment as best as can be achieved during transport
  - Clearly document refusal of immobilization

- If spinal immobilization is indicated but the patient cannot tolerate supine position:
  - Apply all elements of spinal immobilization that the patient will tolerate
  - Maintain spinal alignment as best as can be achieved during transport
  - Clearly document the clinical condition that interfered with full immobilization

Contact Medical Control for Additional Orders if Needed
Spinal Immobilization - Indications

BLUNT TRAUMA
(with concerning mechanism of injury)

YES

Altered level of consciousness or inability to communicate

YES

Any of the following?
• Spinal pain or tenderness
• Neurological symptoms
• Anatomical deformity of spine

YES

Distracting Injuries?
• Fractures/dislocations
• Serious soft tissue injuries or burns

YES

IMMOBILIZE

NO

Immobilization not indicated

NO

1. Includes significant intoxication, dementia, speech or hearing impairment, age (young children), language barrier

2. Examples are numbness, focal weakness, focal sensory deficit, parasthesias
Spinal Immobilization - Indications

1. Includes unconsciousness, significant intoxication, dementia, etc.
2. Examples are numbness, focal weakness, focal sensory deficit, parasthesias
Stroke - Suspected

Whenever operationally feasible, Stroke Alert patients should be transported to a Comprehensive Stroke Center. If distance is excessive, or resources are limited, transport to a Primary Stroke Center is an acceptable alternative.

Central Florida Stroke Centers:
- Florida Hospital-Orlando (Comprehensive)
- Dr. P. Phillips Hospital (Primary)
- Florida Hospital East (Primary)
- Health Central Hospital (Primary)
- Orlando Regional Medical Center (Primary)
- Osceola Regional Medical Center (Primary)

Basic Life Support
- Supplemental oxygen via nasal cannula only if O2 saturation < 95%
- Keep head of stretcher at 30-45° elevation (unless spinal trauma suspected)
- If spinal immobilization is indicated, elevate head of backboard 15°-30°
- Give nothing by mouth

Advanced Life Support
- Full ALS Assessment and Treatment
- For hypotension (systolic BP < 90 mmHg) not improved by fluid boluses, or when fluid boluses are contraindicated
  - Dopamine infusion at 5-20 mcg/kg/min titrated to maintain systolic BP > 90 mm Hg
- If hypoglycemic (Blood glucose <50mg/dL for stroke):
  - Dextrose 50% 25 gm slow IV
  - If the patient appears malnourished administer Thiamine 100 mg IV
  - If no IV available:
    - Glucose paste or other oral glucose containing agent (e.g. orange juice) if patient alert enough to self administer oral agent
    - If unable to take oral glucose administer Glucagon 1 mg IM
- Complete Stroke Alert Screen (see following page):
  - If ALL of the following criteria are met initiate Stroke Alert:
    - The patient has no evidence of trauma
    - The stroke symptoms are new, and onset ≤ 5 hours
    - The initial blood glucose is ≥ 50
    - The patient currently has an abnormal Stroke Examination
  - If patient meets Stroke Alert criteria immediately notify the receiving Stroke Center
  - Report the last time seen normal and note if patient is on anticoagulants (coumadin, etc)
  - If patient does not meet Stroke Alert criteria, transport to closest appropriate facility
  - If seizures occur, refer to seizure protocol

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
**Stroke - Suspected**

<table>
<thead>
<tr>
<th>Stroke Alert Screen (if all items &quot;YES&quot;, initiate Stroke Alert)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Screening Item</strong></td>
</tr>
<tr>
<td>Absence of Trauma</td>
</tr>
<tr>
<td>Stroke Symptoms ≤ 5 Hours</td>
</tr>
<tr>
<td>Initial Glucose ≥ 50</td>
</tr>
</tbody>
</table>

*Abnormal* Stroke Exam (Below)

If any screening item is "NO", do not initiate Stroke Alert

<table>
<thead>
<tr>
<th>Stroke Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Facial Asymmetry:</strong></td>
</tr>
<tr>
<td>• Have patient smile or grimace</td>
</tr>
<tr>
<td>• Observe for facial weakness or droop</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Arm Drift:**

• Have the patient hold arms straight out and close eyes
• Observe for inability to keep arms at same level

□ **NORMAL** (Both arms held at same level)
□ **RIGHT ARM DRIFTS DOWN**
□ **LEFT ARM DRIFTS DOWN**

**Speech:**

• Have the patient repeat a sentence
• "You can teach an old dog new tricks"
• Observe for the ability to say words clearly and appropriately

□ **NORMAL** (Clear and appropriate)
□ **SLURRED SPEECH**
□ **INAPPROPRIATE WORDS**
□ **UNABLE TO SPEAK**

Do not initiate Stroke Alert if all Stroke Exam items are NORMAL

Document the time of symptom onset (or last time witnessed without deficit), as well as a name and telephone contact number for a relative who can assist with medical decision making and additional history

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Syncope

**Basic Life Support**
- Supplemental oxygen

**Advanced Life Support**
- Full ALS Assessment and Treatment
- For hypotension (systolic BP < 90 mmHg) not improved by fluid boluses, or when fluid boluses are contraindicated
  - *Dopamine* infusion at 5-20 mcg/kg/min titrated to maintain systolic BP > 90 mm Hg
- Check blood glucose level
  - If < 70 mg/dL, treat per Altered Mental Status/Hypoglycemia Protocol
- If ECG rhythm is bradycardia, heart block, or dysrhythmia, see specific protocol
- If Altered Mental Status persists, or if Acute Stroke suspected refer to appropriate protocol
Trauma Transportation

Dispatch / Joint Response / Mutual Aid Procedures:
Each agency has individual Standard Operating Guidelines (SOG’s) pertaining to dispatch, joint response and mutual aid. The filing of these procedures with the State is the responsibility of each agency at the time of licensure renewal.

Adult & Pediatric Trauma Alert Procedure:
• Assess the trauma patient and determine the need for transportation to the State Approved Trauma Center (SATC) using the adult or pediatric trauma criteria:
  • A "Trauma Alert" is to be initiated immediately when an adult or pediatric trauma patient is determined to meet the adult or pediatric trauma alert criteria
  • Patients meeting Trauma Alert criteria will be transported to the nearest available SATC
  • All Trauma Alert patients ≤ 15 years of age will be transported to the Level I Pediatric Trauma Center at Arnold Palmer Children’s Hospital
• Once a Trauma Alert has been initiated, contact the receiving facility and provide initial notification that a Trauma Alert patient will be transported, or is en route:
  • Give agency name and unit number, paramedic/EMT number, incident location, brief description of injury and estimated time of arrival
  • Be specific as to the actual Trauma Alert criteria when possible
  • Use the term "Trauma Alert" to avoid any confusion
• When en route, the transporting crew will re-contact the SATC and provide a full radio report, as outlined in the Radio Report Format section
• The transporting agency will provide a completed Patient Care Report to the hospital staff upon delivery of patient to the SATC, or other appropriate facility
• All medical care will be provided in accordance with condition specific protocols or Medical Control orders
• Trauma Alert patients may also be transported to the nearest emergency department (other than a State Approved Trauma Center) when the following conditions exist:
  • Cardiac arrest on initial patient assessment following trauma
  • Unmanageable airway emergencies
  • Logistical failures that make transport to SATC impossible

Transport Mode
• The route (air or ground) that enables the patient to arrive at the trauma center in the shortest time shall be used
• **Traumatic cardiac arrest is a contraindication to initiating helicopter transport**
  • An exception to this principle is when the arrest occurs during the transition of the patient to the helicopter (this may include transport in a ground unit to the landing zone)
Trauma

Central Florida State Approved Trauma Centers

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Level</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orlando Regional Medical Center</td>
<td>Level I</td>
<td>Orlando</td>
</tr>
<tr>
<td>Arnold Palmer Children’s Hospital</td>
<td>Level I</td>
<td>Orlando</td>
</tr>
<tr>
<td>Shand’s Health Care</td>
<td>Level I</td>
<td>Gainesville</td>
</tr>
<tr>
<td>Tampa General Hospital</td>
<td>Level I</td>
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<td>Lakeland Regional Medical Center</td>
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<td>Melbourne</td>
</tr>
<tr>
<td>Halifax Medical Center</td>
<td>Level II</td>
<td>Daytona</td>
</tr>
</tbody>
</table>

List of alternative facilities in Central Florida:

- Central Florida Regional Hospital
- Dr. P. Phillips Hospital
- Florida Hospital Altamonte
- Florida Hospital Apopka
- Florida Hospital East Orlando
- Florida Hospital Kissimmee
- Florida Hospital Orlando
- Florida Hospital Waterman
- Florida Hospital Celebration Health
- Florida Hospital Winter Park
- Health Central Hospital
- Osceola Regional Hospital
- Nemours Children’s Hospital
- South Lake Hospital
- South Seminole Hospital
- St. Cloud Hospital

Emergency Interfacility Transfer of Trauma Victims

Patients may occasionally require emergency interfacility transfer from an outlying hospital to a State Approved Trauma Center (SATC). The decision to initiate this level of interfacility transfer is made by the treating physician at the outlying hospital, in coordination with the accepting physician at the SATC.

When this scenario arises, adhere to the following:

- Assess the patient upon arrival, but avoid unnecessary delays in transport
- Transport to the facility at which a physician has accepted the patient; it is the transferring hospitals responsibility to assure the receiving center has accepted the patient
- If EMS crew members have not received training on, and/or are not capable of managing, devices or medications that must be continued during transport, an adequately trained care provider from the transferring facility must accompany the patient during transport

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
## Trauma

### Adult Trauma Alert Criteria
The presence of any of the 4 listed items below requires Trauma Alert activation:

- 1. Meets color coded triage system (any one RED, or any two BLUE criteria met)
- 2. GCS ≤ 12 (GCS is a stand-alone criteria, even if color coded criteria not met)
- 3. Meets Local Criteria: **High Voltage Electrical Injury (>1000 volts)**
- 4. Patient does not meet any above criteria but, in the judgement of the paramedic, should be transported as a Trauma Alert. Document reason on run report.

<table>
<thead>
<tr>
<th>Component</th>
<th>BLUE Criteria</th>
<th>RED Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airway</td>
<td>Respiratory rate ≥ 30</td>
<td>Active airway assistance&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Circulation</td>
<td>Sustained heart rate ≥ 120</td>
<td>Any of the following:</td>
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<tr>
<td></td>
<td></td>
<td>• Lack of radial pulse with sustained heart rate ≥ 120</td>
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<td></td>
<td>• Blood Pressure &lt; 90 mmHg</td>
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<tr>
<td>Best Motor Response (Glasgow Coma Scale)</td>
<td>BMR of 5</td>
<td>Any of the following:</td>
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<td>• BMR &lt; 4</td>
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<tr>
<td></td>
<td></td>
<td>• Suspicion of spinal cord injury:</td>
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<tr>
<td></td>
<td></td>
<td>• Paralysis</td>
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<tr>
<td></td>
<td></td>
<td>• Loss of sensation</td>
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<tr>
<td>Cutaneous</td>
<td>Any of the following:</td>
<td>Any of the following:</td>
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<tr>
<td></td>
<td>• Soft tissue loss&lt;sup&gt;2&lt;/sup&gt;</td>
<td>• 2nd or 3rd degree burns &gt; 15% TBSA</td>
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<td></td>
<td>• GSW to extremity</td>
<td>• Amputation proximal to wrist or ankle</td>
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<tr>
<td></td>
<td></td>
<td>• Penetrating injury to head, neck or torso&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Long Bone Fracture&lt;sup&gt;4&lt;/sup&gt;</td>
<td>Any of the following:</td>
<td>Fracture or 2 or more long bones&lt;sup&gt;4&lt;/sup&gt;</td>
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<tr>
<td></td>
<td>• Single fracture site due to MVC</td>
<td></td>
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<tr>
<td></td>
<td>• Fall from ≥ 10 feet</td>
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</tr>
<tr>
<td>Age</td>
<td>55 years or older</td>
<td>N/A</td>
</tr>
<tr>
<td>Mechanism of Injury</td>
<td>Any of the following:</td>
<td>N/A</td>
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<tr>
<td></td>
<td>• Ejection from a vehicle&lt;sup&gt;5&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Deformed steering wheel&lt;sup&gt;6&lt;/sup&gt;</td>
<td></td>
</tr>
</tbody>
</table>

<sup>1</sup> Airway assistance beyond administration of oxygen
<sup>2</sup> Major degloving injuries, or major flap avulsion (> 5 in.)
<sup>3</sup> Excluding superficial wounds in which the depth of the wound can be determined
<sup>4</sup> Longbones include humerus, radius-ulna, femur, tibia-fibula
<sup>5</sup> Excluding motorcycle, moped, all terrain vehicle, bicycle, or open body of a pickup truck
<sup>6</sup> Only applies to driver of vehicle
Trauma

General Approach to All Trauma Patients

Immediately assess all trauma patients for Trauma Alert Criteria. If criteria are met, begin transport to state approved trauma center within 10 minutes of arrival on scene whenever possible.

Basic Life Support

- Secure airway/Spinal immobilization if indicated
- Supplemental 100% oxygen if any respiratory symptoms
- Examine patient for obvious bleeding
- Control active bleeding with direct pressure
- Assess Disability – neurologic status/record Glasgow coma score
- Head to toe examination to assess for injuries
- Apply physical restraints if needed to ensure patient/crew safety
- Prevent loss of body heat

Advanced Life Support

- When condition warrants (specified as “Full ALS Assessment and Treatment” in individual protocols):
  - Advanced airway/ventilatory management as needed
  - Perform cardiac monitoring
  - Record & monitor continuous 02 saturation and microstream capnography
  - IV 0.9% NaCl KVO or IV lock
  - If BP < 90 mm Hg systolic, administer boluses of 0.9% NaCl at 250 ml until systolic BP > 90 mm Hg
  - Assess for Tension Pneumothorax
    - Tension pneumothorax should be suspected in patients who exhibit:
      - Severe respiratory distress with hypoxia
      - Unilateral decreased or absent lung sounds (may see tracheal deviation away from collapsed lung field)
      - Evidence of hemodynamic compromise (shock, hypotension, tachycardia, altered mental status)
    - Pleural decompression for tension pneumothorax should only be performed when all 3 of the above criteria are present; If indicated perform pleural decompression at 2nd intercostal space, mid-clavicular line
      - In the setting of traumatic cardiac arrest with suspected chest trauma, consider bilateral pleural decompressions as part of the resuscitation efforts
- Do not delay transport to perform procedures on scene unless immediately needed to stabilize patient (e.g. airway management, hemorrhage control)

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Trauma

Burns-Thermal

**Basic Life Support**
- Remove or cool heat source if present (tar, clothing)
- Cool compress dressings on minor burns with sterile saline (do not use ice packs)
- Dry, sterile burn sheet on:
  - 2° burns greater than 15% of Body Surface Area
  - 3° burns
  - Electrical and chemical burns
- Spinal immobilization if high voltage electrical injuries (>1000 Volts, excluding Taser)

**Advanced Life Support**
- If moderate, severe pain:
  - *Fentanyl* (Sublimaze) 1 mcg/kg (maximum 50 mcg) slow IV; repeat once after 5 minutes as needed (maximum 100 mcg total dose) **OR** 100 mcg intranasal via MAD (divide dose equally between nostrils)
  - Preferentially use intranasal delivery via MAD for those where IV access may be difficult to obtain in a timely fashion
  - Initiate only after BP stabilized
  - Use with caution in inhalation injuries

Chest Injuries

**Basic Life Support**
- Assess breath sounds frequently
- Assess for ventilatory compromise and assist with BVM as needed
- For Open/Sucking Chest wounds, apply occlusive dressing sealed on three sides
  - Remove temporarily to vent air if respiratory status worsens

**Advanced Life Support**
- Full ALS Assessment and Treatment
- Total amount of IVF should not exceed 1000 ml
- Assess for flail segment and tension pneumothorax
- Observe for signs of impending respiratory failure; Refer to the Airway Management Protocol if needed:
  - Hypoxia (O2 Sat <90) not improved by 100% Oxygen
  - Poor ventilatory effort
  - Altered mental status/ decreased level of consciousness
  - Inability to maintain patent airway

*Contact Medical Control for Additional Orders if Needed*
Trauma

Extremity Trauma

Basic Life Support

- Remove or cut away clothing to expose area of injury
- Control active bleeding
- Check distal pulses, capillary refill, sensation/movement prior to splinting
  - If pulse present, splint in position found if possible
  - If pulse absent, attempt to place the injury into anatomical position
- Open wounds/fractures should be covered with sterile dressings and immobilized in the presenting position
- Dislocations should be immobilized to prevent any further movement of the joint
- Check distal pulses, capillary refill, and sensation after splinting
- Isolated lateral patellar dislocations may be reduced according to Orange County EMS Procedural Manual
  - If unable to reduce patellar dislocation after one attempt provide pain management and transport to nearest facility
  - If patellar dislocation successfully reduced, patient MUST be transported to an appropriate destination (may not accept patient refusal after successful dislocation reduction)

Advanced Life Support

- For isolated extremity trauma:
  - Fentanyl (Sublimaze) 1 mcg/kg (maximum 50 mcg) slow IV; repeat once after 5 minutes as needed (maximum 100 mcg total dose) OR 100 mcg intranasal via MAD (divide dose equally between nostrils)
  - Consider pain control only after BP stabilized
- For uncontrollable hemorrhage despite aggressive direct pressure with standard gauze:
  - Refer to Hemorrhage - Life Threatening protocol
- For limbs that remain entrapped despite all other extrication attempts contact ORMC via radio and Med Com to arrange for on-scene medical direction.

Eye Trauma

Basic Life Support

- Stabilize any penetrating objects
- Do not remove any impaled object
- Protective metal shield unless impaled object precludes
- Prevent patient from bending or straining
- If blood observed in anterior chamber, transport with head elevated 60°
Trauma

Head Injuries
Airway interventions can be detrimental in patients with head injury by raising intracranial pressure, worsening hypoxia (and secondary brain injury) and increasing risk of aspiration. Whenever possible, these patients should be managed in the least invasive manner to maintain O2 saturation > 90% (i.e. NRB or BVM, with 100% O2).

Basic Life Support
- Supplemental oxygen
- Restrain as needed
- If Normotensive or Hypertensive elevate head of backboard 15°-30°

Advanced Life Support
- Full ALS Assessment and Treatment
- Advanced airway/ventilatory management as needed
  - Observe for signs of impending respiratory failure; Refer to the Airway Management Protocol if needed
    - Hypoxia (O2 Sat <90) not improved by 100% Oxygen
    - Poor ventilatory effort (increasing ETCO2)
    - Altered mental status/ decreased level of consciousness
    - Inability to maintain patent airway
  - For patients with assisted ventilation administer eucapneic (normal rate 12-15/minute) ventilations with a goal of ETCO2 between 35-40 mmHg
  - Acute herniation should be suspected when the following signs are present:
    - Acute unilateral dilated and nonreactive pupil
    - Abrupt deterioration in mental status
    - Abrupt onset of motor posturing
    - Hyperventilation (ventilatory rate of 20) is a temporizing measure which is only indicated in the event of acute herniation
      - If signs of acute herniation develop, increase ventilatory rate to 20/minute with a goal of ETCO2 between 30-35 mmHg
  - For awake patients experiencing nausea or vomiting administer Ondansetron (Zofran), 4 mg slow IV or 4 mg Oral Disintegrating Tablet (ODT) by mouth
  - For combative patients secondary to head trauma
    - Ensure hypoxia and hypotension are addressed
    - Apply physical restraints if needed to ensure patient/crew safety
    - If severely agitated despite all other efforts: Ziprasidone (Geodon) 10 mg IM if < 60 kg and 20 mg IM if > 60 kg
      - Avoid if history of long QT-syndrome or dementia-related psychosis
    - Inform receiving facility the patient was given sedating medication
    - DO NOT use Midazolam (Versed) or any other benzodiazepine
Trauma

Hemorrhage - Life Threatening

The most effective method to control serious bleeding is direct pressure. If aggressive direct pressure fails to control life threatening hemorrhage proceed as below, in addition to all other applicable advanced life support measures.

Basic Life Support

- Supplemental oxygen
- Direct pressure to bleeding source with standard gauze

Advanced Life Support

- Full ALS Assessment and Treatment
- Advanced airway/ventilatory management as needed
- For uncontrollable hemorrhage despite aggressive direct pressure with standard gauze:
  - Apply a Hemostatic Agent Impregnated Gauze dressing if available (must be approved by the medical director)

Extremity Trauma Only:

- If uncontrollable, life threatening hemorrhage continues after applying Hemostatic Agent Impregnated Gauze, apply one of the following based on availability:
  - A pressure bandage over the hemostatic dressing in accordance with manufacturer’s recommendations
  - A tourniquet device **4-6 inches proximal to bleeding site**
    - Tourniquet must be at least 2 inches wide or an approved commercially available product
    - Do not apply over a joint
    - Tighten tourniquet until bright red bleeding has stopped
- Secure in place and expedite transport to Level I Trauma Center
- Notify receiving center of presence and location of the Emergency Bandage or tourniquet

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Trauma

Sexual Assault

- For victims of sexual assault who meet Trauma Red or Trauma Alert criteria, transport to Orlando Regional Medical Center (ORMC)
- For all other cases, transport to nearest emergency department
- Provide supportive care as indicated by patient’s condition

Traumatic Amputations

Basic Life Support

- If amputation incomplete:
  - Attempt to stabilize with bulky pressure dressing
  - Splint inline
- If amputation complete:
  - Cleanse amputated part with sterile saline
  - Wrap in sterile dressing soaked in sterile saline
  - Place in plastic bag if possible
  - Attempt to cool with cool pack during transport

Advanced Life Support

- For isolated extremity trauma:
  - Fentanyl (Sublimaze) 1 mcg/kg (maximum 50 mcg) slow IV; repeat once after 5 minutes as needed (maximum 100 mcg total dose) OR 100 mcg intranasal via MAD (divide dose equally between nostrils)
    - Initiate only after BP stabilized
- For uncontrollable hemorrhage despite aggressive direct pressure with standard gauze:
  - Apply a Hemostatic Agent Impregnated Gauze dressing if available (must be approved by the medical director)
- If uncontrollable, life threatening hemorrhage continues after applying Hemostatic Agent Impregnated Gauze, apply one of the following based on availability:
  - A pressure bandage over the hemostatic dressing in accordance with manufacturer’s recommendations
  - A tourniquet device 4-6 inches proximal to bleeding site
    - Tourniquet must be at least 2 inches wide or an approved commercially available product
    - Do not apply over a joint
    - Tighten tourniquet until bright red bleeding has stopped
- Secure in place and expedite transport to Level I Trauma Center
- Notify receiving center of presence and location of the Emergency Bandage or tourniquet
General Approach to All Pediatric Patients

The following measures will apply to the management of all pediatric patients:

- **A Child** shall be defined as:
  - **Age ≤ 12 years or weight ≤ 40 kilograms (if age unknown)**
  - **For PALS resuscitation: infant up to puberty**
  - **For Trauma alert: ≤ 15 years**

### Basic Life Support
- Establish patient responsiveness
- Immobilize spine if cervical or other spine injury suspected
- Assess airway and breathing
  - Supplemental 100% oxygen if any respiratory signs or symptoms
- Assess circulation and perfusion by measuring heart rate, and observing skin color, temperature, capillary refill, and the quality of central/peripheral pulses
  - For children with absent pulses initiate cardiopulmonary resuscitation
- Control hemorrhage using direct pressure or a pressure dressing
- Measure BP only in children older than 3 years of age
- Evaluate mental status, including pupil reaction, motor function and sensation
  - For mental status, use the AVPU scale:
    - A- The patient is alert and oriented (age appropriate)
    - V- The patient is responsive to verbal stimulus
    - P- The patient is responsive to painful stimulus
    - U- The patient is unresponsive to any stimulus
- Expose the child only as necessary to perform further assessments
- Maintain the child’s body temperature throughout the examination

### Advanced Life Support
- When condition warrants (specified as “Full Pediatric ALS Assessment and Treatment” in individual protocols):
  - Advanced airway/ventilatory management as needed
  - Perform cardiac monitoring
  - Continuously monitor oxygen saturation and capnography
  - If symptoms severe or for medication access IV 0.9% NaCl KVO or IV lock
  - If signs of shock administer boluses of 0.9% NaCl at 20ml/kg until signs of shock resolve or 60ml/kg total
  - If signs of severe cardiopulmonary compromise and IV attempts unsuccessful in a child < 5 years old, establish intraosseous access
  - If child’s condition is critical or unstable, initiate transport without delay
  - For patients with severe nausea or vomiting:
    - Ondansetron (Zofran), 2 mg (8-15 kg) or 4 mg (>15 kg) oral disintegrating tablet (ODT) by mouth (break 4 mg tablet in half for 2 mg dose)
  - Reassess the patient frequently

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Airway Emergencies – Pediatric Dyspnea

Basic Life Support
- Supplemental 100% oxygen
- If foreign body obstruction is suspected refer to foreign body protocol

Advanced Life Support
- Full Pediatric ALS Assessment and Treatment
- For bronchospasm:
  - *Albuterol* (Proventil) 2.5mg/3ml and *Ipratropium Bromide* 0.02% (Atrovent) 0.5mg/2.5ml via nebulizer over 10-15 minutes
  - Repeat *Albuterol* (Proventil)/*Ipratropium Bromide* (Atrovent) X 2 for continued wheezing
- If patient shows signs of worsening respiratory distress, inadequate ventilation or respiratory failure in the setting of bronchospasm or a history of asthma:
  - *Epinephrine* 1:1,000 at 0.01 mg/kg (max 0.3 mg) IM
    - May repeat *Epinephrine* every 15 minutes X 2 additional doses (3 total) if severe symptoms persist
  - May administer at same time nebulizer is being administered
  - *Methylprednisolone* (Solumedrol) 2 mg/kg IV or IM (Maximum individual dose 125 mg)
  - *Magnesium Sulfate* 50 mg/kg IV over 5-10 minutes; contraindicated if history of renal failure
- If partial upper airway obstruction or stridor without severe respiratory distress:
  - Do nothing to upset the child
  - Perform critical assessments only
  - Have parent administer blow by supplemental oxygen
  - Place patient in position of comfort
  - Do not obtain vascular access
  - Expedite transport
- If complete airway obstruction, or severe respiratory distress, failure, or arrest:
  - Advanced airway/ventilatory management as needed

Drowning
- Spinal immobilization if pool related event or circumstances uncertain
- Protect from heat loss
- Patients may develop delayed onset respiratory symptoms
  - Consider CPAP for patients with significant dyspnea or hypoxia if size allows
- Refer to appropriate protocol if cardiac arrest present

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
**Basic Life Support**
- If suspicion of trauma, maintain C-spine immobilization
- Suction all debris, secretions from airway
- Bag valve mask ventilate; use only sufficient volume and force to just make chest rise visibly
- Ventilate at a rate of 12-20 breaths/minute, using the higher rate for younger ages
- Supplemental 100% oxygen

**Advanced Life Support**
- Have assistant apply cardiac monitor as soon as possible
- Address cardiac rhythm abnormalities per appropriate protocol
- Monitor end-tidal CO2 and oxygen saturation continuously
- BVM ventilate at least 2 minutes with 100% oxygen to achieve O2 saturation >90%
- Follow sequence listed below (use weight/length based tape to select appropriate equipment)

- **Bag mask ventilate (BVM)**
  - Goal is to keep oxygen saturation ≥ 90 for 1-2 minutes pre-attempt when possible

**Airway Emergencies – Pediatric**

- **Endotracheal Intubation (ETT)**
  - Only 1 attempt

- **Laryngeal Tube Airway (LTA)**
  - Only 1 attempt

- **Confirm ETCO2 and Exam**

- **Unsuccessful**
  - Resume BVM
  - Attempt LTA

- **Successful**
  - Continue Ventilation and Monitoring

- **Unsuccessful**
  - Resume BVM

- **-OR-**
  - At every step of airway algorithm, effective bag valve mask ventilation is an acceptable level of airway management
  - Components of effective ventilation include oxygenation, chest rise and fall, adequate lung sounds, and the presence of an alveolar waveform on capnography
  - Monitor ETCO2, oxygen saturation and assess for effective ventilation continuously

Contact Medical Control for Additional Orders if Needed
Airway Emergencies – Pediatric

Confirmation of Placement and Effectiveness of Ventilation (ETT or LTA)

Capnography/ETCO2 Monitoring:
- Digital capnography (waveform) is the system standard for ETCO2 monitoring and continuous ETCO2 monitoring is a **mandatory** component of invasive airway management.
- Immediately after placing an ETT or LTA capnography shall be applied to confirm proper placement.
  - Proper placement is indicated by the presence of a continuous alveolar waveform on capnography.
  - If an alveolar waveform is not initially present, or disappears after 3-5 breaths (i.e. flat-line), remove the ETT or LTA and proceed to the next step in the algorithm.
- With the exception of on-scene equipment failure, patients should not be switched from digital capnography to a colorimetric device for monitoring end-tidal C02.
- If capnography is not available due to serious on-scene equipment failure, apply a colorimetric ETCO2 detector capable of continuous ETCO2 monitoring (much less reliable).
- If ETCO2 monitoring cannot be accomplished by either of the above methods, the invasive airway device must be removed, and the airway managed noninvasively.

Additional Measures
- Assess epigastric sounds, breath sounds, and chest rise and fall.
- Record tube depth and secure in place using a commercial tube holder.
- Utilize head restraint devices or rigid cervical collar and long spine board immobilization as needed to help secure airway device in place.

Foreign Body Airway Obstruction
- If unresponsive, open airway using a head tilt/chin lift (if no trauma).
- If < 1 year old, administer up to 5 back blows and 5 chest compressions.
- If ≥ 1 to 8 years, administer abdominal thrusts until foreign body dislodged.
- If ventilation is unsuccessful (O2 saturations cannot be kept > 90) perform the following in order:
  - Reposition airway and attempt bag valve mask assisted ventilation again.
  - If unsuccessful, establish direct view of object and attempt to remove it with Magill forceps.
  - If unable to visualize a foreign body using laryngoscope, and vocal cords are clearly seen, attempt intubation only once.
  - If unsuccessful, re-attempt BVM ventilation; if oxygen saturation > 90 with BVM proceed no further and expedite transport.
- If patient cannot be ventilated/oxygenated with the above measures, perform needle cricothyrotomy and needle jet insufflation as a last resort.
- Expedite transport to nearest emergency department.

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Allergic Reactions - Pediatric

Basic Life Support

• Assist patient in self-administration of previously prescribed epinephrine (via auto injector)
• Nothing by mouth

Advanced Life Support

• If Moderate or Severe symptoms, perform Full Pediatric ALS Assessment and Treatment

Mild Reaction (Itching/Hives)

• Diphenhydramine (Benadryl) 1 mg/kg IV (Maximum 50 mg)
  • May be administered IM if no IV access available

Moderate Reaction (Dyspnea, Wheezing, Chest tightness)

• Albuterol (Proventil) 2.5 mg/3 ml via and Ipratropium Bromide 0.02% (Atrovent) 0.5 mg/2.5 ml via nebulizer
  • Repeat Albuterol (Proventil)/Ipratropium Bromide (Atrovent) X 2 for continued wheezing
• Diphenhydramine (Benadryl) 1 mg/kg IV (Maximum 50 mg)
  • May be administered IM if no IV access available
• Methylprednisolone (Solumedrol) 2 mg/kg IV or IM (Maximum individual dose 60 mg)

Severe Reaction (anaphylactic shock, stridor, severe respiratory distress)

• Epinephrine 1:1,000 solution 0.01mg/kg IM (max dose 0.3mg)
  • Massage injection site vigorously for 30-60 seconds
  • Repeat Epinephrine if signs of severe reaction or shock persist after initial dose
• Albuterol (Proventil) 2.5 mg/3 ml and Ipratropium Bromide 0.02% (Atrovent) 0.5 mg/2.5 ml via nebulizer
  • Repeat Albuterol (Proventil)/Ipratropium Bromide (Atrovent) X 2 for continued wheezing
• Diphenhydramine (Benadryl) 1 mg/kg IV (Maximum 50 mg)
  • May be administered IM if no IV access available
• Methylprednisolone (Solumedrol) 2 mg/kg IV or IM (Maximum individual dose 60 mg)

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Apparent Life Threatening Event (ALTE)

An Apparent Life Threatening Event (ALTE), sometimes referred to as a “near-miss” SIDS, is an episode that is frightening to the observer, and involves some combination of the following:

- Apnea
- Color change (cyanosis, pallor, erythema, plethora)
- Marked change in muscle tone (limpness)
- Choking or gagging

History of an ALTE may represent serious illness, even if the infant appears entirely well by the time he or she is evaluated. The apparent well-being should not be considered evidence that a potentially life-threatening event with successful resuscitation did not occur if the clinical history indicates otherwise.

**Basic Life Support**

- Assume the history given is accurate and reliable
- Determine the severity, nature and duration of the episode
- Obtain a medical history:
  - Known chronic diseases
  - History of preterm delivery
  - Evidence of seizure activity
  - Current or recent infections
  - Gastroesophageal reflux
  - Inappropriate mixture of formula
  - Recent trauma
  - Consider non-accidental trauma
- Perform a thorough physical assessment that includes the general appearance, skin color, level of interaction with environment, and evidence of trauma
- Transport to the nearest appropriate receiving facility
- Contact with Medical Control is required prior to accepting a refusal for patients < 6 months of age
Altered Mental Status - Pediatric

This protocol is intended for pediatric patients with new altered mental status of unknown etiology.

**Basic Life Support**
- If trauma suspected, stabilize spine
- Supplemental 100% oxygen
- Blood glucose check

**Advanced Life Support**
- Full Pediatric ALS Assessment and Treatment
- Determine blood glucose and treat glucose $< 70$ mg/dl
  - $D10W$ at 5 ml/kg for children $< 1$ year old (max 40 ml)
  - $D25W$ at 2 ml/kg for children 1-8 years old (max 50 ml)
  - $D50W$ at 1 ml/kg for children $\geq 9$ years old (max 50 ml)
- If no IV available:
  - Glucose paste (if $> 2$ yo) or other oral glucose containing agent (e.g. orange juice) if patient alert enough to self administer oral agent
  - Glucagon 0.1 mg/kg IM (Maximum dose 1 mg)
- If hypoglycemia persists:
  - Repeat blood glucose check with a different glucometer
  - Repeat Dextrose (as above) once if blood glucose $< 70$ mg/dl after 10 minutes
  - Naloxone at 0.1 mg/kg (Maximum individual dose 2 mg) via IV or IO route
  - If IV or IO unavailable Naloxone can be given IM or via mucosal atomizer device
Cardiac Arrest / Non-traumatic - Pediatric

Airway management by BVM is sufficient in the pediatric arrest patient. A single attempt at intubation or laryngeal tube placement can be made if time allows. Do not prolong transport or scene time to attempt invasive airway placement.

Basic Life Support
- Establish responsiveness
- If trauma suspected, stabilize spine
- Confirm apnea and pulselessness and administer CPR
- Apply AED as soon as available for ≥ 8 years old
- For children ≤ 8 years old use pediatric AED cables/electrodes if available
  - As a last resort in a child ≤ 8 years old in cardiac arrest, apply AED with any available cables/electrodes

Advanced Life Support
- Full Pediatric ALS Assessment and Treatment
- Determine cardiac rhythm and refer to appropriate protocol for further management actions
- Check blood glucose and treat glucose < 70 mg/dl
  - D10W at 5 ml/kg for children < 1 year old (max 40 ml)
  - D25W at 2 ml/kg for children 1-8 years old (max 50 ml)
  - D50W at 1 ml/kg for children ≥ 9 years old (max 50 ml)
- Due to the child’s critical condition, initiate transport without delay
Cardiac Arrest / Non-traumatic - Pediatric

**Pediatric Cardiac Arrest**
- Immediately begin CPR
- Minimize interruptions in compressions

**Shockable Rhythm?**

**VF/VT**
- CPR until defibrillator charged

**Give 1 Shock (2J/kg)**
- Resume CPR & continue for 2 min.
- Do not wait for rhythm check or pulse check
- Establish IV/IO

**Shockable rhythm after 2 min. of CPR?**

**Asystole/PEA**

**Resume CPR & continue for 2 min.**
- Establish IV/IO
- Epinephrine 0.01 mg/kg IV/IO every 3-5 min

**Shockable rhythm after 2 min. of CPR?**

**Give 1 Shock (4J/kg)**
- Resume CPR immediately
- Epinephrine 0.01 mg/kg IV/IO every 3-5 min

**Shockable rhythm after 2 min. of CPR?**

**Give 1 Shock (10J/kg)**
- Resume CPR immediately
- Amiodarone 5 mg/kg IV/IO
  - Max 1st dose 300mg
  - May repeat 5mg/kg x 2
  - Magnesium 50mg/kg IV/IO if Torsades highly suspected (max dose 2 grams)

**ROSC?**

**Post Resuscitation Care**

|| Contact Medical Control for Additional Orders if Needed |

**Authorization Date:** 9/4/2013
Cardiac Arrest / Non-traumatic - Pediatric

Asystole and Pulseless Electrical Activity

**Advanced Life Support**
- Follow Cardiac Arrest/Nontraumatic-Pediatric protocol
- Confirm the presence of Asystole in two leads
- Minimize any interruptions in compressions
- Using the most readily available route, administer (during CPR)
  - Epinephrine (1:10,000) 0.01 mg/kg IV/IO every 3-5 min during arrest
  - **OR, if no IV/IO**
    - Epinephrine (1:1,000) 0.1 mg/kg (Max. of 10 mg) diluted in 5 ml of NaCl via endotracheal tube; give 5 manual ventilations after drug administered
- Treat any suspected contributing factors:
  - If hypovolemic, administer 0.9% NaCl 20 ml/kg IV/IO bolus, may repeat X 2 (to a maximum total of 60ml/kg)
  - If hypoxic, secure airway and assist ventilation
    - BVM is sufficient to address hypoxia and assist ventilation
  - If hypothermic, rewarm
  - If hyperkalemia suspected (history of renal failure/dialysis):
    - Calcium chloride (10%), 20 mg/kg IV (Max individual dose 1g)
    - Sodium Bicarbonate 1 mEq/kg IV
  - If toxin ingestion, see specific toxin section
  - Assess for tension pneumothorax:
    - Unilateral decreased or absent lung sounds (may see tracheal deviation away from collapsed lung field)
    - Evidence of hemodynamic compromise
    - If tension pneumothorax suspected due to history or condition perform pleural decompression at 2nd intercostal space, mid-clavicular line

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Cardiac Arrest / Non-traumatic - Pediatric

**Ventricular Fibrillation or Pulseless Ventricular Tachycardia**

**Advanced Life Support**
- Follow Cardiac Arrest/Nontraumatic-Pediatric protocol
- Confirm the presence of ventricular fibrillation/pulseless ventricular tachycardia
- Defibrillate for persistent VF or pulseless VT:
  - Defibrillate at 2 J/kg (maximum 200 J)
  - Continue CPR immediately after shock (do not stop to check pulse or rhythm)
  - Call first defibrillation time to dispatch (if not done above)
- Analyze rhythm after 2 minutes of good CPR; If VF/VT persists:
  - Defibrillate at 4 J/kg (maximum 360 J)
  - Continue CPR immediately after shock (do not stop to check pulse or rhythm)
  - *Epinephrine (1:10,000)* 0.01 mg/kg IV/IO every 3-5 min during arrest

**OR, if no IV/IO**
- *Epinephrine (1:1,000)* 0.1 mg/kg (Max. of 10 mg) diluted in 5 ml of NaCl via endotracheal tube; give 5 manual ventilations after drug administered
- Analyze rhythm after 2 minutes of good CPR; If VF/VT persists:
  - Defibrillate at 10 J/kg (maximum 360 J)
  - All subsequent shocks at 10J/kg (maximum 360 J)
  - Continue CPR immediately after shock (do not stop to check pulse or rhythm)
  - *Amiodarone* 5 mg/kg IV/IO bolus (maximum individual dose 300 mg)
    - For persistent VF/VT repeat *Amiodarone* 5 mg/kg IV/IO bolus on second and third round (maximum total dose 15mg/kg)
- Continue cycle of CPR & Drug ➔ Rhythm Check ➔ CPR ➔ Shock ➔ CPR and Drug ➔ Rhythm Check ➔ CPR ➔ Shock as needed
- *Magnesium* 50 mg/kg IV/IO for suspected torsades de pointes

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Cardiac Arrhythmia - Pediatric

Bradycardia

Basic Life Support
- Supplemental 100% oxygen
- Open airway using head tilt-chin lift method
- Assist ventilation as needed using Bag-Valve-Mask
- Look for signs of airway obstruction
  - Absent breath sounds, intercostal retractions, stridor, choking, bradycardia or cyanosis

Advanced Life Support
- Full Pediatric ALS Assessment and Treatment
- Identify and treat possible causes of bradycardia:
  - If hypoxia open airway, assist breathing
  - If hypothermic, re-warm
  - If acutely deteriorating head injury, hyperventilate (goal ETCO2 of 30-35 mmHg)
  - If heart block or post heart transplant, apply transcutaneous pacer (see below)
  - If toxin ingestion, see specific toxin

  - In an infant (< 1 year) initiate chest compressions if heart rate remains slower than 60 beats per minute despite oxygenation and ventilation
  - If signs of severe cardiopulmonary compromise persist (use first available route):
    - Epinephrine (1:10,000) 0.01 mg/kg (Max 1 mg) IV/IO
      OR, if no IV/IO
    - Epinephrine (1:1,000) 0.1 mg/kg (Max 10 mg) diluted in 5 ml of NaCl via endotracheal tube; give 5 manual ventilations after drug administered
      - Repeat dose every 3-5 minutes until either the bradycardia or severe cardiopulmonary compromise resolves

  - If signs of severe cardiopulmonary compromise persist despite Epinephrine:
    - Atropine at 0.02 mg/kg via IV, IO, or Endotracheal tube (if given via ETT dilute in 5 ml of 0.9% NaCl and administer 5 ventilations after drug given)
      - Minimum dose is 0.1 mg; Maximum individual dose is 0.5 mg
      - May repeat once after 3-5 minutes

  - If severe cardiopulmonary compromise persists despite Epinephrine/Atropine apply transcutaneous pacemaker:
    - If weight is ≥ 15 kilograms apply adult transcutaneous pacemaker
    - If <15 kilograms use pediatric pads (small/medium electrodes) in the standard configuration for adult size pacer pads
    - Use lowest energy setting that achieves ventricular capture (pulse)

  - Check blood glucose and treat glucose < 70 mg/dl
    - D10W at 5 ml/kg for children < 1 year old (max 40 ml)
    - D25W at 2 ml/kg for children 1-8 years old (max 50 ml)
    - D50W at 1 ml/kg for children ≥ 9 years old (max 50 ml)

Contact Medical Control for Additional Orders if Needed
Bradycardia

Pediatric Bradycardia
- Airway, 100% Oxygen
- Identify and treat underlying conditions

Severe Cardiopulmonary Compromise?

Begin CPR if HR <60
- Continuous monitoring
- Establish IV/IO

Bradycardia persists?

Support ABC’s
- Give Oxygen
- Close observation
- Expedite transport

YES

NO

YES

NO

Epi (1:10,000) 0.01 mg/kg
- Repeat every 3-5 min if needed

Atropine 0.02 mg/kg
- Min. dose 0.1 mg, Max. individual dose 0.5 mg
- Repeat once if needed
- Consider transcutaneous pacing

If pulseless arrest develops, go to Cardiac Arrest algorithm

Orange County EMS System

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Cardiac Arrhythmia - Pediatric

Tachycardia

**Basic Life Support**
- If trauma suspected, stabilize spine
- Supplemental 100% oxygen

**Advanced Life Support**
- Full Pediatric ALS Assessment and Treatment
- Check blood glucose and treat glucose < 70 mg/dl
  - D10W at 5 ml/kg for children < 1 year old (max 40 ml)
  - D25W at 2 ml/kg for children 1-8 years old (max 50 ml)
  - D50W at 1 ml/kg for children ≥ 9 years old (max 50 ml)

**Sinus tachycardia**
- Infants: rate usually <220/min
- Children: rate usually <180/min
- Identify and treat possible causes

**Supraventricular tachycardia with severe cardiopulmonary compromise**
- Infants: rate usually ≥220/min
- Children: rate usually ≥180/min
- If vascular access is available:
  - Adenosine (Adenocard) 0.1 mg/kg (Maximum individual dose 6 mg) IV rapid bolus
  - Repeat Adenosine (Adenocard) twice at 0.2 mg/kg if needed (Maximum individual dose 12 mg)
- If Adenosine is unsuccessful and patient still has severe cardiopulmonary compromise:
  - Synchronized Cardioversion at 1 J/kg
  - If unsuccessful and severe symptoms persist repeat Synchronized Cardioversion at 2 J/kg (Maximum individual dose 360 joules)
- Expedite transport

**Ventricular tachycardia with a pulse**
- If the patient is stable provide supportive care and expedite transport
- If the patient becomes unstable (hypotension and acutely altered mental status):
  - Synchronized Cardioversion at 1 J/kg
  - If unsuccessful and severe symptoms persist repeat Synchronized Cardioversion at 2 J/kg (Maximum individual dose 360 joules)
- If Torsades de Pointes is suspected:
  - Magnesium Sulfate 50 mg/kg IV over 10 minutes

Contact Medical Control for Additional Orders if Needed
Cardiac Arrhythmia - Pediatric

**Tachycardia**

**Pediatric Tachycardia**
- Airway, 100% Oxygen
- Identify and treat underlying conditions
- Evaluate 12 lead ECG

Evaluate QRS duration

- **Wide** (>0.09 sec)
- **Narrow** (≤0.09 sec)

**Probable sinus tach**
- Consistent history
- P waves present/normal
- Infants: rate usually <220/min
- Children: rate usually <180/min

Search for and treat cause

**Probable SVT**
- Consistent history; abrupt onset
- P waves absent
- Infants: rate usually ≥220/min
- Children: rate usually ≥180/min

Severe Symptoms?
If no, expedite transport

**Possible VT**

Severe Symptoms?
If no, expedite transport

**Adenosine 0.1mg/kg**
(Repeat 0.2mg/kg twice as needed)

Unsuccessful and persistent severe symptoms?
If successful, expedite transport

**Synchronized Cardioversion**
- 1J/kg initial synchronized shock
- Repeat at 2J/kg if needed (Max of 360J)

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Newborn Resuscitation

**Basic Life Support**
- Note gestational age, and if twin gestation is known
- Assess for presence of meconium
- Assess breathing or presence of crying
- Assess muscle tone
- Assess color
- Provide warmth using blankets and cap
- Spontaneously breathing, well-appearing infants do not require suctioning
  - For infants who have obvious obstruction to spontaneous breathing or who require positive-pressure ventilation, open airway and suction with bulb syringe
  - Suction mouth first, then nasopharynx
- Dry, stimulate and reposition
- Administer supplemental blow-by oxygen
- Evaluate respirations, heart rate, and color
  - If apnea, or HR < 100, provide ventilations using BVM and room air initially
  - If HR remains < 60, begin chest compressions
- Note APGAR scores at 1 and 5 minutes after birth and then sequentially every 5 minutes until vital signs have stabilized

**Advanced Life Support**
- If the fluid contains meconium and the newborn has absent or depressed respirations, decreased muscle tone, or heart rate < 100 bpm:
  - Suction any visible meconium from the hypopharynx and airway
  - After suctioning, provide ventilations using BVM and 100% Oxygen
- If apnea, or HR < 100, provide ventilations with 100% Oxygen
- Target oxygen saturation after birth:
  - 1 min - 60-65%
  - 2 min - 65-70%
  - 3 min - 70-75%
  - 4 min - 75-80%
  - 5 min - 80-85%
  - 10 min - 85-95%
- If HR remains < 60, administer chest compressions
- Administer boluses of 0.9% NaCl at 10ml/kg
  - If no IV access obtained after 3 attempts, or within 90 sec., obtain IO access
- **Epinephrine** 0.01 mg/kg IV of a 1:10,000 solution if no improvement
  - Repeat Epinephrine (same dose) every 3 to 5 minutes if no response
- **Naloxone** (Narcan) 0.1 mg/kg, IV or IO if respiratory depression in a newborn of a mother who received narcotics within 4 hours of delivery
  - Repeat Naloxone (Narcan) dose as needed
- Administer D10W at 2ml/kg; no need to check blood glucose prior to administration

Contact Medical Control for Additional Orders if Needed
Newborn Resuscitation

Full-Term gestation? Breathing or crying? Good tone?

- Provide warmth
- Clear airway
- Stimulate, dry

YES

HR < 100? Gasping, apnea?

- BVM with room air

NO

NO

HR < 100?

- BVM with 100% Oxygen

YES

NO

HR < 60?

- Begin chest compressions
- Continue airway support
- Consider intubation

YES

HR < 60?

- Epinephrine 1:10,000
  0.01 mg/kg IV/IO

YES

Routine care:
- Provide warmth
- Clear airway
- Dry
- Ongoing evaluation

Post resuscitation care:
- Naloxone
- Give D10W at 2ml/kg
- Ongoing evaluation

Contact Medical Control for Additional Orders if Needed
Newborn Resuscitation

APGAR Score

APGAR is a quick test performed at 1 and 5 minutes after birth. The 1-minute score determines how well the baby tolerated the birthing process. The 5-minute score assesses how well the newborn is adapting to the new environment. The rating is based on a total score of 1 to 10, with 10 suggesting the healthiest infant. This test is a screening tool to help determine whether a newborn needs resuscitative efforts.

<table>
<thead>
<tr>
<th></th>
<th>0 (Points)</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>Blue or pale all over</td>
<td>Blue extremities, but torso pink</td>
<td>Pink all over</td>
</tr>
<tr>
<td><strong>Pulse</strong></td>
<td>None</td>
<td>&lt; 100</td>
<td>≥ 100</td>
</tr>
<tr>
<td><strong>Grimace</strong></td>
<td>No response</td>
<td>Weak grimace when stimulated</td>
<td>Cries or pulls away when stimulated</td>
</tr>
<tr>
<td><strong>Activity</strong></td>
<td>None</td>
<td>Some flexion of arms</td>
<td>Arms flexed, legs resist extension</td>
</tr>
<tr>
<td><strong>Respirations</strong></td>
<td>None</td>
<td>Weak, irregular or gasping</td>
<td>Strong cry</td>
</tr>
</tbody>
</table>

0-3 Critically Low, 4-6 Fairly Low, 7-10 Generally Normal

Abandoned Newborn

Florida statute 383.50 allows for new parents to anonymously leave a newborn at a fire station or a hospital. If this scenario is encountered, adhere to the following:
- Assess and treat the newborn as per newborn/pediatric resuscitation protocols
- Transport newborn to nearest emergency department
- If possible record physical description of parent
- Attempt to obtain information regarding prenatal care and pertinent family history
- If any written information available, turn it over to the Emergency Department

Contact Medical Control for Additional Orders if Needed
Overdose, Poisoning, or Ingestion - Pediatric

For any overdose or poisoning contact should be made with the Regional Poison Control Center. Whenever possible, determine the agent involved, the time of the ingestion/exposure, and the amount ingested. Bring empty pill bottles, etc., to the receiving facility.

**Advanced Life Support**
- If any symptoms present perform Full Pediatric ALS Assessment and Treatment
- If respiratory depression is present and an overdose is suspected:
  - **Naloxone** at 0.1 mg/kg (Maximum dose 2.0 mg) via IV, IO, or IM route

*Treatment for specific toxic exposures is indicated only when patients are clearly symptomatic. In the absence of significant symptoms, monitor closely and expedite transport. If indicated, initiate HAZMAT Alert*

**Organophosphates**
Symptoms include dyspnea, bronchorrhea, lacrimation, vomiting/diarrhea, weakness, paralysis, seizures
- **Atropine** 0.02 mg/kg IV (minimum dose 0.1 mg)
- If seizures present see Pediatric Seizure Protocol

**Tricyclic Antidepressant**
Symptoms include hypotension, arrhythmias, wide QRS complex (>0.09 sec)
- **Sodium Bicarbonate** 1 mEq/kg IV
  - May be repeated in 10 minutes

**Calcium Channel Blockers and Beta Blockers**
Symptoms include bradycardia, hypotension and heart blocks
- **Glucagon** 0.5 mg (< 20 kg) or 1 mg (≥ 20 kg) IM or IV
- If symptoms persist, **Atropine** 0.02 mg/kg (minimum dose 0.1 mg)
- If poisoning due to calcium channel blocker, **Calcium Chloride** 0.2 ml/kg slow IV (max 2 g)

**Dystonic Reaction**
Acute uncontrollable muscle contractions
- **Diphenhydramine** (Benadryl) 1 mg/kg IV or deep IM (Maximum dose 50 mg)

**Insulin Reaction**
Hypoglycemia and altered mental status due to excessive insulin
- Treat glucose < 70 mg/dl
  - **D10W** at 5 ml/kg for children < 1 year old (max 40 ml)
  - **D25W** at 2 ml/kg for children 1-8 years old (max 50 ml)
  - **D50W** at 1 ml/kg for children ≥ 9 years old (max 50 ml)
  - If no IV access **Glucagon** 0.5 mg (< 20 kg) or 1 mg (≥ 20 kg) IM

*Contact Medical Control for Additional Orders if Needed*
Pain Management - Pediatric

**Advanced Life Support**
Analgesic agents may be administered if patient has severe pain and one of following:

- Isolated extremity injury
- Burn without airway, breathing, or circulatory compromise
- Typical sickle cell crisis for patient
- Animal bite or envenomation

- Agents for pain control:
  - *Fentanyl* (Sublimaze) 0.5 mcg/kg (maximum 25 mcg) slow IV; repeat once after 5 minutes as needed (maximum 50 mcg total dose) OR 1.5 mcg/kg (max 100 mcg) intranasal via MAD (divide dose equally between nostrils)
  - Preferentially use intranasal delivery via MAD for those where IV access may be difficult to obtain in a timely fashion
- Assess and record the patient’s pain level after medication
- Note adequacy of ventilation and perfusion
- Record & monitor continuous O2 saturation and microstream capnography

Contact Medical Control for Additional Orders if Needed
Seizures - Pediatric

Basic Life Support
- Supplemental 100% oxygen if active seizures
- Blood glucose check

Advanced Life Support
- Full Pediatric ALS Assessment and Treatment
- Determine blood glucose and treat if glucose < 70 mg/dl
  - D10W at 5 ml/kg for children < 1 year old (max 40 ml)
  - D25W at 2 ml/kg for children 1-8 years old (max 50 ml)
  - D50W at 1 ml/kg for children ≥ 9 years old (max 50 ml)
- If no IV available:
  - Glucagon 0.1 mg/kg IM (Max. 1mg)
- If hypoglycemia persists:
  - Repeat blood glucose check with a different glucometer
  - Repeat Dextrose (as above) once if blood glucose < 70 mg/dl after 10 minutes
- For active seizures only, choose one of the following options:
  - Do NOT delay treatment to obtain intravenous access, begin with IM dose unless IV is already established
  - Midazolam (Versed) 0.2 mg/kg (max 5 mg) IM or intranasal via MAD OR 0.1 mg/kg (max 2.5 mg) IV
    - If seizures continue or re-occur repeat Midazolam (Versed) 0.2 mg/kg (max 5 mg) IM or intranasal via MAD OR 0.1 mg/kg (max 2.5 mg) IV; wait at least 5 minutes from initial dose
  OR
  - Diazepam rectal gel (Diastat®) if available: Some patients with a diagnosed seizure disorder will have their own Diazepam rectal gel (Diastat®) prescribed by their physician. When available, Diastat can be given if no IV is available. Use the patient's prescribed dose or refer to the table below. If an IV is readily available, Midazolam is the preferred medication.

<table>
<thead>
<tr>
<th>Weight (kg)</th>
<th>Dose (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-5 years old (0.5mg/kg)</td>
<td></td>
</tr>
<tr>
<td>6-11</td>
<td>5</td>
</tr>
<tr>
<td>12-22</td>
<td>10</td>
</tr>
<tr>
<td>23-33</td>
<td>15</td>
</tr>
<tr>
<td>34-44</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weight (kg)</th>
<th>Dose (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-11 years old (0.3mg/kg)</td>
<td></td>
</tr>
<tr>
<td>10-18</td>
<td>5</td>
</tr>
<tr>
<td>19-37</td>
<td>10</td>
</tr>
<tr>
<td>38-55</td>
<td>15</td>
</tr>
<tr>
<td>56-74</td>
<td>20</td>
</tr>
</tbody>
</table>

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Trauma - Pediatric

Basic Life Support
- Stabilize spine
- Use modified jaw thrust if airway obstructed
- Supplemental 100% oxygen
- Control hemorrhage using direct pressure or pressure dressing
- Perform head-to-toe survey to identify injuries
- Splint obvious fractures of long bones
- Prevent loss of body heat

Advanced Life Support
- If moderate or severe injuries present, perform Full Pediatric ALS Assessment and Treatment
- Assess for Pediatric Trauma Triage Criteria and initiate transport to Pediatric Trauma Center if criteria are met
- Assess for Tension Pneumothorax:
  - Severe respiratory distress with hypoxia
  - Unilateral decreased or absent lung sounds (may see tracheal deviation away from collapsed lung field)
  - Evidence of hemodynamic compromise (shock, hypotension, tachycardia, altered mental status)
- Pleural decompression for tension pneumothorax should only be preformed when all 3 of the above criteria are present; If indicated Perform Pleural decompression at 2nd intercostal space, mid-clavicular line
- Initiate transport to an appropriate trauma facility within 10 minutes of arrival on the scene, unless extenuating circumstances (extrication)
- Perform procedures, history and detailed physical examination en route to the hospital
- Reassess frequently

Contact Medical Control for Additional Orders if Needed
Trauma - Pediatric

Burns

Basic Life Support
- Remove or cool heat source if present (tar, clothing)
- Cool compress dressings on minor burns with sterile saline (do not use ice packs)
- Dry, sterile burn sheet on:
  - 2° burns greater than 15% of Body Surface Area
  - 3° burns
  - Electrical burns
- Spinal immobilization if high voltage electrical injuries
  - If high voltage electrical injury (> 1000 volts) initiate Trauma Alert
- If chemical burn, refer to Basic Approach to Hazardous Material Exposures Protocol

Advanced Life Support
- If moderate or severe pain and no signs of shock (normal cap refill, normal blood pressure for age):
  - Fentanyl (Sublimaze) 0.5 mcg/kg (maximum 25 mcg) slow IV; repeat once after 5 minutes as needed (maximum 50 mcg total dose) OR 1.5 mcg/kg (max 100 mcg) intranasal via MAD (divide dose equally between nostrils)
  - Preferentially use intranasal delivery via MAD for those where IV access may be difficult to obtain in a timely fashion
  - Use with caution if inhalational injury or respiratory symptoms
- Expedite transport to nearest Trauma Center if Trauma Red or Trauma Alert

Contact Medical Control for Additional Orders if Needed

Authorization Date: 9/4/2013
Pediatric Trauma Alert Criteria

The presence of any of the 3 listed items below requires Trauma Alert activation:

- 1. Meets color coded triage system (any one RED, or any two BLUE criteria met)
- 2. Meets Local Criteria: **High Voltage Electrical Injury (>1000 volts)**
- 3. Patient does not meet any above criteria but, in the judgement of the paramedic, should be transported as a Trauma Alert. Document reason on run report.

<table>
<thead>
<tr>
<th>Component</th>
<th>BLUE Criteria</th>
<th>RED Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Any of the following:</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>• Weight ≤ 11kg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Length ≤ 33 in. (Broselow)</td>
<td></td>
</tr>
<tr>
<td>Airway</td>
<td>N/A</td>
<td>• Assisted Ventilation or Intubated¹</td>
</tr>
<tr>
<td>Consciousness</td>
<td>Any of the following:</td>
<td>Any of the following:</td>
</tr>
<tr>
<td></td>
<td>• Amnesia</td>
<td>• Altered mental status²</td>
</tr>
<tr>
<td></td>
<td>• Loss of Consciousness</td>
<td>• Coma</td>
</tr>
<tr>
<td></td>
<td>Any of the following:</td>
<td>• Suspicion of spinal cord injury:</td>
</tr>
<tr>
<td></td>
<td>• Faint or non-palpable carotid or femoral pulse</td>
<td>• Paralysis or Loss of sensation</td>
</tr>
<tr>
<td></td>
<td>• SBP &lt; 90mmHg</td>
<td></td>
</tr>
<tr>
<td>Circulation</td>
<td>Any of the following:</td>
<td>Any of the following:</td>
</tr>
<tr>
<td></td>
<td>• Palpable carotid or femoral pulse, but absent radial or pedal pulse</td>
<td>• Open long bone fracture³</td>
</tr>
<tr>
<td></td>
<td>• SBP &lt; 90mmHg</td>
<td>• Multiple fracture sites</td>
</tr>
<tr>
<td></td>
<td>Any of the following:</td>
<td>• Multiple dislocations</td>
</tr>
<tr>
<td>Fracture</td>
<td>• Single closed long bone fracture³</td>
<td>Any of the following:</td>
</tr>
<tr>
<td>Cutaneous</td>
<td>N/A</td>
<td>• Major soft tissue disruption or flap avulsion⁴</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2° or 3° to ≥ 10% TBSA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Amputation⁵</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Penetrating injury to Head, Neck or Torso⁶</td>
</tr>
</tbody>
</table>

1. Includes jaw thrust, frequent suctioning, or other airway adjuncts
2. Includes drowsiness, lethargy, inability to follow commands, unresponsiveness
3. Includes humerus, radius+ulna, femur, tibia+fibula; does not include isolated wrist and ankle fractures
4. Major degloving injuries
5. Amputations proximal to wrist or ankle
6. Excluding superficial wounds where depth can be accurately determined

Contact Medical Control for Additional Orders if Needed
Basic Airway Adjuncts

**Bag-Valve-Mask (BVM):**

**Indications:**
- Assisted ventilation for both adults and pediatric patients.

**Technique:**
- Create a good seal between mask and the patients face by using one or two person technique
- Assure the mask is properly sized for the patient’s face

**Oropharyngeal Airway (OPA) and Nasopharyngeal Airway (NPA)**

**Indications:**
- Assist in maintaining an open airway in patients with inadequate breathing
- OPA is indicated only in patients with *no gag reflex*
- NPA can be used in patients with an *intact gag reflex* or clenched jaw

**Technique (OPA):**
- Choose the correct size OPA by measuring “lip to lobe”.
- In an adult, insert the OPA upside down until resistance is met, then rotate 180° and advance until flange is at the lips
- For pediatric patients use a tongue depressor to guide the OPA into position right side up

**Technique (NPA):**
- Choose the proper size by measuring from nose to lobe
- Lubricate the NPA and insert into the nostril while pushing the tip of the nose upward.
- Gently advance until the flange rests against the nostril.
- Contraindicated if suspected facial fractures or suspected basilar skull fractures (raccoon eyes, battle signs, blood from ear canal)

**Complications:**
- Regurgitation and aspiration of gastric contents
Airway Procedures

**Endotracheal Intubation**

**Indications:**
- Respiratory or cardiac arrest
- Inadequate ventilation with bag valve mask
- Impending respiratory failure or apnea
- Hypoxia unresponsive to 100% oxygen, and any of the following:
  - Respiratory rate < 8 breaths per minute
  - Poor ventilatory effort (with hypoxia unresponsive to 100% oxygen)
  - Inability to maintain patent airway
  - Airway obstruction

**Equipment:**
- Laryngoscope handle with appropriate size blade.
- Proper size endotracheal tube (ETT) plus back up ETT 0.5 – 1.0 mm smaller
- Water soluble lubrication gel, (lubricate distal end of tube at cuff)
- 10-12 ml syringe
- Stylet, (insert into ET tube and do not let stylet extend beyond tip of ET tube)
- ETT securing device
- Proper size oral pharyngeal airway
- BVM or automatic ventilator
- Oxygen source
- Suction device
- Stethoscope
- Digital capnography and oxygen saturation monitors

**Technique:**
- Assure all equipment is readily accessible and functioning
- Inflate the cuff of the endotracheal tube to check for leaks
- With the stylet in place, maintain the tube's natural curve or reshape into “hockey stick” shape
- If possible adjust the bed height so that the patient’s head is level with the lower portion of your sternum
- Unless there are contraindications, move the patient into the “sniffing” position by placing a pillow or folded towel under the patient’s occiput
- **Ear should be level with sternal notch**
Orange County EMS System

Airway Procedures

Endotracheal Intubation (continued)

Technique (continued):

- When intubating an infant, you typically do not need to provide additional head support, because the infant's large occiput naturally causes the head to assume the sniffing position.
- If the clinical situation allows, pre-oxygenate the patient with a non-rebreather mask or a bag-valve mask for at least 3 minutes prior to intubation.
  - This step may minimize the need for BVM ventilation, thus reducing the risk of aspiration.
- While holding the laryngoscope in your left hand, open the patient's mouth with your right hand.
- Insert the laryngoscope blade to the right of the patient's tongue and gradually move the blade to the center of the mouth, pushing the tongue to the left.
- Slowly advance the blade along the tongue and locate the epiglottis.
  - If using a curved blade, place the blade tip into the vallecula epiglottica.
  - If using a straight blade place the blade tip posterior to the epiglottis.
- With the tip of the blade in position, lift the laryngoscope upward and forward at a 45 degree angle to expose the vocal cords.
- Try to achieve the best possible view of the vocal cords before attempting to pass the endotracheal tube.
- To avoid dental injury do not rock the blade against the patient's teeth as this will do nothing to improve the view.
- While maintaining your view of the vocal cords, insert the endotracheal tube into the right side of the patient's mouth.
- The tube should not obstruct your view of the vocal cords during this critical part of the procedure.
- Pass the tube through the vocal cords until the balloon disappears into the trachea.
- Advance the tube until the balloon is 3 to 4 cm beyond the vocal cords.
  - Typical depth in centimeters is "3 times the tube size" (e.g. 21 cm for a 7 mm, 24 cm for an 8 mm tube).
- Inflate the endotracheal balloon with air and assess for proper placement using capnography.
  - If no alveolar waveform is seen on capnography the tube must be removed.
- Secondary assessment of placement should include auscultation over the epigastrium and auscultation of both lungs fields for symmetry.
- If an alveolar waveform is present secure the tube using a commercial tube holder.

Complications:

- Esophageal intubation (catastrophic if unrecognized)
- Aspiration of gastric contents
- Bradycardia
- Oral trauma
- Exacerbation of spine injuries
ETCO₂ Monitoring using Capnography

Waveform capnography is the most sensitive and specific method available to objectively determine endotracheal tube location after intubation attempts and throughout airway management in the field.

Following intubation, immediately attach capnography line and observe for presence of a four-phase alveolar waveform:

![Waveform Image]

**An Alveolar waveform confirms ventilation is occurring.** In the intubated patient an alveolar waveform confirms tracheal placement of the tube. In a non-intubated patient, capnography provides continuous monitoring of respirations, and is the most sensitive method for recognizing impending respiratory failure.

![Waveform Image]

**A flat line indicates NO VENTILATION is occurring.** In the intubated patient this indicates a misplaced esophageal intubation. In the non-intubated patient a flat line indicates respirations have ceased (hypoventilation/apnea).

![Waveform Image]

In states of hypoperfusion, such as severe shock or cardiac arrest, end-tidal carbon dioxide (ETCO₂) levels will be very low (< 20 mmHg). In cardiac arrest patients, high quality chest compressions improve perfusion and increase ETCO₂ - monitor these levels to maintain optimal CPR and recognize operator fatigue. A sudden rise in the ETCO₂ indicates return of spontaneous circulation (ROSC).
ETCO2 Monitoring using Capnography (continued)

End-tidal carbon dioxide (ETCO2) provides valuable information about ventilation, perfusion and the metabolic status of the patient. Normal values fall into a range of 30-45 mmHg.

**Elevated ETCO2 levels indicate:**
- Intubated patients
  - Hypoventilation – increase depth and rate of bagging if this occurs
  - Partial airway obstruction – reassess airway and tube if this occurs
- All patients
  - Bronchoconstriction/CO2 retention such as asthma or COPD (especially if waveform has "shark-fin" appearance)
  - Hypoventilation in spontaneously breathing sedated or unconscious patients – assess for airway management
  - ROSC (sudden rise of ETCO2 during cardiac arrest resuscitation)

**Decreased ETCO2 levels indicate:**
- Intubated patients
  - A sudden decline in ETCO2 indicates extubation or obstructed tube – immediately assess patient for each of these complications
  - Hyperventilation – decrease depth and rate of bagging if this occurs
- All patients
  - Hypoperfusion such as severe sepsis or shock
  - Cardiac arrest or impending cardiac arrest
  - Metabolic acidosis such as diabetic ketoacidosis (DKA) or severe dehydration
  - Hyperventilation as seen in significant dyspnea, pulmonary embolism, or anxiety
Airway Procedures

Laryngeal Tube Airway

Indications:
- Respiratory or other emergencies requiring assisted ventilation

Contraindications:
- Responsive patients with an intact gag reflex
- Patients with known esophageal disease
- Patients who have ingested caustic substances

Equipment:
- Correctly sized airway device (see manufacturer’s recommendations below)
- Water based lubricant
- Inflation syringe or KLT900 Cuff pressure Gauge
- Suction device
- Bag-Valve-Mask
- Oxygen
- Endotracheal tube holder
- Capnography and oxygen saturation monitors
- Stethoscope

Technique:
- Test cuff by injecting maximum amount of air into the cuff, then deflate for insertion
- Apply water based lubricant to the beveled distal tip and posterior aspect of tube, being careful not to introduce lubricant into the ventilation ports
- Pre-oxygenate with BVM
- Position the head in the sniffing position if no cervical spinal injury is suspected
  - Use the neutral position if cervical spinal injury is considered
- While holding the King LT with the dominant hand, open the mouth with the non-dominant hand, and apply a chin lift if no cervical spinal injury suspected
- With the King LT rotated laterally at 45-90 such that the blue orientation line is touching the corner of the mouth, introduce the tip into the mouth and advance behind the base of the tongue
- As the tube tip passes under the tongue, rotate the tube back to midline (blue orientation line faces chin)
- Without using excessive force, advance the King LT until the base of the connector aligns with the teeth or gums
- If using the KLT900 Cuff Pressure Gauge, inflate the cuff to 60cm H2O
- If using a syringe, inflate the cuff with the minimum volume to seal the airway at the peak ventilatory pressure employed
Technique (continued):
- Attach resuscitation bag and deliver a gentle breath while simultaneously withdraw the airway device until ventilation is easy.
- Confirm proper placement by assessing capnography waveform and by auscultating lungs sounds.
- Secure the device using a commercial tube holder

Complications:
- Regurgitation and aspiration
- Inadvertent intubation of the trachea
Airway Procedures

**Surgical cricothyrotomy (adult)**

**Percutaneous cricothyrotomy using the Seldinger technique (adult)**

**Needle cricothyrotomy with jet ventilation (children < 12 years of age)**

**Indications:**
- Inability to secure an airway using nonsurgical methods
- As a last resort in a “cannot intubate, cannot ventilate” scenario
- Needle cricothyrotomy is the surgical airway of choice for children less than 12 years old.

**Contraindications:**
- In true emergencies, there are no absolute contraindications
- Airway obstruction distal to the cricoid membrane
- Inability to identify anatomical landmarks
- Infection at the incision site

**Equipment:**
- Cricothyrotomy
  - Cuffed endotracheal tubes (5 and 6mm)
  - Scalpel, No. 11
  - Trousseau dilator
  - Tracheal hook
  - 4 X 4 gauze/sponges
- Percutaneous cricothyrotomy using Seldinger technique
  - Commercial cricothyrotomy kit
  - Scalpel, No. 11
  - 4 X 4 gauze/sponges
- Needle cricothyrotomy
  - Over-the-needle catheter, 14 ga, 2 to 2.5 inches in length
  - Syringe, 10 ml
  - Scalpel, No. 11
  - 4 X 4 gauze/sponges
  - Nasal cannula or oxygen tubing with Y-connector

**Technique: Cricothyrotomy**
- Position the patient supine, with the neck in a neutral position
- Clean the patient’s neck using antiseptic swabs
- Identify the cricothyroid membrane, between the thyroid and cricoid cartilage
- Using the non-dominant hand, stabilize the trachea
Airway Procedures

- Make a 2-3 cm midline vertical incision through the skin from the caudal end of the thyroid cartilage to the cephalic end of the cricoid cartilage.
- Make a 1-2 cm transverse incision through the cricothyroid membrane.
- Insert the scalpel handle into the incision and rotate 90°. (A hemostat may also be used to open the airway.)
- If available, use a tracheal hook to lift the caudal end of the opening to allow passage of a cuffed endotracheal tube directly into the trachea (No. 5 or 6)
  - In an urgent scenario, insert the tube into the trachea with the assistance of a hemostat or the handle of the scalpel
- Inflate the cuff and confirm placement using Capnography (mandatory) and by assessing chest rise and lung sounds
- Secure the tube

Technique: Percutaneous cricothyrotomy using Seldinger technique
- Use a commercially available kit that has been authorized by the Medical Director
- In addition to manufacturer recommended procedures, follow the first 4 steps of the cricothyrotomy technique
- Direct the needle at a 45° angle caudally while maintaining negative pressure to the syringe
- Once air is aspirated remove the syringe, leaving the needle in place, and pass the guide wire into the trachea
- Insert the dilator/airway tube combination over the guide wire
- Once the airway tube is in place, remove the dilator and guide wire
- Attach to a ventilation device and secure the device
- Confirm placement using capnography (mandatory)
Airway Procedures

**Technique: Needle cricothyrotomy**

- Follow the first 4 steps above
- Attach an over-the-needle catheter (8.5 cm) to a 10mL syringe
- Use a 16 or 18 gauge needle for a child less than 12
- Insert the needle in the midline into the cricothyroid membrane, at a 45 angle caudally, while maintaining negative pressure on the syringe
- A small incision with a No. 11 blade may facilitate passage of the needle
- Once air is aspirated advance no further and attempt to pass the catheter over the needle
- If the catheter passes easily, slowly remove the needle and secure the catheter
- When catheter is secure, insert a size 3mm endotracheal tube adapter into the hub of the 14ga needle
- Attach a BVM on to the ETT adapter and ventilate
- Needle cricothyrotomy is a temporizing measure only; expedite transport because ventilation will be suboptimal

**Complications:**

- Aspiration
- Hemorrhage
- Unrecognized misplacement
- Thyroid perforation
- Inadequate ventilation/hypoxia
- Esophageal or tracheal laceration
- Mediastinal or subcutaneous emphysema
- Vocal cord injury
Bougie (Endotracheal Tube Introducer)

Indication:
The Gum Elastic Bougie is helpful in achieving endotracheal intubation when there is a restricted view of the glottic opening. It is not necessary to use on every patient, but it may be useful when a difficult airway is anticipated. The Bougie is not for "blind" intubation - you should always visualize the tip of the epiglottis, arytenoids, or a partial view of the vocal cords.

Technique:
- Once the best possible laryngeal view is obtained, pass the bougie into the patient’s mouth and through the glottic opening.
- If unable to visualize the vocal cords, advance the bougie anteriorly under the epiglottis and feel for clicks as it slides along the tracheal rings.
- While maintaining the best laryngeal view, slide the endotracheal tube over the bougie, and advance it to the desired depth, while maintaining proximal control of the bougie. This may require two operators.
- If resistance is encountered while passing the tube, try rotating the bougie and tube 90°.

Complications:
- Esophageal intubation
- Vomiting and aspiration
- Laryngospasm
- Bronchospasm
- Oral trauma
- Exacerbation spinal injuries
Airway Procedures

Nasogastric Tube Insertion

Indications
- Airway management using a King LTS-D
- Unable to ventilate intubated patient due to over distended stomach
- Prolonged transport for patient felt to be at high risk for aspiration
  - Note for interfacility transfers, the NG tube should be placed by transferring facility

Contraindications
- Suspected facial fractures or suspected basilar skull fractures (raccoon eyes, battle signs, blood from ear canal)
- History of alkali ingestion
- Comatose state with unprotected airway (procedure will induce vomiting)
- Penetrating cervical injuries in the awake trauma patient

Equipment
- 18 Fr nasogastric tube
- 35 ml syringe
- Water soluble lubrication gel
- Tape

Technique
- Medical Control orders required unless being placed using the Gastric Access Lumen on a King LTS-D
- Mark distance tube should be inserted by measuring from nose to ear lobe to below xiphoid process
- Lubricate distal 6 - 8" of NG tube and pass into the gastric access lumen of the King LTS-D
- If placing nasally:
  - Examine nose for septal deviation
  - Use right naris if both nostrils are same size
  - Place patient in semi-fowler’s position if condition permits and slightly flex head
  - Insert tube in nostril & gently pass tube into nose along hard palate (floor of nose)
- Confirm tube placement by aspirating gastric contents and by auscultating epigastrium while injecting 20 -30 ml air through tube (a gurgling sound should be heard via stethoscope)
- Tape tube in place and maintain suction
Infection Control Procedures

Universal Precautions

According to the Occupational Safety and Health Administration (OSHA), universal precautions are required methods of control to protect employees from exposure to all human blood and other potentially infectious material (OPIM). The term "universal precautions" refers to a concept of blood borne disease control which requires that all human blood and OPIM be treated as if known to be infectious for HIV, HBV, HCV or other blood borne pathogens, regardless of the perceived "low risk" status of a patient.

- In addition to any body fluid that is visibly contaminated with blood, the term “other potentially infectious material” is defined by OSHA as follows:
  - Semen or vaginal secretions
  - Cerebrospinal fluid
  - Synovial fluid
  - Pleural fluid
  - Any unfixed tissue from a human and HIV or HBV containing cells, tissue or culture from a human or experimental animal

Body Surface Isolation and Standard Precautions

The concepts of Body Substance Isolation (BSI) and Standard Precautions assume all body fluids and substances as infectious. These methods incorporate not only the fluids and materials covered by universal precautions, but expand coverage to include all body fluids, substances and contaminated material. Standard precautions are designed to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources of infection.

Standard precautions includes the use of hand washing, appropriate personal protective equipment such as gloves, gowns, masks, whenever touching or exposure to patients’ body fluids is anticipated. The CDC recommends Standard Precautions for the care of all patients, regardless of their diagnosis or presumed infection status.

Transmission-Based Precautions

Transmission-Based Precautions (i.e., Airborne Precautions, Droplet Precautions, and Contact Precautions), are recommended to provide additional precautions beyond Standard Precautions to interrupt transmission of pathogens. Transmission-based precautions can be used for patients known or suspected to be infected with epidemiologically important pathogens that can be transmitted by airborne or droplet transmission or by contact with dry skin or contaminated surfaces. These precautions should be used in addition to standard precautions.
Transmission-Based Precautions

**Airborne Precautions:** Used for infections spread in small particles in the air such as chicken pox. This requires an N-95 mask or greater.

**Droplet Precautions:** Used for infections spread in large droplets by coughing, talking, or sneezing such as influenza.

**Contact Precautions:** Used for infections spread by skin to skin contact or contact with other surfaces such as herpes simplex virus.

Clinical Syndromes or Conditions Warranting Empiric Precautions to Prevent Transmission of Epidemiologically Important Pathogens Pending Confirmation of Diagnosis:

<table>
<thead>
<tr>
<th>Clinical Syndrome</th>
<th>Potential Pathogen</th>
<th>Empiric Precaution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult with Diarrhea</td>
<td>Clostridium Difficile</td>
<td>Contact</td>
</tr>
<tr>
<td>Fever and altered mental status</td>
<td>Neisseria Meningitidis</td>
<td>Droplet</td>
</tr>
<tr>
<td>Generalized rash of unknown etiology</td>
<td>Neisseria Meningitidis Neisseria Meningitidis Varicella Rubeola (measles)</td>
<td>Droplet, Airborne (N-95 mask) and Contact</td>
</tr>
<tr>
<td>Cough, fever and hemoptysis</td>
<td>Mycobacterium Tuberculosis</td>
<td>Airborne (N-95 mask)</td>
</tr>
<tr>
<td>Cough, fever in an HIV patient</td>
<td>Mycobacterium Tuberculosis</td>
<td>Airborne (N-95 mask)</td>
</tr>
<tr>
<td>Skin abscess or draining wound</td>
<td>Staphylococcus Aureus</td>
<td>Contact</td>
</tr>
<tr>
<td>History of drug-resistant infection</td>
<td>MRSA, Vancomycin Resistant Enterococcus</td>
<td>Contact</td>
</tr>
</tbody>
</table>


Medication Administration

Endotracheal Medication Administration

Indications
In life-threatening emergencies when drug therapy is vital to patient survival and an IV line cannot be established. Dosage for medications administered via this route must be 2-2.5 times the IVP dose.

Equipment:
• Medication to be administered:
  • Narcan
  • Atropine
  • Epinephrine (use 10 X IV dose if less than 8 years old)
  • Lidocaine
• Endotracheal tube with proper placement confirmed by capnography
• BVM or automatic ventilator

Technique:
• Dilute agent in 10 ml normal saline if > 8 years and up to 5 ml if < 8 years old
• If performing CPR, stop compressions momentarily
• Detach BVM inject and medication directly into the endotracheal tube
• Immediately re-attach BVM to tube and ventilate with 5 breaths
• Resume CPR if patient in cardiac arrest
Medication Administration

Intranasal Mucosal Atomization Device

Using the LMA® MAD Nasal™ Intranasal Mucosal Atomization Device

**MATERIALS**

- LMA MAD Nasal Device with MAD adapter and 5 ml. in 5 cc syringe

**PROCEDURE**

1. **STEP 1:** Remove and discard the green vial adapter cap.
2. **STEP 2:** Pierce the medication vial with the syringe vial adapter.
3. **STEP 3:** Aspirate the proper volume of medication required to treat the patient (an extra 0.1 ml of medication should be drawn up to account for the dead space in the device).
4. **STEP 4:** Remove the syringe from the vial adapter.
5. **STEP 5:** Attack the MAD Nasal Device to the syringe via the luer lock connector.
6. **STEP 6:** Using the free hand to hold the receiving end of the tube, place the tip of the MAD Nasal Device against the nostril aiming slightly up and outward (toward the top of the ear).
7. **STEP 7:** Gently compress the syringe plunger to deliver half of the medication into the nostril.
8. **STEP 8:** Move the device over to the opposite nostril and, repeating steps 6 and 7, administer the remaining medication into the nostril if indicated.

**TIPS TO IMPROVE SUCCESS**

1. Minimize volume, maximize concentration
   - 1/5 ml. per nostril is ideal. 1 ml. is maximum
2. Use the appropriately concentrated drug
3. Maximize total mucosal absorptive surface area
   - Atomize the drug (rather than drip it in) to ensure broad surface area
   - Use BOTH nostrils to double the absorptive surface area
4. Aim slightly up and outward to rinse the turbinates and olfactory meatus
5. Beware of abnormal mucosal characteristics
   - Mucous, blood or vasconstrictors reduce absorption
   - Section nostril or consider alternate drug delivery method in these situations
Rectal Administration of Diazepam Gel (Diastat®)

Indications
- Inability to establish peripheral IV access
- Patient in status seizure activity with Diastat available for home administration

Technique
- Select appropriate dose of medication based on patient's prescription
Combat Application Tourniquet®

Instructions for Use: Two-handled Application
To prepare for use, store the C-A-T® in its one-handed configuration.

1. Apply tourniquet proximal to the bleeding site. Place the band around the limb and pass the tip through the inside slot of the buckle. Pull the band tight.

2. Pass the tip through the outer slot of the buckle. The friction buckle will lock the band in place.

3. Pull the band very tight and securely fasten the band back on itself.

4. Twist the rod until bright red bleeding has stopped and the distal pulse is diminished.

5. Place the rod inside the slip, locking it in place. Check for bleeding and distal pulses. If bleeding is not controlled, consider additional tightening or applying a second tourniquet proximal side by side to the first and reseal.

6. Secure the rod inside the slip with the strap. Prepare the patient for transport and resuscitate. Record the time of application.
Trauma Procedures

Emergency Bandage (formerly known as the "Israeli Bandage")

Instructions for Use

1. Place pad on wound and wrap the elastic bandage around limb or body part.
2. Insert elastic bandage completely into pressure bar.
3. Pull elastic bandage back over top sides of pressure bar forcing it down onto the pad.
4. Wrap elastic bandage tightly over pressure bar and wrap over all edges of pad.
5. Secure hooking ends of closure bar into elastic bandage.

QuikClot® Hemostatic Dressing

QuikClot® Hemostatic Dressing Instructions for Use

1. Open package and remove QuikClot Dressing. Keep the empty package.
2. Place QuikClot Dressing over the wound and use it to apply pressure directly over bleeding source. (More than one dressing may be required.)
3. Continue to apply pressure for 3 minutes or until bleeding stops.
4. Wrap and tie bandage to maintain pressure. Seek medical care immediately. Show product removal directions on package to medical personnel.
Patella Dislocation - Relocation Procedure

Dislocation of the patella is a frequently occurring, painful injury. Lateral dislocation is the most common and may be caused by flexion and external rotation of the knee with simultaneous contraction of the quadriceps tendon. The quadriceps contraction pulls the patella laterally. Common mechanisms are rotational motion of the knee with a planted foot, often seen in volleyball, tennis, basketball, football, gymnastics, and dancers.

Clinically, patients will present with obvious deformity of the knee and a displaced patella. Swelling may be present. This injury is extremely painful and significant relief of pain will occur once the patella is relocated.

Fractures accompanying patellar dislocation occur in 30%-50% of patients and typically involve a direct blow to the patella. Medial patellar dislocations are almost always associated with direct trauma to the patella. When a fracture is suspected field relocation should not be attempted.

Field relocation of patellar dislocations should only be attempted for lateral dislocations and when there was no direct blow or trauma to the patella.

Technique:
• Palpate and inspect the patella for obvious signs of fracture or open wounds
• If fracture suspected or medial dislocation do not attempt relocation and splint the injury as found
Trauma Procedures

Technique (continued):
- If possible, place the patient supine with the injured extremity elevated and flexed at 60-90 degrees
- Smoothly straighten the extremity by lifting under the ankle, while simultaneously applying firm medial pressure to the lateral aspect of the patella
  - If the patient experiences significant pain with relocation attempt, discontinue and apply splint
- The patella should “pop” easily back into place as the knee approaches full extension
- Once reduced, apply ice or cold packs, splint in the extended position and transport for further evaluation

Complications:
- Pain with attempted reduction technique
- Fractures related to the relocation procedure are rare
- Most complications are related to the injury itself
Trauma Procedures

Pleural Decompression for Suspected Tension Pneumothorax

Indications:
1. **Suspected Tension Pneumothorax** in patients exhibiting at least 3 of the following criteria:
   - Severe respiratory distress with hypoxia
   - Unilateral decreased or absent lung sounds
   - Evidence of hemodynamic compromise (Shock, hypotension, tachycardia, altered mental status)
   - Tracheal deviation away from the collapsed lung field (less reliable than the above
2. **Cardiac Arrest after blunt or penetrating trauma** involving the chest or abdomen
   - Unless the injury is clearly unilateral, consider bilateral pleural decompression in patients who suffer cardiac arrest in this scenario

Equipment:
- 14 gauge 2 - 2.5 inch catheter over the needle
- Tape
- Sterile gauze pads
- Antiseptic swabs
- Occlusive dressing

Technique:
- Locate decompression site
- Identify the 2nd intercostal space in the mid-clavicular line on the same side as the suspected tension pneumothorax
- Prepare the site with an antiseptic swab
- Firmly introduce catheter immediately above 3rd rib in the mid-clavicular line
- Insert the catheter into the thorax until air exits
- Advance catheter and remove needle
- Secure the catheter taking care not to allow it to kink
- Reassess lung sounds and patient condition
- Dress area with Occlusive dressing then cover with sterile gauze pad
- Assess breath sounds and respiratory status
Trauma Procedures

Spinal Immobilization for Football Players

EMS providers must use extreme caution when evaluating and treating an injured football player, especially when the extent of the injury remains unknown. Suspect spinal injury in any football player who has altered mental status or any other neurologic complaint. If the football player isn’t breathing work quickly and effectively with the athletic trainer staff to remove the face mask and administer care. In most situations, the helmet and shoulder pads should not be removed in the field. Manage of head and neck injuries with the helmet and shoulder pads in place, removing only the face mask from the helmet.

Football Face Mask Removal:
- The face mask should be removed prior to transportation, regardless of current respiratory status
- Those involved in the prehospital care of injured football players must have the tools for face mask removal readily available

Indications for Football Helmet Removal:
- The athletic helmet and chin strap should only be removed if:
  - The helmet and chin strap do not hold the head securely, such that immobilization of the helmet does not also immobilize the head
  - The design of the helmet and chin strap is such that even after removal of the face mask the airway can not be controlled, or ventilation be provided
  - The face mask can not be removed after a reasonable period of time
  - The helmet prevents immobilization for transportation in an appropriate position

Helmet Removal Technique:
- If it becomes absolutely necessary, spinal immobilization must be maintained while removing the helmet
- Due to the varying types of helmets encountered, the helmet should be removed with close oversight by the team athletic trainers and/or sports medicine staff
- In most circumstances, it may be helpful to remove cheek padding and/or deflate air padding prior to helmet removal
- Appropriate spinal alignment must be maintained during care and transport using backboard, straps, tape, head-blocks or other necessary equipment.
  - Be aware that the helmet and shoulder pads elevate an athlete’s trunk when in the supine position.
  - The front of the shoulder pads can be opened to allow access for CPR and defibrillation
Vascular Access Procedures

External Jugular IV line Placement

Indications
- Patients requiring IV medications or fluids when a peripheral line cannot be established
  - In cardiac arrest scenarios attempt intraosseous access first to avoid interference with resuscitation efforts

Contraindications
- Child with partial airway obstruction (e.g. suspected epiglottitis)—when agitation from performing procedure may worsen respiratory difficulty

Equipment
- Appropriate tubing or IV lock
- #14 - #24 catheter over the needle
- Antiseptic swab
- Gauze pad or adhesive bandage
- Antibiotic ointment
- Tape or other securing device

Technique
- Assemble IV solution and tubing
- Verify correct IV solution and check for clarity and expiration date
- Identify the external jugular vein on the lateral aspect of the neck
  - Turn the patient’s head slightly to the side opposite the insertion site
  - Slight Trendelenburg position may help accentuate the vein
  - Apply light pressure above the clavicle to engorge the external jugular vein
- Clean the skin with the antiseptic swab
- Select a site for puncture, preferably as far away as possible from the clavicle in order to avoid accidental lung puncture
- Once a flash is obtained advance the catheter over the needle and remove the needle while compressing the proximal tip of the catheter to minimize blood loss
- Connect IV tubing to the catheter, or secure the IV lock to the catheter and flush with appropriate solution (normal saline)
- Check the IV insertion site occasionally for swelling which may indicate extravasation or loss of patency
Intraosseous Access using the EZ-IO®

**Indications:**
- When vascular access is essential in the management of a severely ill adult or child and no other option is readily available
- For adults, Medical Control approval is necessary unless the patient is in cardiac arrest

**Contraindications:**
- The only absolute contraindication is fracture of the tibia or long bones sites for potential intraosseous access
- Infection over the insertion site (should be avoided but not strictly contraindicated)
- Relatively contraindicated if other adequate vascular access is readily available

**Technique: Tibial Insertion**
- Identify and palpate the tibial tuberosity just below the knee
- Locate a consistent flat area of bone 2 cm distal and slightly medial to the tibial tuberosity
- Support the flexed knee by placing a hand or towel under the calf
- Cleanse the area with a sterilizing solution and perform insertion using aseptic technique
- Using the EZ-IO® drill insertion device, gently pierce skin until the needle touches bone. Ensure at least one black line is visible on the needle (if not, select larger needle size)
- Squeeze the trigger while maintaining gentle, steady pressure on the handle
- Release the trigger when you feel a decrease in resistance (hub may be flush with skin)
  - If properly placed, the needle should stand up from the bone without assistance
- Remove the inner trocar and use a syringe to aspirate bone marrow
  - Obtaining marrow confirms placement
- If marrow does not return when aspirated, flush with 5-10 ml of Normal Saline
  - Significant resistance or extravasation suggests improper placement
  - If flow is good, and no extravasation is seen, attach IV tubing and secure in place
Vascular Access Procedures

Technique: Humeral Head Insertion

- This site is only to be used on adult cardiac arrest patients
- The humerus is most easily palpated at the insertion point for the deltoid muscle, between the bicep and tricep muscles
  - This point is approximately mid-way along the length of the arm
  - Palpation of the bone requires firm pressure due to overlying structures
- The surgical neck can be located by palpating up the length of the humerus until you feel a "notch" or "groove"
- The appropriate insertion site is approximately 1cm above the surgical neck for most adults
- Cleanse the area with a sterilizing solution and perform insertion using aseptic technique
- Using the EZ-IO® drill insertion device, place the needle tip at the selected insertion site, keeping the needle perpendicular to the skin
- Push the needle through the skin and make contact with the bone (ensure at least one black line is visible)
- When ready press the trigger while maintaining gentle steady pressure on the handle
- Once the needle hub has contacted the shin release the trigger
  - If properly placed, the needle should stand up from the bone without assistance
- Remove the inner trocar and use a syringe to aspirate bone marrow
  - Obtaining marrow confirms placement
- If marrow does not return when aspirated, flush with 5-10 ml of Normal Saline
  - Significant resistance or extravasation suggests improper placement
  - If flow is good, and no extravasation is seen, attach IV tubing and secure in place

Complications:

- Extravasation of fluid or caustic medications
- Pain, fracture, hematoma, growth plate injury
- Compartment syndrome
- Osteomyelitis
- Cellulitis at the insertion site
Vascular Access Procedures

Peripheral IV line Placement

Indications
- Patients requiring IV medications or fluids
- Patients with any potential for deterioration (e.g. seizures, altered mentation, trauma, chest pain, difficulty breathing)

Contraindications
- Child with partial airway obstruction (e.g. suspected epiglottitis) – when agitation from performing procedure may worsen respiratory difficulty

Equipment
- Appropriate tubing or IV lock
- #14 - #24 catheter over the needle
- Venous tourniquet
- Antiseptic swab
- Gauze pad or adhesive bandage
- Antibiotic ointment
- Tape or other securing device

Technique
- Assemble IV solution and tubing
- Verify correct IV solution and check for clarity and expiration date
- Place the tourniquet around the patient’s arm proximal to the IV site
- Identify the most appropriate venous puncture site
- Clean the skin with the antiseptic swab in an increasing sized concentric circle and follow it with an alcohol swab
- Stabilize the vein distally and enter the skin with the bevel of the needle facing upward
- Once a flash is obtained advance the catheter over the needle and remove the needle while compressing the proximal tip of the catheter to minimize blood loss
- Remove the tourniquet
- Connect IV tubing to the catheter, or secure the IV lock to the catheter and flush with appropriate solution (normal saline)
- Check the IV insertion site occasionally for swelling which may indicate extravasation or loss of patency
Delayed Off-Load

Inordinate delays in transferring care can adversely affect the transported patient, as well as reduce the emergency response capabilities of the EMS System. This procedure applies to the transfer of care once an EMS patient arrives on hospital property.

General Principles During Delayed Offload Process:
- Once on hospital property, the receiving facility assumes responsibility for all further medical care delivered to EMS transported patients.
- With the exception of life threatening situations (cardiac arrest, airway emergencies or imminent delivery of a newborn), or medical treatments started prior to arrival (nebulizers, CPAP, IV fluids), Orange County EMS personnel are only authorized to perform passive monitoring while awaiting bed assignment.
- The OCEMS System Protocols are not applicable when in the ED (these protocols are intended for prehospital use only). All patient care shall be dictated by appropriate hospital personnel when on hospital property. In accordance with this, Orange County EMS Medical Control should not be contacted for orders after ED arrival.
- The passive monitoring phase shall be limited to 45 minutes during EMS Operational Green Status (normal operations), and 15 minutes during EMS Operational RED Status.

Delayed Off-load Procedure:
- In addition to the radio report given during transport, contact should be made with the ED charge nurse within 2 minutes of arrival to give a verbal report.
- After arrival communicate all patient medical needs to the ED charge nurse or designee.
- If off-load has not been accomplished at the 30 minute post-arrival mark:
  - Advise the ED charge nurse that the unit will return to service in 15 minutes (45 minutes post-arrival).
  - Prepare all documentation during this interval for hand delivery to the ED charge nurse.
- If off-load has not been accomplished at the 45 minute post-arrival mark:
  - Contact authorized supervisor for approval to proceed with off-load onto temporary stretcher or wheelchair.
  - The final decision to move a patient should be made by an agency supervisor in accordance with agency specific policies.
- For patients who will be placed in wheelchairs, assure the following:
  - Patient has no alteration in mental status.
  - Patient is not at obvious risk of falling or suddenly losing consciousness (i.e. seizures, syncope or severe vertigo).
  - Patient tolerates the seated position without significant discomfort.
  - No change in general splinting position or immobilization status occurs for the purpose of placing patient in a wheelchair.
Miscellaneous Procedures

Delayed Off-load Procedure (continued):
- Advise the patient of the move, and determine if moving the patient can be done safely.
- In the event a patient refuses to be moved, communicate with supervisor for further instructions.
- Move the patient safely, so as not to worsen or exacerbate pain or discomfort.
- Notify the ED charge nurse or designee (face-to-face communication) of the patient’s location and condition at the time of the move; hand-deliver all documentation.
- Document pertinent details of the process, including the name of the ED staff member who received the final report, and the time final report was given.

Once the patient is off-loaded, the unit should return to service immediately (do not linger on hospital property any longer then is necessary).

EMS Operational RED Status:
At times of critical operational overload, crews are needed to immediately return to service. Delays in returning units to service under these conditions may constitute a threat to public safety. For the Orange County EMS System, this status will be announced by MEDCOM over every hospital frequency.
- Offload delays during EMS Operational RED Status should not exceed 15 minutes:
  - When giving initial report, advise the ED charge nurse of EMS Operational RED Status.
  - If awaiting bed assignment when EMS Operational RED Status is announced, advise the ED charge nurse or designee of the change, and that the unit will return to service in 15 minutes.
  - If off-load has not been accomplished at the 15 minute mark, contact authorized supervisor for approval to proceed with off-load onto temporary stretcher or wheelchair.
  - Follow all of the patient safety steps listed above when off-loading patients during EMS Operational RED Status.
  - Once the patient is off-loaded, the unit should return to service immediately.

No Bed Assignment/No Offload After Specified Time Limit:
When a patient cannot be safely moved to a temporary stretcher or wheelchair, in accordance with the 45 or 15 minute time limits notify agency supervisor of the inability to physically transfer the patient.
Continue the passive monitoring process, assuring the patient’s well-being is protected as much as possible. The supervisor should gather details of the interaction, including patient condition, reason why move was not accomplished and name of the ED staff member involved. The supervisor may request MEDCOM to page the Office of the Medical Director (OMD) staff-member on call if assistance is needed. Every case will be evaluated for areas of improvement.
Double Sequential External Defibrillation (DSED)

This procedure is only to be used for persistent and continuous ventricular fibrillation that has failed to convert after at least five shocks.

Technique:
- Assure all other essential interventions have been performed and potential causes of the arrest have been addressed
- Continue high quality chest compressions while preparing for DSED
- Using a second monitor/defibrillator, apply second set of external defibrillation pads in the Anterior/Posterior position
  - Assure that the pads do not make contact with each other
- Charge both defibrillators to 360 joules while minimizing interruptions in chest compressions
- If the monitor continues to show Ventricular Fibrillation prepare to deliver shock by loudly clearing the patient of any contact with rescuers (CLEAR!)
- Simultaneously depress the shock button on both monitors, delivering a combined shock of 760 joules
  - Immediately resume chest compressions
  - Perform a pulse check and rhythm check after approximately 2 minutes
  - If Ventricular Fibrillation persists DSED can be repeated as needed
The following pages provide supplemental information on pharmaceuticals approved for use in the Orange County EMS System. This material is meant to provide additional information, it does not establish orders for delivery of medication. **Drugs may only be administered as directed by authorized Orange County EMS System Protocols or by direct medical control order.**
Adenosine (Adenocard®)

Pharmacologic properties:
Adenosine is an endogenous purine nucleoside that slows conduction time through the AV node and interrupts AV reentry pathways which restores normal sinus rhythm in patients with paroxysmal supraventricular tachycardia (PSVT). The onset of action is 20-30 seconds and the duration of action is < 10 seconds.

Indications:
- PSVT (rate > 150)
- Wide-complex tachycardia (rate >150), stable and SVT highly likely

Contraindications:
- 2nd or 3rd degree AV block
- Sick sinus syndrome
- Known hypersensitivity

Precautions:
- Effects of adenosine are antagonized by methylxanthine (theophylline and caffeine)
- Adenosine can provoke bronchospasm and should be used cautiously in patients with reactive airway disease
- Tegretol and Persantine may potentiate the effect of Adenosine
- Adenosine is not effective in converting atrial fibrillation or flutter
- The half-life of adenosine is < 5 seconds - the drug should be administered via a large bore IV in the upper extremity, and at the port closest to the IV hub

Side effects/ adverse reactions:
- Cardiovascular- transient chest pain
- Facial flushing (transient)
- Respiratory- transient dyspnea
- Metallic taste

Dosage and administration:
- Adult
  - 6 mg rapid IV bolus over 1-3 seconds
  - If inadequate response in 1-2 minutes, administer 12 mg rapid IV bolus over 1-3 seconds
  - If inadequate response in 1-2 minutes, repeat 12 mg rapid IV bolus over 1-3 seconds.
- Pediatric
  - 0.1 mg/kg rapid IV/IO bolus over 1-3 seconds (maximum dose 6 mg)
  - If inadequate response in 1-2 minutes, administer 0.2 mg/kg (maximum dose 12 mg) rapid IV bolus, over 1-3 seconds
  - If inadequate response in 1-2 minutes, repeat 0.2 mg/kg (maximum dose 12 mg) rapid IV bolus, over 1-3 seconds

Refer to the Physician's Desk Reference (PDR) for complete drug information
Amiodarone (Cordarone®)

Pharmacologic properties:
Amiodarone is considered a class III antiarrhythmic. It possesses electrophysiologic characteristics of sodium, potassium and calcium channel blockade, as well as alpha and beta adrenergic blocking activity. These properties prolong action potentials and repolarization, stabilizing myocardial membranes.

Indications:
- Ventricular fibrillation/pulseless ventricular tachycardia
- Ventricular tachycardia without overt signs of shock (SBP > 90)
- Wide complex tachycardia of unknown etiology
- Pediatric ventricular fibrillation/pulseless ventricular tachycardia

Contraindications:
- Cardiogenic shock
- Marked sinus bradycardia
- Second or third degree AV block
- Known hypersensitivity

Precautions:
- Solution is extremely viscous, Do Not Shake
- Administer the medication slowly
- Use large bore filtered needles, or needless filter straws

Side effects/ adverse reactions:
- Hypotension
- Bradycardia
- Adverse effects can be treated by the following:
  - Slow the rate of drug infusion
  - IVF bolus, pressors, chronotropic agents, or temporary pacing

Dosage and administration:
- Adult cardiac arrest
  - 300 mg, IV/IO bolus
    - If administered undiluted, immediately follow with 10-20 ml bolus of NS
    - For persistent VF/VT repeat 150 mg, IV/IO bolus (maximum total dose 450 mg)
- Adult noncardiac arrest
  - 150 mg (mixed in 100 ml of D5W), IV over 10 minutes
  - Repeat 150 mg IV (over 10 min) every 10-15 min as needed (maximum total dose 450 mg)
- Pediatric cardiac arrest
  - 5 mg/kg, IV/IO bolus (maximum individual dose 300 mg)
  - For persistent VF/VT repeat 5 mg/kg, IV/IO bolus (maximum total dose 15 mg/kg)

Refer to the Physician’s Desk Reference (PDR) for complete drug information
Albuterol Sulfate (Proventil®, Ventolin®)

Pharmacologic properties:
Albuterol is primarily a beta-2 agonist that produces bronchodilation with limited cardiovascular side effects due to its high specificity for beta-2 receptors. Onset is within 15 minutes; peak effect is in 60-90 minutes. Therapeutic effects may be active up to 5 hours.

Indications:
• Acute bronchospasm (wheezing) due to asthma, COPD or allergic reactions

Contraindications:
• Known hypersensitivity

Precautions:
• Use cautiously in patients with coronary artery disease, hypertension, hyperthyroidism, diabetes
• Epinephrine should not be used at the same time as albuterol, however, either may be used subsequent to a failure of the other

Side effects/ adverse reactions:
• Nervousness
• Tremor
• Tachycardia
• Hypertension
• Nausea
• Vomiting

Dosage and administration:
• Each unit dose delivers 2.5 mg of Albuterol Sulfate in 3 ml total solution in adult and pediatric patients
  • Adult
    • 2.5 mg/3 ml administered via nebulization
    • Repeat as needed to maximum total 3 doses
  • Pediatric
    • 2.5 mg/3 ml administered via nebulization
    • Repeat as needed to maximum total 3 doses

Refer to the Physician's Desk Reference (PDR) for complete drug information

Authorization Date: 9/4/2013
Aspirin (ASA)

**Pharmacologic properties:**
Aspirin is a salicylate with anti-platelet activity. It inhibits cyclooxygenase, blocking the synthesis of prostaglandin to interfere with platelet aggregation. This action has been demonstrated to reduce mortality in patients suffering from myocardial infarction. Aspirin also has moderate analgesic and anti-pyretic effects. The onset of action is 5-30 minutes, and the duration of action is 3-6 hours.

**Indications:**
- Chest Pain - suspected myocardial ischemia

**Contraindications:**
- Known hypersensitivity
- Active ulcer disease
- Pregnant (especially third trimester) or a nursing mother

**Adverse Reactions:**
- Anaphylaxis (if history of hypersensitivity)
- Abdominal discomfort
- Gastrointestinal bleeding (if previous condition exists)

**Dosage and administration:**
- 324 mg PO

Refer to the Physician’s Desk Reference (PDR) for complete drug information
Atropine Sulfate (cardiac indications)

Pharmacologic properties:
Atropine is a potent parasympatholytic anticholinergic. It inhibits muscarinic receptor activity in the parasympathetic sites in smooth muscle, central nervous system, cardiac and secretory tissue. This reduces vagal tone, increases automaticity of the SA node and increases AV conductions, thus increasing heart rate. Additional effects include drying secretions and slowing motility in the gastrointestinal tract.

Indications:
• Bradydysrhythmias (rate < 50) accompanied by hemodynamic compromise, i.e. hypotension (systolic less than 90 mmHg), shock, pulmonary edema, altered level of consciousness
• Pediatric Bradycardia (HR < 100 in an infant, HR < 60 in a child) despite adequate oxygenation, ventilation, chest compressions, and refractory to epinephrine

Contraindications:
• Atropine has no effect in patients with transplanted hearts
• 3rd degree AV block in the setting of an acute anterior wall MI

Precautions:
• If normal dose pushed too slowly, or if too small a dose (<0.5 mg) is given, heart rate may initially slow down
• Atropine is potentiated by antihistamines and antidepressants
• Cautious use in Type II AV block and 3rd degree block with wide QRS complexes

Adverse reactions:
• Restlessness
• Agitation
• Confusion
• Pupil dilation
• Blurred vision
• Headache
• Increased myocardial oxygen demand
• Ventricular fibrillation
• Dry mouth
• Difficulty swallowing
• Urinary retention

Dosage and administration:
• Adult symptomatic bradycardia:
  • 0.5 mg IV bolus, repeat every 3-5 minutes until improved (maximum dose 3 mg)
• Pediatric Symptomatic Bradycardia:
  • 0.02 mg/kg IV, IO or ET, (minimum individual dose is 0.1 mg and maximum individual dose is 0.5 mg)
  • May be repeated in 3-5 minutes
  • Maximum total dose 1.0 mg

Refer to the Physician’s Desk Reference (PDR) for complete drug information
Atropine Sulfate (as an antidote for poisoning)

**Pharmacologic properties:**
Atropine is a potent parasympatholytic anticholinergic. It inhibits muscarinic receptor activity in the parasympathetic sites on smooth muscle and the central nervous system, as well as cardiac and secretory tissue. This reduces vagal tone, increases automaticity of the SA node and increases AV conduction, thus increasing heart rate. Additional effects include drying secretions and slowing motility in the gastrointestinal tract.

**Indications:**
- Organophosphate Poisoning (i.e. parathion, malathion, rid-a-bug) and carbamate (Baygon, sevin, and many common roach and ant sprays)
- Poisoning Signs “SLUDGE”
  - Salivation
  - Lacrimation
  - Urination
  - Defecation
  - GI hypermotility (Emesis, diarrhea)
  - Excessive sweating and bronchorrhea
  - Additional signs include: pinpoint pupils and bradycardia

**Contraindications:**
- None when used in the management of severe organophosphate poisoning

**Precautions:**
- It is important that the patient be adequately oxygenated and ventilated prior to using atropine, as atropine may precipitate ventricular fibrillation in a poorly oxygenated patient.
- Do not rely upon pupilloconstriction to discontinue or to titrate medications

**Adverse reactions:**
- Victims of organophosphate poisoning can tolerate large doses (1000 mg) of atropine.
- Signs of atropinization (flushing, pupil dilation, dry mouth, tachycardia) are likely to occur

**Dosage and administration:**
- **Adult**
  - 2 mg IV. May repeat 2 mg every 5 minutes
  - Titrate until respiratory secretions/distress begins to decrease
- **Pediatric**
  - 0.02 mg/kg repeat every 5 minutes as necessary
  - Titrate until respiratory secretions/distress begins to decrease

Refer to the Physician's Desk Reference (PDR) for complete drug information
Calcium Chloride

Pharmacologic properties:
Calcium is a cation that essential for neurotransmission, bone formation, enzymatic reactions and muscle (including cardiac) contraction. In the myocardium, it increases the force of contraction and augments cardiac output. Calcium also has a stabilizing effect on myocardial membranes when dangerously high potassium levels make the heart at risk for fibrillation.

Indications:
• Hyperkalemia with associated ECG disturbances
• Hypocalcemia (known)
• Calcium channel blocker toxicity with hemodynamic compromise
• Magnesium (MgSO4) toxicity

Contraindications:
• Cardiac arrest not associated with one of the above
• Digoxin toxicity
• Hypercalcemia

Precautions:
• Cautious use in patients receiving Digoxin - do not administer to patients with suspected Digoxin toxicity or overdose
• Do not mix with sodium bicarbonate - it will precipitate

Adverse reactions:
• Bradycardia (usually caused by rapid administration)
• Arrhythmias - especially in patients on digoxin
• Sclerosis of veins (if IV infiltrates)

Dosage and administration:
• Adult
  • 1 gram (10 ml of a 10% solution), IV bolus
  • May repeat once in ten minutes if no response
• Pediatric
  • 0.2 ml/kg (20 mg/kg) slow IV push
  • May repeat once in 10 minutes if no response (maximum dose 2 grams)
**Dextrose**

**Pharmacologic properties:**
Dextrose is a simple monosaccharide also known as glucose. It provides calories for metabolic needs, sparing body proteins and loss of electrolytes. Dextrose is a hypertonic solution that is readily excreted by the kidneys producing diuresis.

**Indications:**
- Hypoglycemia
  - Adult < 70 mg/dL (< 50 mg/dL if suspected stroke)
  - Pediatric < 70 mg/dL
- Coma of unknown origin (altered level of consciousness), and unable to perform glucose check

**Contraindications:**
- Stroke or acute brain injury with glucose > 50 mg/dL

**Precautions:**
- May theoretically precipitate Wernicke-Korsakoff syndrome if given without thiamine in chronic alcohol dependence and malnutrition

**Adverse reactions:**
- Thrombosis, sclerosing if given in a peripheral vein
- Tissue irritation if infiltrates.
- Hyperglycemia
- Hypokalemia

**Dosage and administration:**
- Adult
  - 50 ml of a 50% solution (25gm) IV
- Pediatric
  - D10W at 5 ml/kg for children < 1 year old (maximum dose 40 ml)
  - D25W at 2 ml/kg for children 1-8 years old (maximum dose 50 ml)
  - D50W at 1 ml/kg for children ≥ 9 years old (maximum dose 50 ml)

**Dextrose Administration Summary Table**

<table>
<thead>
<tr>
<th>Age</th>
<th>Threshold glucose (mg/dL)</th>
<th>Dosage</th>
<th>Dextrose solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1 YR</td>
<td>&lt; 70</td>
<td>5 mL/kg</td>
<td>10%</td>
</tr>
<tr>
<td>1-8 YRS</td>
<td>&lt; 70</td>
<td>2 mL/kg</td>
<td>25%</td>
</tr>
<tr>
<td>≥ 9 YRS</td>
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<tr>
<td>Adult</td>
<td>&lt; 70</td>
<td>50 mL</td>
<td>50%</td>
</tr>
</tbody>
</table>

Refer to the Physician's Desk Reference (PDR) for complete drug information
Diltiazem (Cardizem®)

**Pharmacologic properties:**
Diltiazem is a calcium channel blocking agent that inhibits the influx of calcium ions during membrane depolarization of cardiac and vascular smooth muscle. Its action is to slow AV nodal conduction and increase the AV nodal refractory period. Diltiazem slows the ventricular rate in patients with a rapid ventricular response during atrial fibrillation or atrial flutter, potentially converts supraventricular tachycardia to normal sinus rhythm, and decreases total peripheral resistance in both systolic and diastolic blood pressure.

**Indications:**
- Narrow complex atrial fibrillation/flutter with rapid ventricular rate (>150 bpm)
- PSVT refractory to adenosine

**Contraindications:**
- Patients with impaired left ventricular function or heart failure
- Complete heart block
- Hypotension (SBP <90) or cardiogenic shock
- Recently (within past 1 hour) received IV β-blocker
- Patients with a history of Wolff-Parkinson-White Syndrome (WPW)
- Sick sinus syndrome
- Ventricular tachycardia or wide complex tachycardia

**Precautions:**
- Cautious use in patients with congestive heart failure, monitor for signs of pulmonary edema
- Cautious use in patients who are already taking antihypertensive medications, monitor for hypotension

**Adverse reactions:**
- Hypotension
- Bradycardia
- Heart block

**Dosage and administration:**
- Adults
  - 0.25 mg/kg slow IV bolus (maximum dose 20 mg)
- Pediatric
  - Not Indicated

Refer to the Physician's Desk Reference (PDR) for complete drug information
Diphenhydramine Hydrochloride (Benadryl®)

Pharmacologic properties:
Diphenhydramine is a histamine H1-receptor antagonist that prevents the release of histamine from effector mast cells. Histamine is a vasoactive substance central to allergic reactions that induces vasodilation, vascular permeability, and bronchoconstriction. Diphenhydramine prevents histamine-mediated responses, particularly the effects of histamine on the smooth muscle of the bronchial airways, skin, gastrointestinal tract, and blood vessels.

Indications:
• Acute allergic reactions (mild, moderate, or severe)
• Anaphylaxis
• Acute dystonic reactions associated with ingestion of phenothiazines and related drugs (haloperidol, thorazine, compazine, metaclopramide, ziprasidone)

Contraindications:
• Benadryl is not to be used in newborn or premature infants or in nursing mothers
• Known hypersensitivity to diphenhydramine or antihistamines

Precautions:
• In premature babies and infants, diphenhydramine in over-dosage may cause convulsions or death
• May cause significant sedation or paradoxical excitation/akethesia
• Diphenhydramine has additive effects with alcohol and other CNS depressants
• Antihistamines may cause dizziness, confusion, delirium, hallucinations, and/or hypotension in the elderly (60 years or older)
• Diphenhydramine has an atropine-like action and therefore should be used with caution in patients with a history of bronchial asthma, increased intraocular pressure, hyperthyroidism, cardiovascular disease or hyper-tension

Adverse reactions:
• Drowsiness, sedation
• Confusion
• Vertigo
• Hyperactivity in children
• Palpitations
• Tachycardiac
• PVC’s
• Hypotension
• Nausea
• Vomiting
• Diarrhea
• Dry mouth
• Constipation
• Urinary retention
• Thickening of bronchial secretion
• Wheezing

Dosage and administration:
• Adults
  • 1 mg/kg IV or IM (maximum dose 50 mg)
• Pediatrics
  • 1 mg/kg IV or IM (maximum dose 50 mg)

Refer to the Physician's Desk Reference (PDR) for complete drug information
Dopamine Hydrochloride (Intropin®)

Pharmacologic properties:
Dopamine is an endogenous catecholamine that exerts an inotropic effect on the myocardium resulting in increased cardiac output. It stimulates dopaminergic, beta-adrenergic and alpha-adrenergic receptors of the nervous system in a dose-dependent manner. Low to moderate doses (2-10 mcg/kg/min) have predominant beta-adrenergic receptor stimulating actions that result in increased cardiac output and heart rate with minimal vasoconstriction. At higher doses (>10 mcg/kg/min), dopamine has alpha receptor stimulating actions that result in peripheral vasoconstriction and increased blood pressure.

Indications:
- Cardiogenic, neurogenic, septic, or anaphylactic shock
- Bradycardia with hypotension refractory to Atropine
- Hemodynamically significant (SBP < 90 mmHg) overdose
- Hypotension (SBP < 90 mmHg) not secondary to hypovolemia

Contraindications:
- Shock due to hypovolemia
- Dopamine should not be administered in the presence of uncorrected tachyarrhythmias or ventricular fibrillation
- Dopamine should not be used in patients with pheochromocytoma

Precautions:
- Significant local tissue necrosis can occur with extravasation from peripheral IV
- Dopamine is inactivated in alkaline solution, do not use any alkaline diluent
- Patients who have been treated with monoamine oxidase (MAO) inhibitors will require substantially reduced dosage

Adverse reactions:
- Headache
- Ectopic beats
- Tachycardia
- Anginal pain
- Palpitation
- Hypotension
- Nausea
- Vomiting
- Local
- Necrosis with extravasation
- Piloerection
- Dyspnea

Dosage and administration:
- Mix 400 mg of Dopamine in 250 ml NS to yield a concentration of 1600 mcg/ml
- Hypotension/Shock:
  - 5 - 20 mcg/kg/min titrated to maintain SBP > 90 mm Hg
  - Bradycardia with hypotension, refractory to atropine
  - 2 - 10 mcg/kg/min titrated to maintain SBP > 90 mm Hg

Refer to the Physician's Desk Reference (PDR) for complete drug information
Epinephrine Hydrochloride (1:1,000)

**Pharmacologic properties:**
Epinephrine is a sympathomimetic which stimulates both alpha and beta adrenergic receptors. Its effects are to increase systemic vascular resistance, arterial blood pressure, coronary and cerebral blood flow, heart rate and contractility. The alpha-adrenergic effect increases vascular resistance and coronary blood flow, which may make the fibrillating myocardium more susceptible to counter-shock. The beta adrenergic effect increases heart rate and cardiac output, and induces bronchodilation.

**Indications:**
- Anaphylaxis and acute allergic reactions associated with severe systemic symptoms (BP < 90 mmHg, stridor, severe respiratory distress) in adults and pediatrics
- Bronchospasm (wheezing) with severe respiratory distress during asthma or COPD exacerbation
- Cardiac arrest in pediatrics (via endotracheal tube, diluted)

**Contraindications:**
- Known hypersensitivity

**Precautions:**
- Presence of hypertension
- History of heart disease
- Age over 50 years
- Epinephrine is inactivated by alkaline solutions and should not be mixed with Sodium Bicarbonate
- Epinephrine 1:1,000 cannot be given intravenously in non-cardiac arrest patients

**Adverse reactions:**
- Anxiety
- Headache
- Cerebral hemorrhage
- Tachycardia
- Ventricular dysrhythmias
- Hypertension
- Angina
- Nausea and vomiting

**Dosage and administration:**
- **Adult**
  - 0.3 mg IM
- **Pediatric**
  - Bronchospasm / Acute allergic reaction
    - 0.01 mg/kg (max 0.3 mg) IM
    - May repeat every 15 minutes as needed X 2 additional doses (3 total)
  - Cardiac Arrest (no IV/IO available)
    - 0.1 mg/kg (max 10 mg) diluted in 5 mL NaCl via endotracheal tube

*Refer to the Physician's Desk Reference (PDR) for complete drug information*
Epinephrine Hydrochloride (1:10,000)

Pharmacologic properties:
Epinephrine is a sympathomimetic which stimulates both Alpha and Beta adrenergic receptors. Its effects are to increase systemic vascular resistance, arterial blood pressure, coronary and cerebral blood flow, heart rate and contractility. The alpha-adrenergic effect increases vascular resistance and coronary blood flow, which may make the fibrillating myocardium more susceptible to counter-shock. The beta adrenergic effect increases heart rate and cardiac output, and induces bronchodilation.

Indications:
• Cardiac arrest (Ventricular fibrillation (VF) or pulseless ventricular tachycardia (VT), Asystole, Pulseless electrical activity (PEA)
• Symptomatic bradycardia
• Anaphylactic shock
• Newborn resuscitation/neonatal asystole or bradycardia
• Pediatric bradycardia and cardiac arrest

Contraindications:
• NONE in the cardiac arrest situation

Precautions:
• Epinephrine is inactivated by alkaline solutions and should not be mixed with Sodium Bicarbonate
• See Epinephrine 1:1,000 for non-cardiac arrest precautions

Adverse reactions:
• Cerebral hemorrhage
• Hypertension
• Tachycardia
• Angina
• Ventricular dysrhythmias
• Nausea and vomiting

Dosage and administration:
• Adult
  • Cardiac arrest:
    • 1 mg (10 mL) IV/IO, repeat every 3-5 minutes
  • Symptomatic bradycardia with hypotension, resistant to dopamine:
    • 2-10 mcg/min (Mix 1mg in 250 mL NS and begin at 30 drops/min)
  • Anaphylactic shock/allergic reaction (cardiac arrest or respiratory arrest imminent)
    • 0.5 mg IV
• Pediatric
  • Cardiac arrest:
    • 0.01 mg/kg, (max 1.0 mg) IV/IO, repeat every 3-5 minutes
    • Bradycardia (heart rate < 60 bpm)
    • 0.01 mg/kg (max 1 mg) IV/IO, repeat every 3-5 minutes as needed
  • Newborn resuscitation
    • 0.01 mg/kg IV of a 1:10,000 solution, Repeat every 3-5 minutes

Refer to the Physician’s Desk Reference (PDR) for complete drug information
Fentanyl (Sublimaze®)

**Pharmacologic properties:**
Fentanyl is a synthetic opioid analgesic that suppresses pain by agonizing opioid receptors in the central nervous system. Fentanyl has fewer vasoactive effects than morphine and does not induce significant histamine release. As a result, the drug does not cause significant hypotension in proper doses.

**Indications:**
- Chest pain associated with suspected myocardial ischemia
- Thermal burns
- Frostbite
- Isolated extremity injury
- Pain from suspected kidney stone

**Contraindications:**
- Pain due to multisystem trauma or suspected acute abdomen
- Hypotension, (SBP <100 mmHg) or volume depletion
- Head trauma
- Acute alcohol intoxication
- Acute respiratory distress
- Known hypersensitivity

**Precautions:**
- Use with caution in elderly patients
- Fentanyl is metabolized by the liver, use caution in patients with known liver disease
- Sedative effects are potentiated by alcohol, antihistamines, barbiturates, benzodiazepines, phenothiazines, and other sedatives

**Adverse reactions:**
- Euphoria
- Drowsiness
- Pupillary constriction
- Respiratory arrest
- Decreases gastric motility
- Nausea and vomiting
- Bradycardia
- Chest wall rigidity

**Dosage and administration:**
- Adult
  - Intravenous - 1-2 mcg/kg (maximum individual dose 50 mcg) slow IV push (maximum total dose 100 mcg)
  - Intranasal - via mucosal atomization device (MAD) – single 100 mcg dose (divide dose between nostrils) for all patients
- Pediatric (3-18 years old)
  - Intravenous - 0.5 mcg/kg (maximum individual dose 25 mcg) slow IV push (maximum total dose 50 mcg)
  - Intranasal (via MAD) – single 1.5 mcg/kg dose (maximum 100 mcg, divide dose between nostrils)

Refer to the Physician's Desk Reference (PDR) for complete drug information
Glucagon

Pharmacologic properties:
Glucagon is an endogenous hormone that is produced in the pancreas. It acts as an insulin antagonist, accelerating hepatic glycogenolysis and gluconeogenesis. This has the effect of increasing blood glucose concentrations. Glucagon also effectively restores force and rate of ventricular contractions in patients with symptomatic beta-blocker and calcium channel blocker overdose via stimulation of intracellular cyclic adenosine monophosphate (cAMP) production.

Indications:
• Hypoglycemia (where IV access cannot be obtained).
• Beta-blocker and calcium channel blocker overdoses.

Contradictions:
• Known hypersensitivity

Precautions:
• Glucagon should be administered with caution in patients with a history of insulinoma or pheochromocytoma
• Awaken patient following administration to provide oral glucose in order to replete glycogen stores

Adverse reactions:
• Occasional nausea and vomiting

Dosage and administration:
• Adult
  • Hypoglycemia
    • 1 mg IM
  • Beta-blocker or calcium channel blocker overdose
    • 5.0 mg IV bolus
• Pediatric
  • Hypoglycemia
    • 0.1 mg/kg IM (maximum dose 1 mg)
  • Beta-blocker or calcium channel blocker overdose
    • 0.5 mg IV/IM if < 20 kg
    • 1 mg IV/IM if ≥ 20 kg

Refer to the Physician's Desk Reference (PDR) for complete drug information
Ipratropium Bromide (Atrovent®)

**Pharmacologic properties:**
Ipratropium bromide is an anticholinergic bronchodilator classified as a quaternary ammonium compound. Anticholinergics prevent the binding of acetylcholine with muscarinic receptors on bronchial smooth muscle, inhibiting bronchoconstriction. The bronchodilating effect of ipratropium is primarily local and site specific. Since it is not well absorbed systemically, there is low potential for toxicity.

**Indications:**
- Acute bronchospasm (wheezing) associated with asthma or COPD in adult and pediatric patients

**Contraindications:**
- Hypersensitivity to ipratropium, atropine or its derivatives, soy, or peanuts

**Precautions:**
- Use with caution in patients with narrow angle glaucoma, prostatic hypertrophy, or bladder-neck obstruction
- Contact with eyes can cause irritation and precipitation of narrow angle glaucoma

**Adverse reactions:**
- Palpitations
- Nervousness
- Dizziness
- Headache
- Nausea
- GI distress
- Dry mouth
- Cough

**Dosage and administration:**
- **Adult**
  - 0.5 mg/2.5 ml via updraft
  - Combined with Albuterol
- **Pediatric**
  - 0.5 mg/2.5 ml via updraft
  - Combined with Albuterol

Refer to the Physician's Desk Reference (PDR) for complete drug information
Magnesium Sulfate

Pharmacologic properties:
Magnesium is a cation that acts as a cofactor of the cellular membrane sodium-potassium pump, and plays an integral role in maintaining intracellular potassium levels. Magnesium is essential for energy transfer and electrical stability, and acts as a powerful antiarrhythmic - particularly in the setting of torsades de pointes. It is also a CNS depressant effective in the management of seizures associated with toxemia of pregnancy (eclampsia), and a bronchodilator effective for asthma and COPD.

Indications:
• Cardiac Arrest associated with suspected hypomagnesemic state
• Torsades de Pointes
• Eclampsia
• Known hypomagnesemia associated with arrhythmias
• Bronchospasm (wheezing) unresponsive to albuterol and ipratropium bromide

Contraindications:
• Renal Failure

Precautions:
• Avoid rapid IVP unless unstable
• May induce respiratory depression or apnea - in this setting, treat with 10% calcium chloride, 5-10 mL IV bolus
• Use with extreme caution in patients with myasthenia gravis, neuromuscular disease, or heart block

Adverse reactions:
• Loss of deep tendon reflexes
• Respiratory arrest
• Hypotension
• Drowsiness
• Flushing

Dosage and administration:
• Adult
  • Cardiac arrest (in the setting of torsades de pointes or hypomagnesemic state):
    • 2 grams, IV/IO bolus over 1-2 minutes
  • Eclampsia:
    • 4 grams IV over 10 minutes
  • Bronchospasm:
    • 2 grams IV in 100 mL Normal Saline over 10-15 minutes
• Pediatric
  • Cardiac Arrest (in the setting of torsades de pointes or hypomagnesemic state):
    • 50 mg/kg IV/IO over 1-2 minutes (maximum dose 2 grams)
  • Bronchospasm:
    • 50 mg/kg IV over 5-10 minutes (maximum dose 2 grams)

Refer to the Physician’s Desk Reference (PDR) for complete drug information
Methylprednisolone (Solumedrol®)

Pharmacologic properties:
Methylprednisolone is a systemic corticosteroid that has many downstream effects on the body. Therapeutically, it has potent anti-inflammatory properties. The onset of action is several hours.

Indications:
• Acute exacerbation of asthma/COPD
• Anaphylaxis/Acute allergic reactions

Contradictions:
• Known hypersensitivity

Precautions:
• Use caution when administering to patients with diabetes mellitus, pregnancy, liver disease, or signs of systemic infection
• Do not administer methylprednisolone preserved with benzyl alcohol to pregnant women, breast feeding women, or neonates - benzyl alcohol is associated with serious adverse events in this population

Adverse reactions:
• Adverse effects with single bolus use of Solumedrol are uncommon, although patients on chronic steroids are at risk for a multitude of side effects

Dosage and administration:
• Adult
  • 125 mg IV
• Pediatric
  • 2 mg/kg IV/IM (maximum dose 60 mg)

Refer to the Physician’s Desk Reference (PDR) for complete drug information
Midazolam (Versed®)

Pharmacologic properties:
Midazolam is a short-acting sedative hypnotic of the benzodiazepine family that increases the action of gamma-aminobutyric acid (GABA), the major inhibitory neurotransmitter in the central nervous system. Midazolam depresses the limbic system, thalamus, and hypothalamus resulting in profound sedation and muscle relaxation. The inhibitory nature of the drug also provides anti-epileptic activity that terminates and prevents seizures.

Indications:
- Status epilepticus
- Cocaine (sympathomimetic) toxicity
- Behavioral emergencies in patients with severe agitation or aggressive behavior resulting in interference with patient care or patient/crew safety
- May be adjunctive treatment with antipsychotics

Contraindications:
- Acute alcohol intoxication
- Do not administer to neonatal patients
- Respiratory insufficiency
- Hypotension (SBP < 90 mmHg)
- Known hypersensitivity to benzodiazepines

Precautions:
- Use extreme caution with intravenous administration - rapid IV bolus may cause hypotension and respiratory depression/arrest
- Effects are exacerbated in the elderly, and when administered to patients who have already ingested another CNS depressant (ETOH, barbiturates, GHB)

Adverse reactions:
- Confusion
- Drowsiness
- Respiratory depression/arrest
- Hypotension
- Nausea
- Vomiting

Dosage and administration:
- Adult
  - Seizures
    - 5 mg IM or intranasal via MAD
    - 2.5 mg IV (slow IVP)
  - Behavioral Agitation (may be combined in same syringe as Haloperidol)
    - 5 mg IM or intranasal via MAD
    - 2.5 mg IV (slow IVP)
- Pediatric
  - Seizures
    - 0.2 mg/kg IM or intranasal via MAD (maximum dose 5 mg)
    - 0.1 mg/kg IV (slow IVP) (maximum dose 2.5 mg)

Refer to the Physician’s Desk Reference (PDR) for complete drug information
Naloxone (Narcan®)

Pharmacologic properties:
Naloxone is a competitive mu opioid receptor antagonist. The drug antagonizes the effects of opiates by competing at the same receptor sites. Onset of action is 1-2 minutes, the duration of action is 1-4 hours.

Indications:
• Naloxone is indicated for the reversal of narcotic intoxication with respiratory depression
• Altered mental status (unknown cause)

Contraindications:
• Known hypersensitivity

Precautions:
• Use caution during administration as patient may become agitated or violent as level of consciousness increases
• Should be administered cautiously to persons who are known or suspected to be physically dependent on opiates, including newborns of dependent mothers – may precipitate acute withdrawal
• Naloxone has a relatively short half-life compared to many narcotics, monitor closely for the need to repeat dose
• Naloxone is not effective against a respiratory depression due to non-opioid drugs
• Patients who become responsive secondary to naloxone administration are not authorized to refuse medical care - transport all such patients as medically incapacitated

Adverse reactions:
• Tremor
• Agitation
• Belligerence
• Pupillary dilation
• Seizures
• Sweating
• Hypertension
• Hypotension
• Ventricular tachycardia
• Pulmonary edema
• Ventricular fibrillation
• Nausea
• Vomiting

Dosage and administration:
• Adult
  • With respiratory depression
    • 2 mg IV, IO, IM, or intranasal via MAD every 3 min as needed (maximum dose 8 mg)
  • Without respiratory depression
    • 0.4 mg IV, IO, IM, or intranasal via MAD every 3 min as needed (maximum dose 2 mg)
• Pediatric
  • 0.1 mg/kg IV, IO, IM, or intranasal via MAD (maximum individual dose 2.0 mg)
  • May repeat dose once

Refer to the Physician's Desk Reference (PDR) for complete drug information
Nitroglycerin (Nitrostat®)

Pharmacologic properties:
Nitroglycerin is an organic nitrate which causes systemic vasodilation by entering vascular smooth muscle, converting to nitric oxide, and activating cGMP. This dose-dependent dilation acts primarily on the venous system, although it also produces direct coronary artery vasodilation as well. The overall result is a decrease in venous return which decreases the workload on the heart and thus, decreases myocardial oxygen demand. Nitroglycerin also improves blood flow to the myocardium and lowers systemic blood pressure.

Indications:
- Chest pain with suspected cardiac ischemia
- Suspected acute myocardial infarct
- Acute dyspnea with suspected pulmonary edema/congestive heart failure

Contraindications:
- Hypertension associated with acute stroke or severe brain injury
- Systolic BP < 90 mmHg
- Phosphodiesterase-5 inhibitor use within 24 hours (Viagra® or Levitra®) or 48 hours (Cialis®)

Precautions:
- Use with caution in acute inferior wall MI or right ventricular infarct (ST elevation in V4R) - be prepared to administer 250 mL NS bolus if hypotension develops
- Patients on chronic nitrate therapy may require larger doses of nitroglycerine during acute anginal episodes
- Nitro tablets are inactivated by light, air and moisture and must be kept in amber glass containers with tight-fitting lids
- Alcohol will accentuate vasodilating and hypotensive effects

Adverse reactions:
- Headache
- Hypotension
- Tachycardia
- Dizziness
- Flushing
- Nausea and vomiting

Dosage and administration:
- 0.4 mg spray or tablet sublingually, every 5 minutes as needed if no contraindication develops

Refer to the Physician's Desk Reference (PDR) for complete drug information

Authorization Date: 9/4/2013
Ondansetron Hydrochloride (Zofran®)

Pharmacologic properties:
Ondansetron hydrochloride is an anti-emetic which acts as a selective inhibitor of the serotonin 5-HT 3 receptor type. The drug binds to both central nervous system and peripheral receptors in the gastrointestinal tract to exert its effects. Its onset of action is 30 minutes, and duration of action is 2-7 hours. Zofran is considered safe for use during pregnancy.

Indications:
- Severe, persistent vomiting

Contraindications:
- Known hypersensitivity
- Known Long-QT Syndrome

Precautions:
- May lengthen QT interval – patients should be placed on a cardiac monitor after administration
- The use of ondansetron in patients following abdominal surgery may mask a progressive ileus and/or gastric distention

Adverse reactions:
- Headache
- Fatigue
- Diarrhea
- Dizziness

Dosage and administration:
- Adult:
  - 4 mg IV
  - 4 mg PO (Oral Disintegrating Tablet, ODT)
- Infants and Children 6 months to 10 years, ≥8 kg (18 lbs)
  - 8-15 kg (18-33 lbs): 2 mg ODT, PO
  - >15 kg (>33 lbs): 4 mg ODT, PO

Refer to the Physician’s Desk Reference (PDR) for complete drug information
Sodium Bicarbonate

Pharmacologic properties:
Sodium bicarbonate is an endogenous anion that reacts with hydrogen ions to form water and carbon dioxide. It is an alkalinizing agent used to buffer acids present in the body during periods of metabolic acidosis. Its effect is to raise the serum pH. This effect is favorable in the treatment of pre-existing metabolic acidosis, hyperkalemia, tricyclic anti-depressant/salicylate (aspirin)/or phenobarbital overdose, and after profound hypoxia/prolonged cardiac arrest. Sodium bicarbonate is effective only when administered with adequate ventilation and oxygenation.

Indications:
• Bicarbonate responsive metabolic acidosis precipitating cardiac arrest
• Hyperkalemia
• Tricyclic antidepressant overdose

Contraindications:
• Congestive heart failure
• Alkalotic states
• Hypoxic lactic acidosis

Precautions:
• Excessive bicarbonate therapy inhibits the release of oxygen, induces hyperosmolarity and hypernatremia, and produces paradoxical acidosis in myocardial and cerebral cells
• Bicarbonate does not improve the ability to defibrillate
• May inactivate simultaneously administered catecholamines
• Will precipitate if mixed with calcium chloride

Adverse reactions:
• Metabolic alkalosis
• Hypernatremia/Hyperosmolality
• Cerebral acidosis (paradoxical effect)
• Sodium and fluid retention which can cause pulmonary edema

Dosage and administration:
• Adult
  • 1 meq/kg IV
  • Repeat with 0.5-1.0 meq/kg every 10 minutes
• Pediatric
  • 1 meq/kg IV
  • Repeat with 0.5 meq/kg every 10 minutes
• Infant
  • 0.5 meq/kg IV (diluted) slowly
  • Repeat with 0.5 meq/kg every 10 minutes

Refer to the Physician's Desk Reference (PDR) for complete drug information
Thiamine Hydrochloride

**Pharmacologic properties:**
Thiamine is vitamin B1, a cofactor needed for the utilization of glucose. Chronic alcohol abuse interferes with intake, absorption, and utilization of thiamine. Thiamine deficiency can lead to Wernicke’s encephalopathy (ophthalmoplegia, ataxia, and confusion) or Korsakoff’s syndrome (amnesia, confabulation, and impaired memory).

**Indications:**
- Altered mental status (especially in alcoholic patient)
- Wernicke’s encephalopathy or Korsakoff’s syndrome
- Delirium Tremens (DT’s)
- Malnourishment

**Contraindications:**
- Known hypersensitivity

**Precautions:**
- Should be given prior to the administration of D50 because administration of glucose may precipitate acute symptoms of thiamine deficiency in marginally nourished subjects

**Adverse reactions:**
- Anaphylaxis
- Hypotension

**Dosage and administration:**
- 100 mg IV

Refer to the Physician’s Desk Reference (PDR) for complete drug information
Ziprasidone (Geodon®)

Pharmacologic properties:
Geodon is an atypical anti-psychotic and tranquilizing agent with multiple mechanisms of action. The drug is an antagonist at dopamine D2, serotonin 5HT1D and 5HT2A receptors, and an agonist at serotonin (5HT1A) receptors. Geodon also moderately inhibits re-uptake of norepinephrine and serotonin and has anti-histamine activity. This drug has fewer documented side effects - including extrapyramidal symptoms - than typical antipsychotics such as haloperidol.

Indications:
• Behavioral emergencies for patients with severe agitation or aggressive behavior resulting in interference with patient care or patient/crew safety.

Contraindications:
• Not to be administered to patients with Dementia-related psychosis
• Documented hypersensitivity
• Documented Long-QT syndrome

Precautions:
• Prolongs QT/QTc – use caution in patients with known risk factors (hypomagnesemia, hypokalemia, use of other drugs that prolong QT/QTc)
• May induce hyperglycemia – monitor glucose in high risk patients
• May cause drug-induced leukopenia/neutropenia

Adverse reactions:
• Extrapyramidal symptoms (dystonic reactions)
• Somnolence
• Dizziness
• Headache
• Orthostatic Hypotension
• EKG changes (prolong QTc)
• Rash
• Nausea and vomiting

Dosage and administration:
• Adult
  • 10 mg IM if < 60 kg
  • 20 mg IM if ≥ 60 kg
• Pediatric
  • Safety and effectiveness in children has not been conducted for IM route

Refer to the Physician's Desk Reference (PDR) for complete drug information
Acceptable Alternative Medications

Approval Process:
In the setting of drug shortages, the Office of the Medical Director will approve of alternative medications for temporary use until the original medications are available. These alternative medications are not meant to be interchangeable with the authorized pharmaceuticals unless officially approved by the Medical Director when deemed appropriate by system needs.

Alternative for Ziprasidone (Geodon®):  
**Haloperidol (Haldol ®):**
- **Pharmacologic properties:** Antipsychotic agent or major tranquilizer
- **Indications:** Behavioral emergencies for patients with severe agitation or aggressive behavior resulting in interference with patient care or patient/crew safety.
- **Dosage/administration:**
  - Adult: 5 mg if < 60 kg IM/IV, 10 mg if > 60 kg IM/IV
  - Pediatric: Safety and effectiveness in children has not been conducted for IM/IV route.

Alternative for Midazolam (Versed®):  
**Lorazepam (Ativan ®):**
- **Pharmacologic properties:** Benzodiazepine, anticonvulsant, sedative hypnotic
- **Indications:** Status epilepticus, cocaine (sympathomimetic) toxicity, premedication prior to cardioversion or transcutaneous pacing, behavioral emergencies - may be adjunctive treatment, with haloperidol
- **Dosage/administration:**
  - Adult: 1-2 mg, IV/IM, may be repeated once
  - Pediatric - For active seizures only:
    - 0.05 mg/kg slow IV or IM (Max. individual dose 2 mg)
    - If seizures continue or re-occur after 5 minutes repeat Lorazepam (Ativan) 0.05 mg kg IV (Max. individual dose 2 mg)

Alternative for Fentanyl (Sublimaze®):  
**Morphine Sulfate:**
- **Pharmacologic properties:** narcotic analgesic
- **Indications:** Chest pain associated with suspected myocardial ischemia or pulmonary edema, thermal burns, frostbite, isolated extremity injury, premedication for cardioversion, or transcutaneous pacing
- **Dosage/administration:**
  - Adult: 2 mg slow IVP every 2 minutes until pain relief (can also be given IM or SC)
    - Maximum total dose 10 mg
  - Pediatric: 0.1 mg/kg slow IVP every 2 minutes until pain relief (can also be given IM or SC)
    - Maximum individual dose 2 mg, maximum total dose 10 mg

Refer to the Physician’s Desk Reference (PDR) for complete drug information