

# **REGIONAL EMS CONSORTIUM**

**Marion & Polk County  
Oregon Emergency Medical Services**

# **PATIENT TREATMENT PROTOCOLS**

# **2017**

## Introduction to Protocols

These patient care protocols will go into effect January 9th, 2017 for EMRs, EMTs, and Paramedics of Salem Fire Department, Falck Northwest Ambulance, Keizer Fire District, Marion County Fire District #1, Santiam Ambulance, Stayton Fire District, Turner Fire District, Gates Fire District, Lyons Fire District, Mill City Fire District, Aumsville Fire District, Sublimity Fire District, Mt. Angel Fire District, Silverton Fire District & Idanha Detroit Fire District.

These protocols, we believe, are the best of their type. Where evidence has been available, the Metro Regional EMS Consortium has diligently evaluated the material and drafted protocols that will assist us in providing excellent patient care. Where evidence is lacking, we have relied on best practices, expert advice and consensus to guide the development of the protocol or procedure. These protocols are reviewed on a regular basis and updated when necessary to reflect advances in the art and science pertaining to the care of the acutely ill and injured.

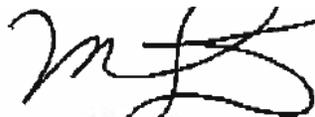
Remember that these protocols are guidelines. EMS is performed in a stressful environment with time-critical decisions and no specific patient care matrix can be developed that will cover every type of injury, illness, and complicating circumstance that EMT's will encounter while providing on-scene care. It is our expectation that providers will use these protocols in conjunction with their training and experience to do what is best for each patient. From time to time, it is expected that circumstances will arise that are not covered within these protocols. In such instances, providers should function within their scope of practice and use all available resources (including On-Line Medical Consultation) to provide the best possible patient care.

Thanks to everyone who has provided assistance in protocol development and review. Anything that is complex and includes detail is prone to errors. Please review these protocols carefully and route any potential errors, unclear directions, or suggestions for improvement to your agency's EMS Office.

Finally, we thank every one of you for your dedication and commitment every day to providing the best possible prehospital medical care to the citizens of our respective communities.



Brian Clothier, MD



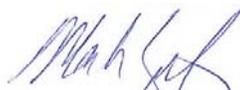
Marc Houston, DO



Lazen Koulibali, DO



Steve Vets, DO



Mark Zeitzer, MD

# Table of Contents

<b>Scope of Practice</b> .....	00.010
<b>Death and Dying</b> .....	00.020
<b>Medical Control of Medications and Procedures</b> .....	00.040
<b>Universal Patient Care</b> .....	00.900
<b>Treatment – 10.000</b>	
Abdominal Pain.....	10.010
Altered Mental Status& Coma .....	10.020
Anaphylaxis & Allergic Reactions .....	10.030
Brief Resolved Unexplained Event (BRUE) .....	10.035
Burns .....	10.040
Cardiac Arrest – <i>AED / CPR</i> .....	10.050
Cardiac Arrest – <i>Asystole</i> .....	10.050
Cardiac Arrest – <i>PEA</i> .....	10.050
Cardiac Arrest – <i>VFib / Pulseless VT</i> .....	10.050
Cardiac Arrest – <i>Post Resuscitation</i> .....	10.050
Cardiac Dysrhythmias – <i>Bradycardia</i> .....	10.060
Cardiac Dysrhythmias – <i>Tachycardia - Stable</i> .....	10.060
Cardiac Dysrhythmias – <i>Tachycardia - Unstable</i> .....	10.060
Chest Pain / Acute Coronary Syndrome .....	10.070
Crush Injury / Entrapment.....	10.075
Eye Emergencies .....	10.077
Hyperkalemia .....	10.078
Hyperthermia.....	10.080
Hypothermia.....	10.090
Musculoskeletal Trauma – Extremity / Hemorrhage .....	10.100
Musculoskeletal Trauma – Spinal Injury .....	10.100
Nausea & Vomiting.....	10.110
Neonatal Resuscitation .....	10.120
Obstetrical Emergencies & Childbirth .....	10.130
Pain / Fever Management .....	10.135
Poisoning & Overdose.....	10.140
Respiratory Distress .....	10.160
Seizures .....	10.170

# Table of Contents

## Treatment – 10.000 (Continued)

Sepsis .....	10.175
Shock .....	10.180
Stroke / CVA .....	10.190
Submerged Patient.....	10.200
Traumatic Brain Injury .....	10.300

## Medications – 20.000

Acetaminophen .....	20.005
Activated Charcoal .....	20.010
Adenosine (Adenocard®) .....	20.020
Albuterol (Ventolin®) .....	20.030
Amiodarone (Cordarone®) .....	20.040
Aspirin .....	20.050
Atropine Sulfate.....	20.060
Calcium Gluconate .....	20.070
Dexamethasone (Decadron®).....	20.075
Dextrose.....	20.080
Diphenhydramine (Benadryl®) .....	20.090
Dopamine (Intropin®).....	20.100
Epinephrine .....	20.110
Etomidate .....	20.115
Fentanyl.....	20.117
Furosemide.....	20.120
Glucagon .....	20.130
Glucose – Oral .....	20.140
Hydroxocobalamin (Cyanokit®) .....	20.145
Ibuprofen.....	20.147
Ipratropium Bromide (Atrovent®) .....	20.150
Ketamine Hydrochloride.....	20.155
Lidocaine .....	20.160
Magnesium Sulfate .....	20.170
Midazolam (Versed®).....	20.190

## Medications – 20.000 (Continued)

Morphine Sulfate .....	20.200
Naloxone (Narcan®) .....	20.210

## Table of Contents

Nitroglycerin .....	20.220
Norepinephrine (Levophed®) .....	20.225
Olanzapine (Zypreza ODT®).....	20.227
Ondansetron (Zofran®) .....	20.230
Oxygen.....	20.240
Pralidoxime (Protopam® / 2-PAM®).....	20.250
Proparacaine (Alcaine®) .....	20.255
Rocuronium (Zemuron®).....	20.257
Sodium Bicarbonate .....	20.260
Succinylcholine (Anectine®).....	20.270
Vecuronium.....	20.290

### Procedures – 30.000

Airway Management General Approach .....	30.010
AICD Deactivation .....	30.020
Behavioral Health Emergencies.....	30.025
Continuous Positive Airway Pressure (CPAP).....	30.032
Endotracheal Intubation .....	30.040
Emergency Cricothyrotomy.....	30.060
End Tidal CO <sub>2</sub> Monitoring .....	30.070
Intranasal Medication Administration .....	30.078
Intraosseous Access & Infusion.....	30.080
Intravenous Access & Infusion .....	30.090
Induced Hypothermia .....	30.102
King Airway® Placement .....	30.105
Left Ventricular Assist Devices .....	30.107

## Procedures – 30.000 (Continued)

Orogastric Tube Insertion and Maintenance .....	30.115
Patellar Dislocation Reduction.....	30.118
Patient Restraint.....	30.120
Pelvic Immobilization .....	30.132
PICC Line Access .....	30.140
Sports Equipment Removal.....	30.160
Suctioning .....	30.161
TASER® Barb Removal .....	30.162
Tension Pneumothorax Decompression.....	30.170
Tourniquet Placement .....	30.175
Transcutaneous Pacing.....	30.180

## Operations – 50.000

Crime Scene Response.....	50.020
Documentation.....	50.040
Hazardous Materials Response.....	50.060
Multiple Toxic Exposure .....	50.070
Medical Control of Scene .....	50.110
On-Line Medical Control.....	50.115
Refusal and Informed Consent.....	50.117
Rehabilitation .....	50.119

## Trauma System – 60.000

Trauma System Guidelines .....	60.000
--------------------------------	--------

## Multi-Casualty Incidents – 65.000

MCI General Guidelines .....	65.100
Medical Task Card.....	65.200
Treatment Task Card.....	65.300
Triage Task Card .....	65.400
Transportation Task Card .....	65.500
Destination Task Card .....	65.550
MPS Log.....	65.600

## Hazardous Materials – 70.000

Decontamination .....	70.010
Hydrogen Cyanide.....	70.020
Hydrogen Fluoride.....	70.030
Organophosphates.....	70.040

**Scope of Practice  
Death & Dying  
Medical Control  
Universal Patient Care**

## EMERGENCY MEDICAL RESPONDER SCOPE OF PRACTICE

An Emergency Medical Responder may:

- A. Conduct primary and secondary patient examinations;
- B. Take and record vital signs;
- C. Utilize noninvasive diagnostic devices in accordance with manufacturer's recommendation;
- D. Open and maintain an airway by positioning the patient's head;
- E. Provide external cardiopulmonary resuscitation and obstructed airway care for infants, children, and adults;
- F. Provide care for musculoskeletal injuries;
- G. Assist with prehospital childbirth;
- H. Complete a clear and accurate prehospital emergency care report form on all patient contacts and provide a copy of that report to the senior emergency medical services provider with the transporting ambulance;
- I. Administer medical oxygen;
- J. Maintain an open airway through the use of:
  - 1. A nasopharyngeal airway device;
  - 2. A non-cuffed oropharyngeal airway device;
  - 3. A pharyngeal suctioning device;
- K. Operate a bag mask ventilation device with reservoir;
- L. Provide care for suspected medical emergencies, including administering liquid oral glucose for hypoglycemia;
- M. Prepare and administer aspirin by mouth for suspected myocardial infarction (MI) in patients with no known history of allergy to aspirin or recent gastrointestinal bleed;
- N. Prepare and administer epinephrine by automatic injection device for anaphylaxis;
- O. Prepare and administer naloxone via intranasal device or auto-injector for suspected opioid overdose; and
- P. Perform cardiac defibrillation with an automatic or semi-automatic defibrillator, only when the Emergency Medical Responder:
  - 1. Has successfully completed an Authority-approved course of instruction in the use of the automatic or semi-automatic defibrillator; and
  - 2. Complies with the periodic requalification requirements for automatic or semi-automatic defibrillator as established by the Authority.
- Q. Perform other emergency tasks as requested if under the direct visual supervision of a physician and then only under the order of that physician.

# Scope of Practice (OAR Div. 35. 847-035-0030) –

## EMERGENCY MEDICAL TECHNICIAN SCOPE OF PRACTICE

An EMT may:

- A. Perform all procedures that an Emergency Medical Responder may perform;
- B. Ventilate with a non-invasive positive pressure delivery device;
- C. Insert a cuffed pharyngeal airway device in the practice of airway maintenance. A cuffed pharyngeal airway device is:
  - a. A single lumen airway device designed for blind insertion into the esophagus providing airway protection where the cuffed tube prevents gastric contents from entering the pharyngeal space; or
  - b. A multi-lumen airway device designed to function either as the single lumen device when placed in the esophagus, or by insertion into the trachea where the distal cuff creates an endotracheal seal around the ventilatory tube preventing aspiration of gastric contents.
- D. Perform tracheobronchial tube suctioning on the endotracheal intubated patient;
- E. Provide care for suspected shock;
- F. Provide care for suspected medical emergencies, including:
  - a. Obtain a capillary blood specimen for blood glucose monitoring;
  - b. Prepare and administer epinephrine by subcutaneous injection, intramuscular injection, or automatic injection device for anaphylaxis;
  - c. Administer activated charcoal for poisonings; and
  - d. Prepare and administer nebulized albuterol sulfate treatments for known asthmatic and chronic obstructive pulmonary disease (COPD) patients suffering from suspected bronchospasm.
- G. Perform cardiac defibrillation with an automatic or semi-automatic defibrillator;
- H. Transport stable patients with saline locks, heparin locks, foley catheters, or in-dwelling vascular devices;
- I. Assist the on-scene Advanced EMT, EMT-Intermediate, or Paramedic by:
  - a. Assembling and priming IV fluid administration sets; and
  - b. Opening, assembling and uncapping preloaded medication syringes and vials;
- J. Complete a clear and accurate prehospital emergency care report form on all patient contacts;
- K. Assist a patient with administration of sublingual nitroglycerine tablets or spray and with metered dose inhalers that have been previously prescribed by that patient's personal physician and that are in the possession of the patient at the time the EMT is summoned to assist that patient;
- L. In the event of a release of organophosphate agents, the EMT who has completed Authority-approved training may prepare and administer atropine sulfate and pralidoxime chloride by autoinjector, using protocols approved by the Authority and adopted by the supervising physician; and
- M. In the event of a declared Mass Casualty Incident (MCI) as defined in the local Mass Casualty Incident plan, monitor patients who have isotonic intravenous fluids flowing.

# Scope of Practice (OAR Div. 35. 847-035-0030) –

## ADVANCED EMERGENCY MEDICAL TECHNICIAN SCOPE OF PRACTICE

Advanced Emergency Medical Technician (AEMT) may:

- A. Perform all procedures that an EMT may perform;
- B. Initiate and maintain peripheral intravenous (I.V.) lines;
- C. Initiate saline or similar locks;
- D. Draw peripheral blood specimens;
- E. Initiate and maintain an intraosseous infusion in the pediatric patient;
- F. Perform tracheobronchial suctioning of an already intubated patient; and
- G. Prepare and administer the following medications under specific written protocols authorized by the supervising physician or direct orders from a licensed physician:
  - 1. Nitrous oxide for acute pain
  - 2. Epinephrine (anaphylaxis)
  - 3. Hypertonic glucose
  - 4. Glucagon
  - 5. Albuterol
  - 6. Ipratropium bromide
  - 7. Nitroglycerine
  - 8. Naloxone
  - 9. Physiologic isotonic crystalloid solution

## EMERGENCY MEDICAL TECHNICIAN – INTERMEDIATE SCOPE OF PRACTICE

An EMT-Intermediate may:

- A. Perform all procedures that an Advanced EMT may perform;
- B. Initiate and maintain an intraosseous infusion;
- C. Prepare and administer the following medications under specific written protocols authorized by the supervising physician, or direct orders from a licensed physician:
  - 1. Epinephrine
  - 2. Atropine sulfate
  - 3. Lidocaine
  - 4. Amiodarone
  - 5. Morphine
  - 6. Nalbuphine hydrochloride
  - 7. Ketorolac tromethamine
  - 8. Fentanyl
  - 9. Diphenhydramine
  - 10. Furosemide
  - 11. Lidocaine (intraosseous infusion anesthetic)
  - 12. Ondansetron
- D. Prepare and administer immunizations in the event of an outbreak or epidemic as declared by the Governor of the state of Oregon, the State Public Health Officer or a county health officer, as part of an emergency immunization program, under the agency's supervising physician's standing order;
- E. Prepare and administer immunizations for seasonal and pandemic influenza vaccinations according to the CDC Advisory Committee on Immunization Practices (ACIP), and/or the Oregon State Public Health Officer's recommended immunization guidelines as directed by the agency's supervising physician's standing order;
- F. Distribute medications at the direction of the Oregon State Public Health Officer as a component of a mass distribution effort;
- G. Prepare and administer routine or emergency immunizations and tuberculosis skin testing, as part of an EMS Agency's occupational health program, to the EMT-Intermediate's EMS agency personnel, under the supervising physician's standing order;
- H. Insert an orogastric tube;
- I. Maintain during transport any intravenous medication infusions or other procedures which were initiated in a medical facility, if clear and understandable written and verbal instructions for such maintenance have been provided by the physician, nurse practitioner or physician assistant at the sending medical facility;
- J. Perform electrocardiographic rhythm interpretation; and
- K. Perform cardiac defibrillation with a manual defibrillator.

# Scope of Practice (OAR Div. 35. 847-035-0030) –

## PARAMEDIC SCOPE OF PRACTICE

A Paramedic may:

- A. Perform all procedures that an EMT-Intermediate may perform;
- B. Initiate the following airway management techniques:
  - a. Endotracheal intubation;
  - b. Cricothyrotomy; and
- C. Initiate a nasogastric tube;
- D. Provide advanced life support in the resuscitation of patients in cardiac arrest;
- E. Perform emergency cardioversion in the compromised patient;
- F. Attempt external transcutaneous pacing of bradycardia that is causing hemodynamic compromise;
- G. Perform electrocardiographic interpretation;
- H. Initiate needle thoracostomy for tension pneumothorax in a prehospital setting;
- I. Obtain peripheral arterial blood specimens under specific written protocols authorized by the supervising physician;
- J. Access indwelling catheters and implanted central IV ports for fluid and medication administration;
- K. Prepare and initiate or administer any medications or blood products under specific written protocols authorized by the supervising physician, or direct orders from a licensed physician.

## A. DEATH IN THE FIELD

Purpose: To define under what conditions treatment can be withheld or stopped.

Resuscitation efforts may be withheld if:

1. The patient has a "DNR" order.
2. The patient is pulseless and apneic in a mass casualty incident or multiple patient scene where the resources of the system are required for the stabilization of living patients.
3. The patient is decapitated.
4. The patient has rigor mortis in a warm environment.
5. The patient is in the stages of decomposition.
6. The patient has skin discoloration in dependent body parts (dependent lividity).

### Traumatic Cardiac Arrest:

1. A victim of trauma (blunt or penetrating) who has no vital signs at the scene may be declared dead. If opening the airway does not restore vital signs/signs of life, the patient should NOT be transported unless there are extenuating circumstances.
2. A cardiac monitor may be beneficial in determining death in the field when you suspect a medical cause or hypovolemia: A narrow complex rhythm (QRS < 0.12) may suggest profound hypovolemia, and may respond to fluid resuscitation. VF should raise your index of suspicion for a medical event.
3. At a trauma scene consider the circumstances surrounding the incident, including the possibility of cardiac arrhythmia, seizure, or hypoglycemia. When a medical event is suspected, treat as a medical event.
4. If the patient deteriorates to no vital signs (i.e. no pulse/respiration), a cardiac monitor should be applied. A viable rhythm especially in patients with penetrating trauma may reflect hypovolemia or obstructive shock (tamponade, tension pneumothorax) and treatment should be continued.
5. If a patient deteriorates to cardiac arrest during transport start CPR and contact the receiving trauma facility for further advice.

### Medical Cardiac Arrest:

1. If the initial EKG shows asystole or agonal rhythm confirmed in 3 leads, and the patient, in the responder's best judgment would not benefit from resuscitation:
  - a. The PIC may determine death in the field; **OR**
  - b. Begin BLS procedures, and contact OLMC with available patient history, current condition, and with a request for advice regarding discontinuing resuscitation.
2. If after the airway is established and the asystole protocol has been exhausted the patient persists in asystole (confirmed in 3 leads) the PIC may determine the patient to be dead in the field.
3. Death in the field may be determined with EtCO<sub>2</sub> of 10 or less in patients with PEA after 20 minutes of ACLS resuscitation. For patients with EtCO<sub>2</sub> greater than 10 either continue resuscitation or contact OLMC to stop resuscitation.
4. Patients in VF should be treated and transported.

### Notes & Precautions:

1. ORS allows a layperson, EMT or paramedic to determine “Death in the Field”.
2. Consult OLMC with any doubt about the resuscitation potential of the patient.
3. A person who was pulseless or apneic and has received CPR and has been resuscitated is not precluded from later being a candidate for solid organ donation.

### **B. POLST ORDERS AND DECISION MAKING**

1. In the pulseless and apneic patient who does not meet DEATH IN THE FIELD criteria, but is suspected to be a candidate for withholding resuscitation, begin CPR and contact OLMC.
2. A patient with decision-making capacity or the legally authorized representative has the right to direct his or her own medical care and can change or rescind previous directives.
3. EMS providers may honor a Do Not Resuscitate (DNR) order signed by a physician, nurse practitioner or physician assistant. DNR orders apply only to the patient in cardiopulmonary arrest and do not indicate the types of treatment that a person not in arrest should receive. POLST was developed to convey orders in other circumstances.
4. Physician Orders for Life-Sustaining Treatment (POLST):  
The POLST was developed to document and communicate patient treatment preferences across treatment settings. While these forms are most often used to limit care, they may also indicate that the patient wants everything medically appropriate done. **Read the form carefully!** When signed by a physician (MD or DO), nurse practitioner, or physician assistant, POLST is a medical order and EMS providers are directed to honor it in their Scope of Practice unless they have reason to doubt the validity of the orders or the patient with decision-making capacity requests change. If there are questions regarding the validity or enforceability of the health care instruction, begin BLS treatment and contact OLMC. If the POLST Form is not immediately available, a POLST form as documented in the Electronic POLST registry hosted at 888-476-5787 may also be honored.
  - Section A: Applies only when patient is in cardiopulmonary arrest
  - Section B: Applies in all other circumstances
  - For a POLST form to be valid it must include:
    - i. Patient’s name
    - ii. Date signed (forms do not expire)
    - iii. Health care professional’s signature (patient signature is optional)

5. The legally authorized representative may make decisions for the patient who is unable to make medical decisions. However, when in doubt or for unresolved conflict on the scene contact OLMC. The order is:
  - a. A legal guardian
  - b. A power of attorney for health care as designated by the patient on the Oregon advance directive
  - c. Spouse or legal domestic partner
  - d. Adult children
  - e. Parent
  
6. Death with Dignity:  
If a person who is terminally ill and appears to have ingested medication under the provisions of the Oregon Death with Dignity Act, the EMS provider should:
  - a. Provide comfort care as indicated.
  - b. Determine who called 9-1-1 and why (i.e. to control symptoms or because the person no longer wishes to end their life with medications).
  - c. Establish the presence of DNAR orders and/or documentation that this was an action under the provisions of the Death with Dignity Act.
  - d. Contact OLMC.
  - e. Withhold resuscitation if: DNAR orders are present, and there is evidence that this is within the provisions of the Death with Dignity Act and OLMC agrees.

### C. PATIENTS ENROLLED IN HOSPICE AND DYING PATIENTS

1. Look for POLST forms (contact Registry if needed) and attempt to honor patient preferences. Always provide comfort measures.
2. If patient is enrolled in hospice and the patient has not already done so, contact hospice if possible.
3. EMS providers cannot take medical orders from a hospice nurse but their advice is often invaluable and may be followed with direction from OLMC.
4. Treat dying persons with warmth and understanding. Do not avoid them. Allow them to discuss their situation, but do not push them to talk.
5. Many dying people are not upset by discussions of death as long as you do not take away all of their hope.
6. Touching a dying person is important. Use words like “death”. Do not use meaningless synonyms.
7. Ask the person how you might help.
8. Give factual information.
9. Be aware of your own fears regarding death and admit when a dying person reminds you of a loved one. If a particular person is too disturbing, have your partner or other members of the responding team take over.
10. Consider providing pain/symptom management and not transporting patient if they are Comfort Measures Only, the symptoms can be managed, and the patient and caregivers on scene do not want transport to the hospital. Consider OLMC contact for advice.

## D. CARE OF GRIEVING PERSONS

### Resuscitation phase:

1. As time allows give accurate and truthful updates about the patient's prognosis. If available, assign one person to interact with and support family members.
2. Consider gently removing children from the resuscitation area.
3. Depending upon the emotional state of family members, consider allowing them to watch and/or participate in a limited and appropriate way.
4. If family or friends were doing CPR prior to your arrival, commend their efforts.
5. If family or friends are disruptive consider removing them or try assigning simple tasks, such as helping bring in the stretcher, holding doors open, telling other family about the event and calling the doctor or minister.
6. Be respectful. Make requests. Don't give orders.

### Once death is determined:

1. Treat the recently dead with respect.
2. Tell family and friends of the death honestly. Use the words "death" or "dead". Avoid using euphemisms such as "passed away" or "gone".
3. Avoid using past tense terms when speaking to survivors of the recently dead.
4. Allow family and friends to express their emotions. Listen to them if they want to talk but don't push them.
5. Give factual information.
6. Genuine warmth and compassion will be more helpful than almost anything else for survivors. Don't feel it necessary to say the "right" things. Listening often provides grieving people with the most comfort.

### Focusing on survivors:

1. See to it that survivors have a support system present before you leave. Call friends, family, clergy, or neighbors to be with them. Respect the survivor's wishes to be alone.
2. Explain the next steps to them after you have pronounced death. This will include the police coming to make reports, possibly the medical examiner, and the possible need for an autopsy.
3. Contact Law Enforcement as soon as possible before moving or altering the body.
4. Allow family and friends to say their good-byes if possible.
5. A chaplain may be helpful in assisting with survivors. It is advisable to call early, as the chaplains do not have code-3 capabilities.
6. Help survivors make decisions such as which people should be called. If they ask you to make calls, try to comply, mention the need to find a funeral home, if one has not already been chosen. Clergy may also be helpful with this decision.

### **E. DEATH OF A CHILD:**

1. Do not accuse the parents of abuse or neglect, but take careful note of the patient's surroundings and the general physical condition of the child.
2. Do not be overly silent, which may imply guilt to the parents.
3. Ask the parents only necessary questions and do not judge or evaluate them. Do not tell them what they "should have" been doing before your arrival.
4. Remind parents to arrange for child care of other children.
5. Listen carefully to their statements and answer only with accurate information.
6. If there is a police investigation, tell the parents that this is routine.
7. Successful management of child deaths requires supportive, compassionate and tactful measures.

## Medical Control for Medications & Procedures – 00.040

The following drugs and procedures are considered **CATEGORY A**, and will be used at the EMT's discretion in accordance with these EMS Treatment Protocols.

### Drugs – Category A:

- Acetaminophen
- Activated Charcoal (aspirin or acetaminophen < 2 hrs post ingestion)
- Adenosine
- Albuterol
- Amiodarone (Cordarone®)
- Aspirin
- Atropine Sulfate
- Calcium Gluconate (cardiac arrest & hyperkalemia)
- Dexamethasone
- Dextrose
- Diphenhydramine (Benadryl®)
- Dopamine
- DuoNeb (albuterol and ipratropium)
- Epinephrine
- Etomidate
- Fentanyl
- Furosemide
- Glucagon (hypoglycemia)
- Glucose, Oral
- Hydroxocobalamin (Cyanokit®)
- IV solutions
- Ibuprofen
- Ipratropium Bromide (Atrovent®)
- Ketamine Hydrochloride
- Lidocaine
- Midazolam (Versed®)
- Morphine Sulfate
- Naloxone (Narcan®)
- Nitroglycerin
- Norepinephrine (Levophed®)
- Olanzapine (Zyprexa®)
- Ondansetron
- Oxygen
- Pralidoxime (Protopam® / 2-PAM®)
- Proparacaine (Alcaine®)
- Rocuronium (Zemuron®)
- Sodium Bicarbonate
- Succinylcholine
- Vecuronium

### Procedures – Category A

- Chemical patient restraint
- Defibrillation in cardiac arrest
- End-tidal CO<sub>2</sub> monitoring
- Endotracheal Intubation
- Endotracheal intubation with paralytics
- Emergency cricothyrotomy
  - Needle cricothyrotomy
  - Per-Trach
  - Quick-Trach<sup>®</sup> (type device)
  - Surgical cricothyrotomy
- Induced hypothermia
- Intranasal medication administration
- Intraosseous access & infusion
- Intravenous access & infusion
- King LT-D/LTS-D Airway Device
- Left Ventricular Assist Device
- Non-invasive positive pressure ventilation
- Patellar dislocation reduction
- Physical patient restraint
- PICC line access
- Pelvic immobilization with sling/wrap
- Sports equipment removal
- Suctioning
- Synchronous cardioversion
  - Unstable V-Tachycardia, OR
  - SVT, unstable patient
- Taser barb removal
- Tension pneumothorax decompression
- Tourniquet placement
- Transcutaneous pacing

## Medical Control for Medications & Procedures – 00.040

The following drugs and procedures are considered **CATEGORY B**, and require On-line Medical Control authorization. Confirmation of dosage or procedure will be obtained directly from a Physician on duty at OLMC.

### **Drugs – Category B:**

- Activated Charcoal (aspirin or acetaminophen > 2 hours post ingestion and all other poisons)
- Calcium Gluconate (calcium channel blocker overdose)
- Glucagon (beta blocker OD)
- Magnesium Sulfate

### **Procedures – Category B:**

- Automatic Implantable Cardio-Defibrillator (AICD) deactivation with magnet.

### **TREATMENT:**

- A. Assess scene safety and use appropriate personal protective equipment.
- B. Begin initial patient assessment and determine chief complaint.
- C. Secure airway and start oxygen as needed per General Airway Management protocol.
- D. Monitor vital signs and SpO<sub>2</sub>.
- E. Monitor ECG, ETCO<sub>2</sub> and obtain CBG readings as appropriate.
- F. Establish vascular access (IV or IO) as appropriate for patient's condition.
- G. Obtain pain severity scale if applicable.
- H. Follow appropriate Patient Care Treatment Protocol if patient's chief complaint or assessment findings change.

### **KEY CONSIDERATIONS:**

If patient is unable to provide medical history, check for medical bracelets and necklaces which can provide critical medical information and treatment.

# Treatment

### TREATMENT:

- A. Treat per Universal Patient Care.
- B. Place patient in a position of comfort.
- C. If systolic blood pressure is < 90 mmHg systolic follow Shock protocol and initiate rapid transport. If traumatic injury is suspected, enter patient into Trauma System. If patient has a suspected abdominal aortic aneurysm, titrate IV to maintain systolic blood pressure of 90 mmHg.
- D. Avoid having the patient eat or drink.
- E. Treat pain per Pain Management protocol

### PEDIATRIC PATIENTS:

- A. Consider non-accidental trauma.
- B. Closely monitor vital signs, blood pressure may drop quickly.
- C. If systolic BP is inappropriate for age, treat per shock protocol.

#### **Lowest normal pediatric systolic blood pressure by age:**

- Less than one month: > 60 mmHg.
- One month to 1 year: > 70 mmHg.
- Greater than 1 year:  $70 + 2 \times \text{age in years}$

### NOTES & PRECAUTIONS:

- A. Abdominal pain may be the first sign of catastrophic internal bleeding (ruptured aneurysm, liver, spleen, ectopic pregnancy, perforated viscous, etc).
- B. Since the bleeding is not apparent you must think of volume depletion and monitor the patient closely for signs of shock.

### KEY CONSIDERATIONS:

Inferior MI, ectopic pregnancy, abdominal aortic aneurysm, recent trauma, perforated viscous, emesis type and amount, last meal, bowel movements, urinary output, ruptured spleen or liver, GI bleed, abnormal vaginal bleeding

### TREATMENT:

A. Treat per Universal Patient Care protocol.

- **Hypoglycemia**

1. Determine capillary blood glucose level. If < 60 mg%, **or** <100 mg% in a symptomatic patient:
  - a. If patient can protect their own airway give oral glucose.
  - b. If patient is unable to protect their own airway give:  
Dextrose 10%, 10 – 25 grams (100 – 250 ml) IV/IO by infusion **or**  
dextrose 50%, 25 grams (50 ml) in large vein.
2. Check CBG after 5 minutes and repeat treatment if blood sugar remains low and patient remains symptomatic.
3. If no IV can be established give glucagon 1 mg IM.

**Precautions:**

Hypoglycemic patients who receive glucose/dextrose/glucagon often refuse transport after correction. This may be reasonable if all the following are present:

1. The patient's mental status has returned to normal.
2. There is a clear precipitating cause (e.g. took insulin but forgot to eat).
3. The patient is able to eat a meal.
4. The patient's recent blood sugar control has been otherwise stable.

Patients with recent evidence of poor glucose control and those who use oral hypoglycemic medications in particular the sulfonylurea agents (e.g. glyburide, glipizide, glimepiride) are at high risk for recurrent hypoglycemia and should be transported. If these individuals refuse transport, contact OLMC for assistance.

- **Opioid Overdose**

1. If opiate intoxication is suspected, administer naloxone 0.5 mg IV. Dose may be repeated every two minutes up to 2 mg titrating to respiratory rate. If no improvement and opiate intoxication is still suspected, repeat Naloxone 2 mg every 3-5 minutes up to a maximum of 8 mg total.
2. If no IV, give naloxone 2 mg IM/IN every 5 minutes up to 8 mg.

B. Treat underlying cause if known.

C. If patient is combative consider sedation per Patient Restraint protocol.

### PEDIATRIC MEDICATIONS:

A. Dextrose – For infants < 10 kg (birth to 1 year) with CBG < 40 mg% and children 10 kg – 35kg with CBG < 60 mg% give:

1. Dextrose 10%, 5ml/kg by infusion not to exceed 250 ml total  
**or (if diluting D50)**
2. Dextrose 12.5%, 4 ml/kg by infusion not to exceed 200 ml total

<b>Weight (kg)</b>	<b>Fluid volume (5 ml/kg)</b>
4	20 ml
6	30 ml
8	40 ml
10	50 ml
12	60 ml
14	70 ml
16	80 ml
18	90 ml
20 & above	100 ml

(Note: for D10% each 10 ml = 1 gram of dextrose)

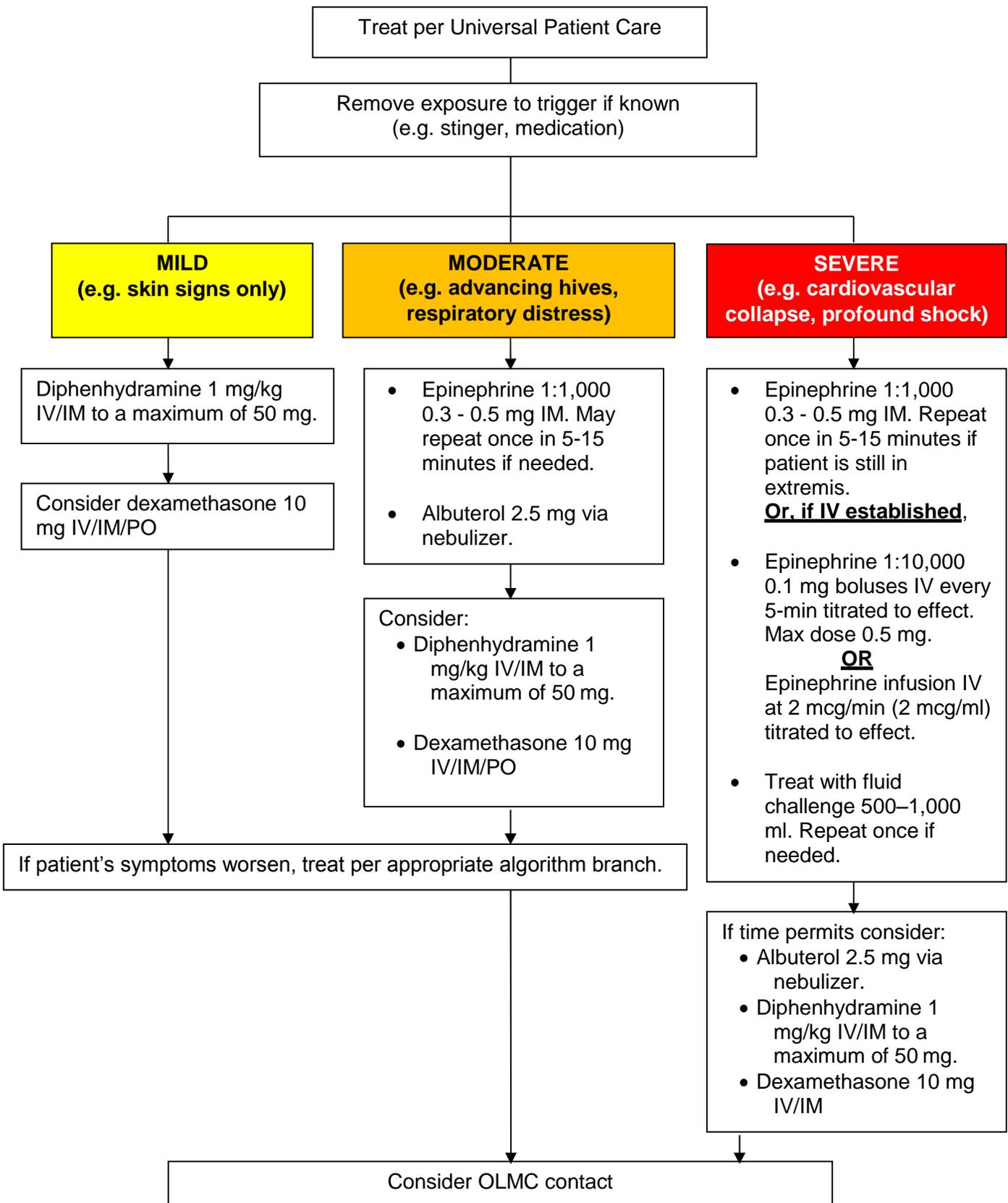
B. Glucagon:

- 0.02 mg/kg IM to a maximum of 1 mg.

C. Naloxone:

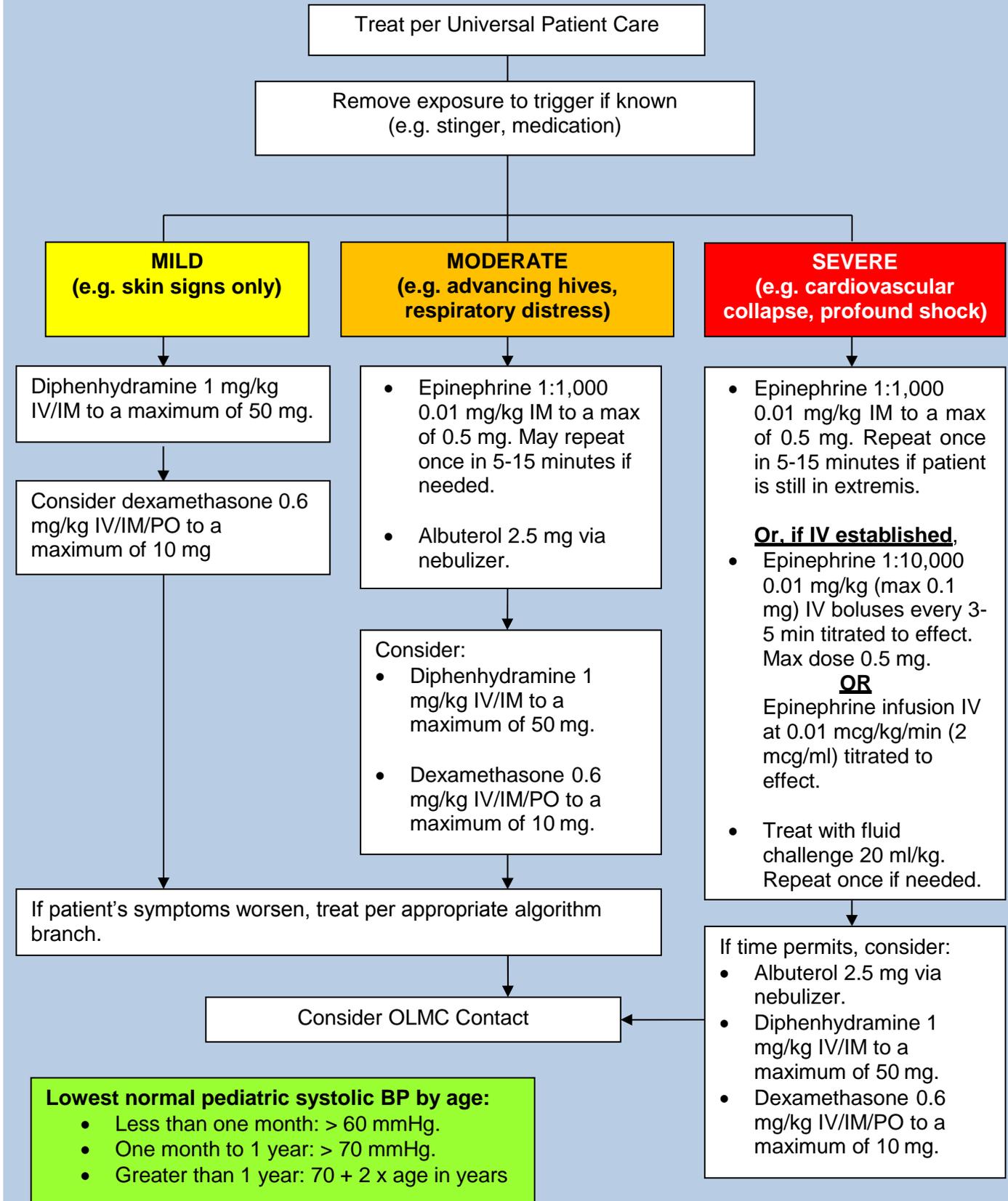
- 0.1 mg/kg IV/IO/IM/ IN to a maximum of 2 mg. Do not give to newborns.

# Allergic Reaction and Anaphylaxis – 10.030



# Allergic Reaction and Anaphylaxis – 10.030

## PEDIATRICS:



## Allergic Reaction and Anaphylaxis – 10.030

### Notes & Precautions:

- A. Preferred location for IM administration is the mid-anterolateral aspect of thigh.
- B. Common side effects of epinephrine include anxiety, tremor, palpitations, tachycardia, and headache.
- C. If epinephrine is ineffective in treating anaphylaxis in patients with beta-blockade, both glucagon administration (OLMC contact required) and isotonic volume expansion (up to several liters of crystalloid) may be necessary.

## Brief Resolved Unexplained Event (BRUE) – 10.035

### DEFINITION:

Event lasting <1 minute in an infant <1 year of age associated with at least one of the following:

- A. Cyanosis or pallor
- B. Absent, decreased, or irregular breathing
- C. Marked change in muscle tone (hypertonia or hypotonia)
- D. Altered level of responsiveness

Patient must appear well and be at baseline health.

### TREATMENT:

- A. Follow airway and respiratory protocols.
- B. Obtain and document any complications of pregnancy, birth date and gestational age at birth, fever or recent infection, prior BRUE episodes, underlying medical conditions.
- C. Obtain and document description of event including symptoms, inciting event, any resuscitation attempts before EMS arrival.
- D. Place on cardiac monitor and follow dysrhythmia protocol as needed
- E. Assess blood glucose.
- F. Transport via ALS to an emergency department even if the infant currently appears in no distress.
- G. Contact OLMC if parents or caregivers cannot be convinced to take the ambulance to the ED for evaluation.

### NOTES & PRECAUTIONS:

- A. BRUE is a group of symptoms, not a specific disease. BRUEs are most common in infants under one year of age, but may occur up to two years of age.
- B. Many infants appear normal by the time EMS arrives.
- C. Consider non-accidental trauma
- D. Serious underlying causes can include pneumonia, bronchiolitis, seizure, sepsis, intracranial hemorrhage, and meningitis.
- E. BRUEs are more frequent in premature infants and infants with other health conditions such as cystic fibrosis, bronchiolitis and congenital heart disease.

**TREATMENT:**

- A. Treat per Universal Patient Care.
- B. If systolic BP < 90 mmHg follow Shock Protocol.
- C. Remove jewelry and clothing that is smoldering or which is non-adherent to the patient.
- D. Cool burned areas (less than 10 minutes for large burns) then cover with sterile dressing. Discontinue cooling if patient begins to shiver. Attempt to leave unbroken blisters intact.
- E. Apply Carbon Monoxide (e.g. Rad-57) monitor if available.
- F. Treat pain per Pain Management protocol.
- G. If the patient has the following, transport to the Burn Center or closest appropriate facility:
  1. Total burn that is 15% or more of body surface area.
  2. Full thickness burn greater than 5% of body surface area.
  3. Burns with inhalation injuries.
  4. Electrical burns
  5. Facial burns or burns to hands, feet, genitalia or circumferential burns.
  6. Burns in high risk patients (pediatrics, elderly, significant cardiac or respiratory problems)
  7. Trauma system patients with burns meeting the above criteria.
- H. If chemical burn:
  1. Consider Haz-Mat response.
  2. Protect yourself from contamination. (See Decontamination protocol)
  3. Flush contaminated areas with copious amounts of water.
  4. If chemical is dry, carefully brush off prior to flushing.
- I. If electrical burn:
  1. Apply sterile dressings to entry and exit wounds
  2. Treat any dysrhythmias per appropriate Cardiac Dysrhythmia protocol.
- J. If Cyanide Toxicity is suspected based on findings (soot in mouth, nose or oropharynx) and patient is comatose, in cardiac or respiratory arrest, or has persistent hypotension despite fluid resuscitation:
  1. Administer Hydroxocobalamin (Cyanokit®) 5 g IV/IO as an infusion over 15 minutes and monitor for clinical response. Contact OLMC for advice regarding a second 5 g dose.
  2. Treat other presenting symptoms per appropriate protocol.
  3. Initiate emergent transport to appropriate facility.

**PEDIATRIC PATIENTS:**

- A. Treat pain per Pain Management protocol.
- B. Consider possibility of non-accidental cause in children.
- C. Hydroxocobalamin dose for pediatric patients is 70 mg/kg IV/IO over 15 minutes. Do not exceed adult dosing. Contact OLMC for advice regarding second dose.
- D. If systolic BP is inappropriate for age, treat per shock protocol.
 

**Lowest normal pediatric systolic blood pressure by age:**

  - Less than one month: > 60 mmHg.
  - One month to 1 year: > 70 mmHg.
  - Greater than 1 year: 70 + 2 x age in years

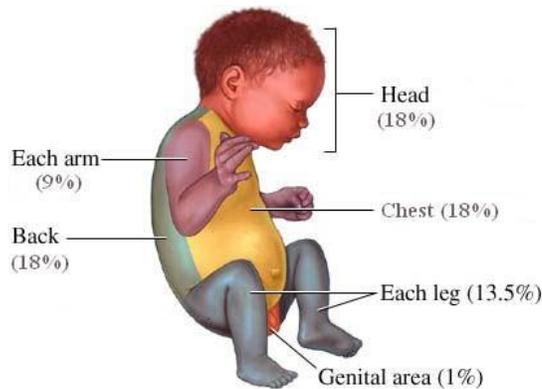
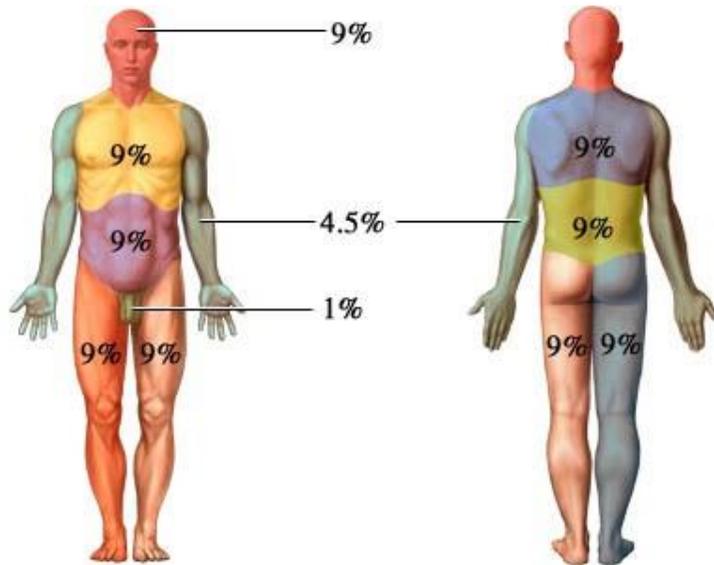
**NOTES & PRECAUTIONS:**

- A. Remove rings or other constricting items immediately.
- B. Be prepared to use RSI early to control airway if necessary.
- C. For firefighters, consider the potential for other traumatic injury or MI.

**KEY CONSIDERATIONS:**

Enclosed space, lung sounds, possibility of inhaled toxins, past medical history, CO/Cyanide poisoning, evidence of respiratory burns, extent of burns, explosion or trauma injuries

**RULE OF NINES:**



## Cardiac Arrest (AED/CPR) – 10.050

### CPR GUIDELINES

Component	Adults and Adolescents	Child 1 yr. to puberty	Infant Under 1 year of age, excluding newborns
Airway	Head tilt-chin lift. Jaw thrust if suspected cervical trauma.		
Breathing: Without CPR	10 to 12 breaths/min (Approximate)	1 breath every 3-5 seconds (12 to 20 breaths/min) (Approximate)	
Breathing: CPR with advanced airway	One breath every 6 seconds (10 breaths/min) asynchronous with chest compressions. About 1 sec/breath. Visible chest rise.		
Foreign Body – Conscious pt	<i>Abdominal thrusts (use chest thrusts in pregnant and obese patients or if abdominal thrusts are not effective)</i>		Back blows and chest thrusts
Compression landmarks	Lower half of sternum between nipples		Just below nipple line (lower half of sternum)
Hand Placement	Heel of one hand, other hand on top	Heel of one hand, as for adults	2 thumb-encircling hands preferred.
Compression depth	At least 2 inches	Approximately one-third anterior/posterior depth of chest. (Approx. 2" in child and 1 ½" in infant)	
Compression rate	100 - 120 per minute		
Compression- ventilation ratio w/o advanced airway	30:2 10:1 with continuous compressions	30:2 (single rescuer) 15:2 (two rescuers)	

### AED GUIDELINES

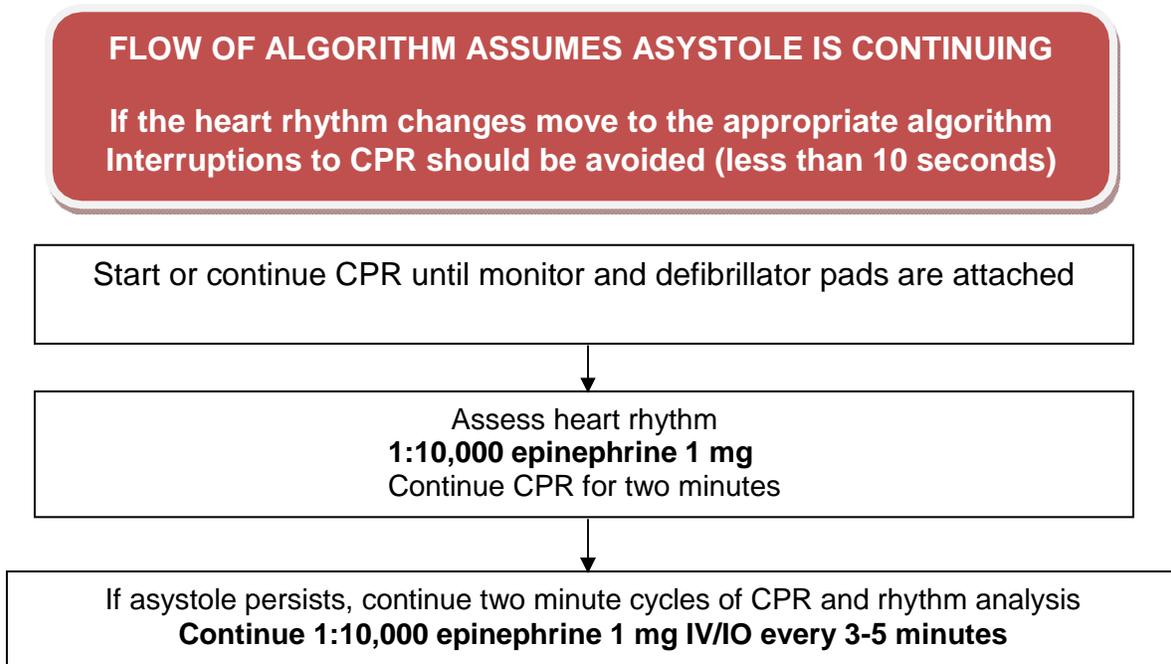
AED Defibrillation	Use adult pads, do not use child pads	Use pediatric dose-attenuator system for children and infants if available.
-----------------------	------------------------------------------	--------------------------------------------------------------------------------

### NEONATAL GUIDELINES

Assisted ventilation should be delivered at a rate of 40-60 breaths/minute to achieve or maintain a heart rate > 100 bpm.  
The ratio of compressions to ventilations should be 3:1, with 90 compressions and 30 breaths to achieve approximately 120 events per minute.

## Cardiac Arrest (Asystole) – 10.050

### TREATMENT:



### PEDIATRIC PATIENTS:

- Follow adult algorithm.
- Epinephrine 1:10,000 dose - 0.01 mg/kg IV/IO as soon as possible after cardiac arrest is recognized. Repeat every 3-5 minutes.

### NOTES & PRECAUTIONS:

- If unwitnessed arrest and no obvious signs of death, proceed with resuscitation and get further information from family/bystanders.
- If history of traumatic event, consider death in the field per Death & Dying protocol.
- Minimize interruptions to CPR when securing patient's airway.
- If patient has return of spontaneous circulation, start cooling per Induced Hypothermia protocol.

### KEY CONSIDERATIONS:

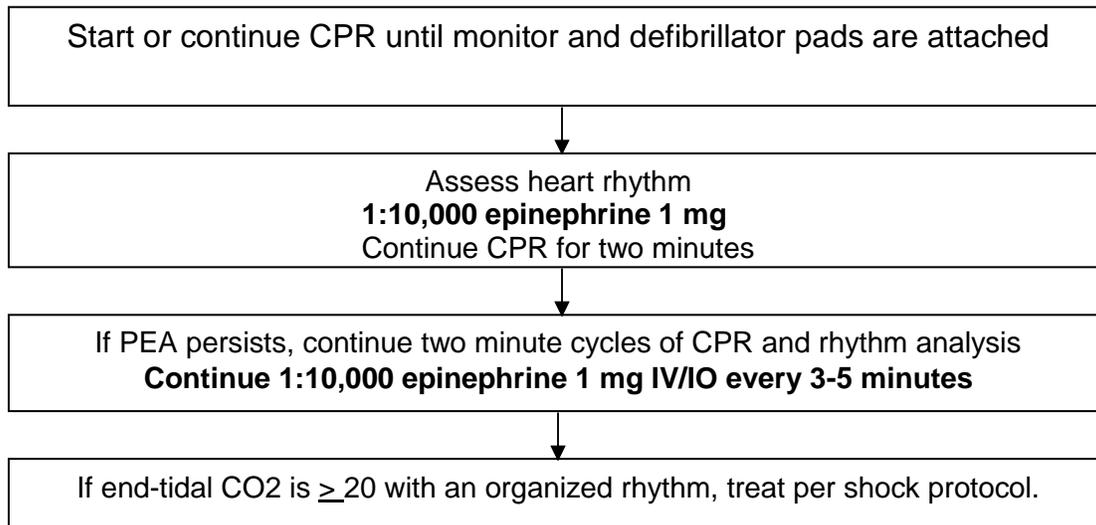
Consider and treat other possible causes:

- Acidosis - Sodium bicarbonate 1 mEq/kg IV.
- Cardiac tamponade – Initiate rapid transport.
- Hyperkalemia – Treat with calcium gluconate 10 ml and sodium bicarbonate 1 mEq/kg per Hyperkalemia protocol.
- Hypothermia – Treat per Hypothermia protocol
- Hypovolemia – Treat with fluids per Shock protocol.
- Hypoxia – Oxygenate and ventilate
- Pulmonary embolus – Initiate rapid transport.
- Tension pneumothorax – Needle decompression.
- Tri-cyclic antidepressant overdose – Sodium bicarbonate 1 mEq/kg

## TREATMENT:

### FLOW OF ALGORITHM ASSUMES PEA IS CONTINUING

If the heart rhythm changes move to the appropriate algorithm  
Interruptions to CPR should be avoided (less than 10 seconds)



## PEDIATRIC PATIENTS:

- Follow adult algorithm.
- Epinephrine 1:10,000 dose - 0.01 mg/kg IV/IO as soon as possible after cardiac arrest is recognized. Repeat every 3-5 minutes.

## NOTES & PRECAUTIONS:

- Minimize interruptions to CPR when securing patients airway.
- If patient has return of spontaneous circulation, consider cooling per Induced Hypothermia protocol.
- Contact OLMC for advice on continuing resuscitation.

## KEY CONSIDERATIONS:

Consider and treat other possible causes:

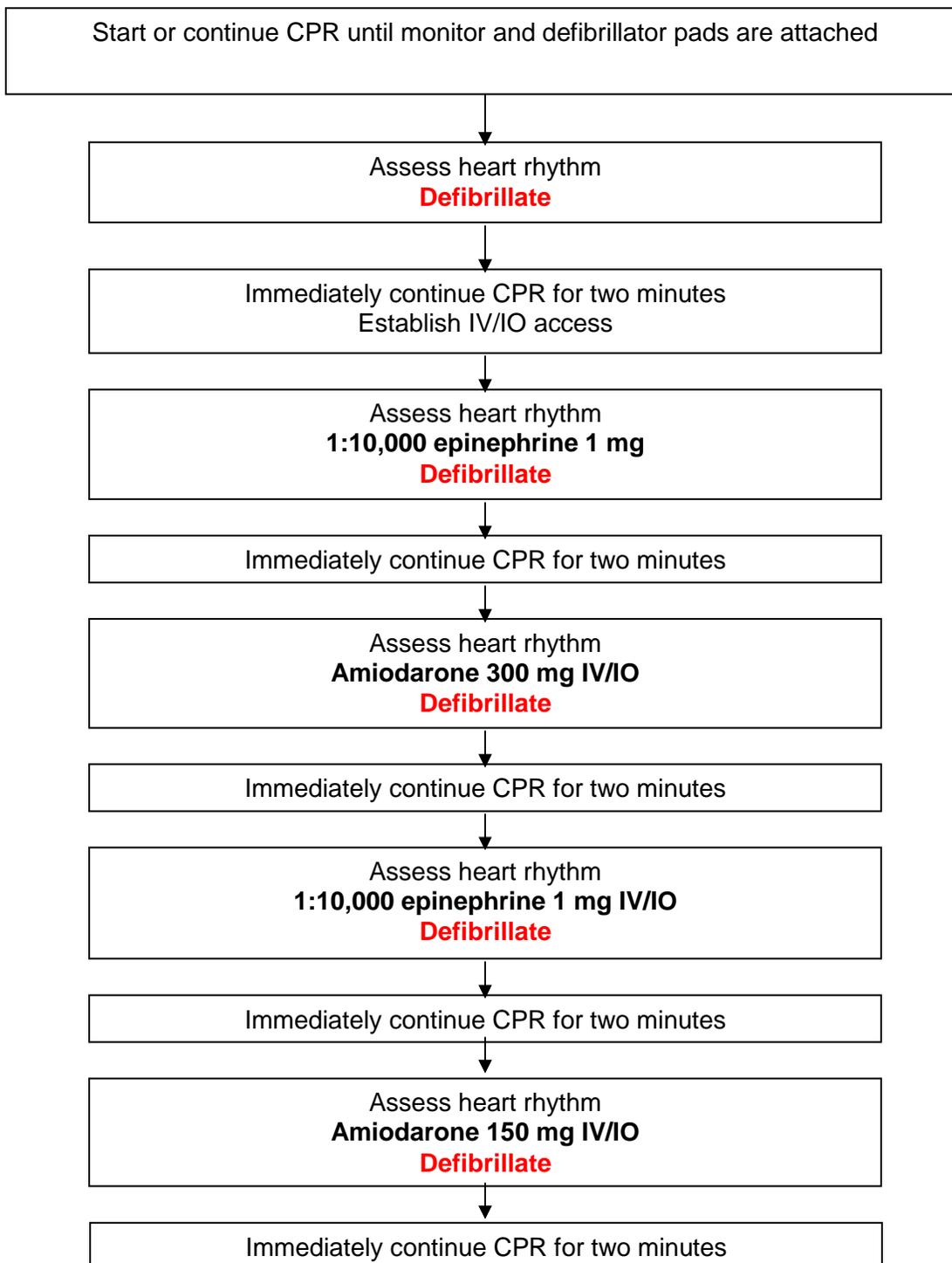
- Acidosis - Sodium bicarbonate 1 mEq/kg IV.
- Cardiac tamponade – Initiate rapid transport.
- Hyperkalemia – Treat with calcium gluconate 10 ml and sodium bicarbonate 1 mEq/kg per Hyperkalemia protocol.
- Hypothermia – Treat per Hypothermia protocol
- Hypovolemia – Treat with fluids per Shock protocol.
- Hypoxia – Oxygenate and ventilate
- Pulmonary embolus – Initiate rapid transport.
- Tension pneumothorax – Needle decompression.
- Tri-cyclic antidepressant overdose – Sodium bicarbonate 1 mEq/kg

# Cardiac Arrest (V-Fib / Pulseless VT) – 10.050

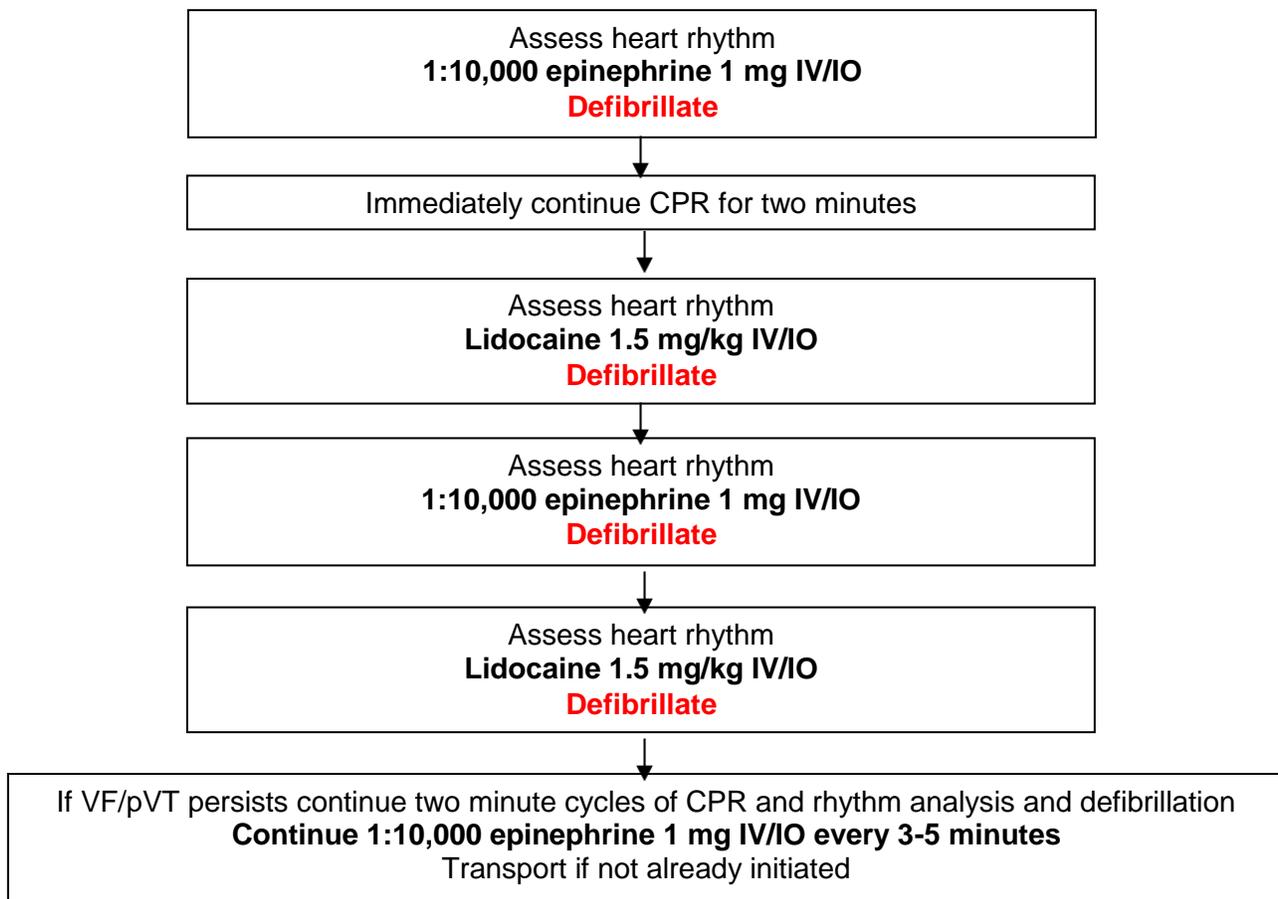
## TREATMENT:

**FLOW OF ALGORITHM ASSUMES VF/VT IS CONTINUING**

**If the heart rhythm changes move to the appropriate algorithm  
Interruptions to CPR should be avoided (less than 10 seconds)**



## Cardiac Arrest (V-Fib / Pulseless VT) – 10.050



### PEDIATRIC PATIENTS:

Follow adult algorithm flow. Use the following dosing:

- Defibrillation:  
4j/kg
- Drugs:
  1. Epinephrine – 1:10,000 – 0.01 mg/kg IV/IO
  2. Amiodarone – 5 mg/kg IV/IO. May repeat once with 2.5 mg/kg IV/IO.
  3. Lidocaine – Follow adult dosing.
  4. Sodium bicarbonate - Follow adult dosing. For children less than 10 kg (1 yr), dilute by one-half with normal saline prior to administration.
- Induced Hypothermia – Patients  $\geq 13$  years old after successful return of spontaneous circulation. Follow Induced Hypothermia protocol.

## Cardiac Arrest (V-Fib / Pulseless VT) – 10.050

### NOTES & PRECAUTIONS:

- A. Airway should be addressed with minimal interruption to CPR. Ventilation rate should be 8-10 breaths per minute.
- B. If patient remains in persistent VF/pVT (greater than three shocks) reposition defibrillation pads anterior/posterior.
- C. Sodium bicarbonate is not recommended for the routine cardiac arrest sequence but should be used early in cardiac arrest of known cyclic antidepressant overdose or in patients with hyperkalemia. It may also be considered after prolonged arrest. If used:
  1. Administer 1 mEq/kg IV/IO.
  2. May be repeated at 0.5 mEq/kg every 10 minutes.
- D. If patient has return of spontaneous circulation:
  1. Follow Post Resuscitation protocol.
  2. Consider cooling per Induced Hypothermia protocol.

### CARDIAC MONITOR JOULE SETTINGS:

**Physio Control Lifepak®** –360j all shocks.

**Philips Heartstart MRX®** – 150j all shocks.

**Zoll E/X-Series®** – 120j, 150j, 200j, and then repeat at 200j as needed.

## Cardiac Arrest Checklists:

## : Pre-ROSC Cardiac Arrest Checklist

- < PIC is identified
  - < Monitor is visible and a dedicated provider is viewing the rhythm with all leads attached
  - < Monitor is in PADS mode
  - < Metronome at 115-120 beats per minute
  - < If applicable, utilize CPR quality control puck
  - < Identify and shock V-Fib / V-Tach every 2 minutes (limit pre-shock pause)
  - < Change compressors every 2 minutes (Ensure a dedicated time keeper)
  - < Pause at compressor switch to identify rhythm (no more than 5-8 seconds)
  - < O2 via BVM
  - < Underlying cause has been considered and treated early in arrest
- ❖ )
- < Airway is managed using basic to advanced procedures
  - < ETCO2 waveform is present and value is being monitored
  - < IV or IO access
  - < Place gastric tube to prevent gastric distention
  - < Family is receiving care

## Post ROSC Cardiac Arrest Checklist

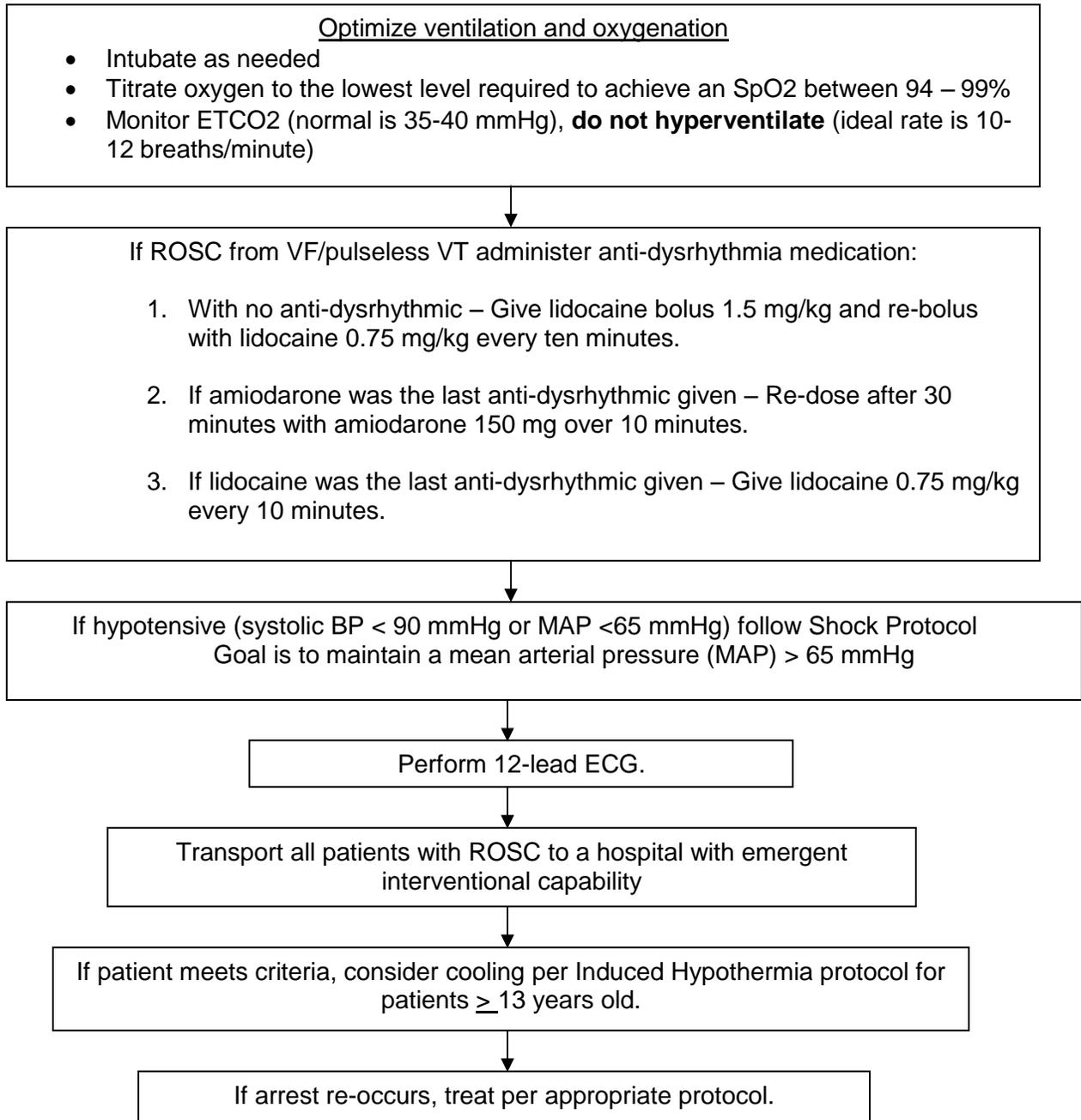
- < ASSESS C02 (should be >20 with good waveform)
- < FINGER on pulse maintain for 10 minutes. DO NOT MOVE
- < Continuous visualization of cardiac monitor rhythm
- < Check O2 supply & pulse Ox to TITRATE to SaO2 94%
- < Do not try to obtain a “normal” ETCO2 by increasing respiratory rate
- < Obtain 12 lead EKG
- < Assess for & TREAT bradycardia's < 60 bpm
- < Obtain B/P -- Pressor agent indicated for SBP < 90
- < Evaluate for post-resuscitative airway placement (e.g., ETT).
- < When patient is moved, CONTINUOUS PULSE CHECK & monitoring of cardiac rhythm
- < Mask is available for BVM in case advanced airway fails
- < Once in ambulance, confirm pulse, breath sounds, SaO2, EtCO2, and cardiac rhythm
- < Appropriate personnel for transport?

## Pearls

- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated. Consider early IO placement if available and difficult IV anticipated.**
- **DO NOT HYPERVENTILATE: Ventilate generally 8 – 10 breaths per minute or as guided by EtCO2**
- Do not interrupt compressions to place endotracheal tube.
- Success is based on proper planning and execution and a team-based approach. Procedures require space and patient access. Make room to work.
- Consider possible **CAUSE** of arrest early: For example, resuscitated Vfib may be STEMI and more rapid transport is indicated. Consider traditional ACLS “Hs and Ts” for PEA: Hypovolemia, Hypoxia, Hydrogen ions (acidosis), Hyperkalemia, Hypothermia, Hypo/Hyperglycemia, Tablets/Toxins/Tricyclics, Tamponade, Tension pneumothorax, Thrombosis (MI), Thromboembolism (Pulmonary Embolism), Trauma
- When considering **CAUSE**, consider utilizing relevant protocols in conjunction: airway, all cardiac protocols, allergic reaction, diabetic, dialysis/renal failure, overdose/ingestion, suspected stroke, environmental protocols, etc.

# Cardiac Arrest Post Resuscitation – 10.050

## TREATMENT:



### NOTES & PRECAUTIONS:

- A. Hyperventilation reduces venous return and may cause hypotension. Additional causes of post-resuscitation hypotension include hypovolemia and pneumothorax especially in the presence of positive pressure ventilation.
- B. The condition of post-resuscitation patients fluctuates rapidly and they require close monitoring.
- C. Do not use amiodarone or lidocaine in perfusing patients in the following situations without OLMC approval:
  - 1. Systolic BP is less than 90 mmHg
  - 2. Heart rate is less than 50 beats per minute
  - 3. Periods of sinus arrest are present
  - 4. Second or third degree heart block are present

# Cardiac Dysrhythmias (Bradycardia) – 10.060

Heart rate generally < 50

Treat per Universal Patient Care  
Obtain 12-lead ECG if feasible.

**Are signs or symptoms of poor perfusion caused by the bradycardia present?**  
(Altered mental status, ischemic chest discomfort, acute heart failure, hypotension or other signs of shock)

No

Observe and monitor patient.

Yes

2<sup>nd</sup> degree Type II, or  
3<sup>rd</sup> degree heart block, or  
Cardiac transplant?

No

Atropine 0.5 mg IV/IO. May repeat every 3-5 minutes to a maximum of 3 mg.

If no response to atropine, begin transcutaneous pacing (TCP)

Capture?

Yes

Monitor patient.

No

- If no response to pacing or atropine: Consider epinephrine infusion 2-10 mcg/min titrated to effect.
- Consider OLMC contact.

Yes

Begin transcutaneous pacing (TCP)

Capture?

No

Atropine 0.5 mg IV/IO. May repeat every 3-5 minutes to a maximum of 3 mg.

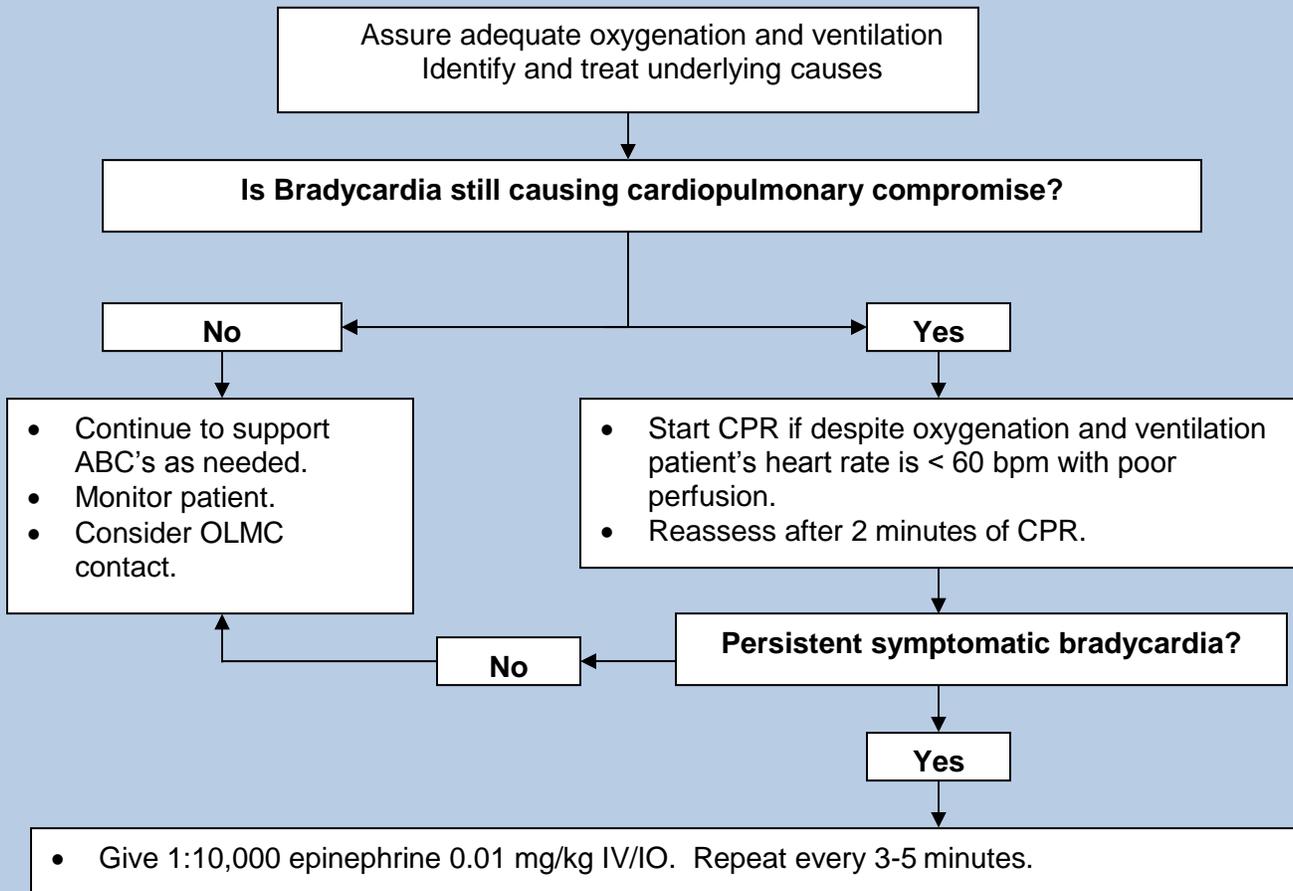
Yes

Monitor patient.

# Cardiac Dysrhythmias (Bradycardia) – 10.060

PEDIATRIC PATIENTS:

## BRADYCARDIA WITH A PULSE AND POOR PERFUSION

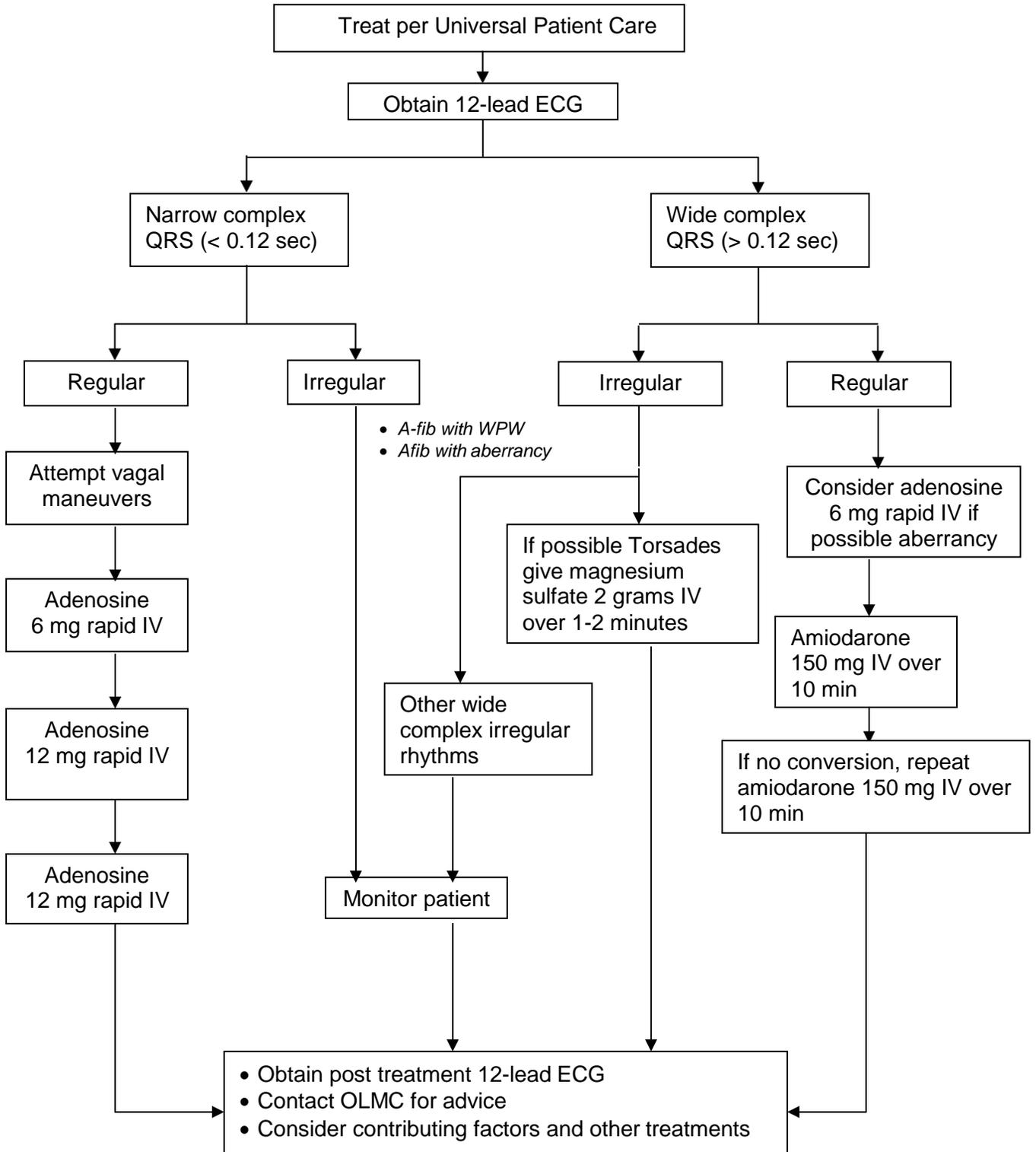


### NOTES & PRECAUTIONS:

- A. Hypoxia is a common cause of bradycardia.
- B. Bradycardia may be protective in the setting of cardiac ischemia and should only be treated if associated with serious signs and symptoms of hypoperfusion. Increasing heart rate may worsen ischemia or increase infarct size.
- C. Hyperkalemia may cause bradycardia. If the patient has a wide complex bradycardia with a history of renal failure, muscular dystrophy, paraplegia, crush injury or serious burn > 48 hours prior, consider treatment per Hyperkalemia protocol.
- D. Immediate TCP can be considered in unstable patients when vascular access is not available.
- E. TCP is at best a temporizing measure and is not useful in asystole.
- F. If TCP capture is not achieved, try repositioning pads.
- G. If capture is achieved with TCP and patient is experience discomfort administer midazolam 2.5 mg IV or 5 mg IM. May repeat IV dose once to a max of 5 mg.
- H. Atropine will likely be ineffective in heart transplant recipients because they lack vagal innervation.
- I. 3<sup>rd</sup> degree heart blocks with a wide complex QRS (>0.12 sec) are less likely to respond to atropine than those with a narrow complex.

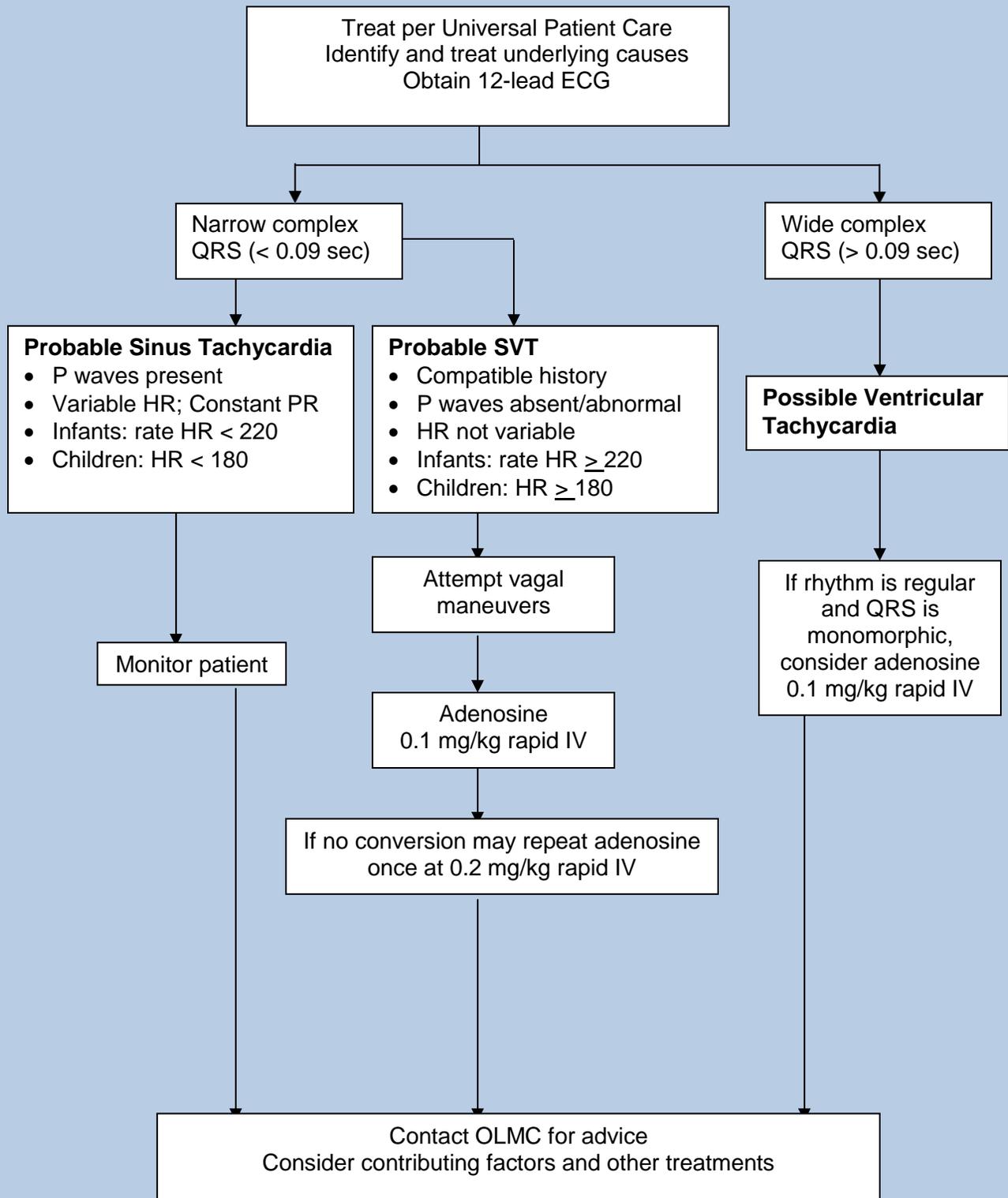
# Cardiac Dysrhythmias (Tachycardia Stable) – 10.060

Patient **does not** have signs or symptoms of poor perfusion caused by the dysrhythmia  
 (Altered mental status, ischemic chest discomfort, acute heart failure, hypotension or other signs of shock)  
*Rate related symptoms uncommon if HR < 150 bpm. Consider other causes.*



# Cardiac Dysrhythmias (Tachycardia Stable) – 10.060

## PEDIATRIC PATIENTS:



## Cardiac Dysrhythmias (Tachycardia Stable) – 10.060

### NOTES & PRECAUTIONS:

- A. In stable wide complex tachycardia, which is monomorphic, consider adenosine if SVT with aberrancy is suspected.
- B. If the patient is asymptomatic, tachycardia may not require treatment in the field. Continue to monitor the patient for changes during transport. The acceptable upper limit for heart rate for sinus tachycardia is 220 minus the patient's age.
- C. Other possible causes of tachycardia include:
  1. Acidosis
  2. Hypovolemia
  3. Hyperthermia/fever
  4. Hypoxia
  5. Hypo/Hyperkalemia
  6. Hypoglycemia
  7. Infection
  8. Pulmonary embolus
  9. Tamponade
  10. Toxic exposure
  11. Tension pneumothorax
- D. If pulseless arrest develops, follow Cardiac Arrest protocol.
- E. All doses of adenosine should be reduced to one-half (50%) in the following clinical settings:
  1. History of cardiac transplantation.
  2. Patients who are on carbamazepine (Tegretol) and dipyridamole (Persantine, Aggrenox).
  3. Administration through any central line.
- F. Adenosine may initiate atrial fibrillation with rapid ventricular response in patients with Wolff-Parkinson-White syndrome.
- G. Adenosine should be used with caution in patients with asthma as it may cause a reactive airways response in some cases.

## Cardiac Dysrhythmias (Tachycardia Unstable) – 10.060

Patient **has** signs or symptoms of poor perfusion caused by the dysrhythmia  
(Altered mental status, ischemic chest discomfort, acute heart failure, hypotension or other signs of shock)  
*Rate related symptoms uncommon if HR < 150 bpm. Consider other causes.*

Treat per Universal Patient Care

### Immediate synchronized cardioversion\*\*

If patient is conscious, consider sedation. Do not delay cardioversion for sedation

If IV is established - administer etomidate 0.15 mg/kg over 30-60 seconds to a max of 10 mg.  
If no IV – administer midazolam 5.0 mg IM/IN

**If no change repeat synchronized cardioversion**

Did the patient convert?

No

Yes

Amiodarone 150 mg IV slow push.

Repeat synchronized cardioversion\*\* x 2 if needed

If still no conversion

Initiate rapid transport

Contact OLMC

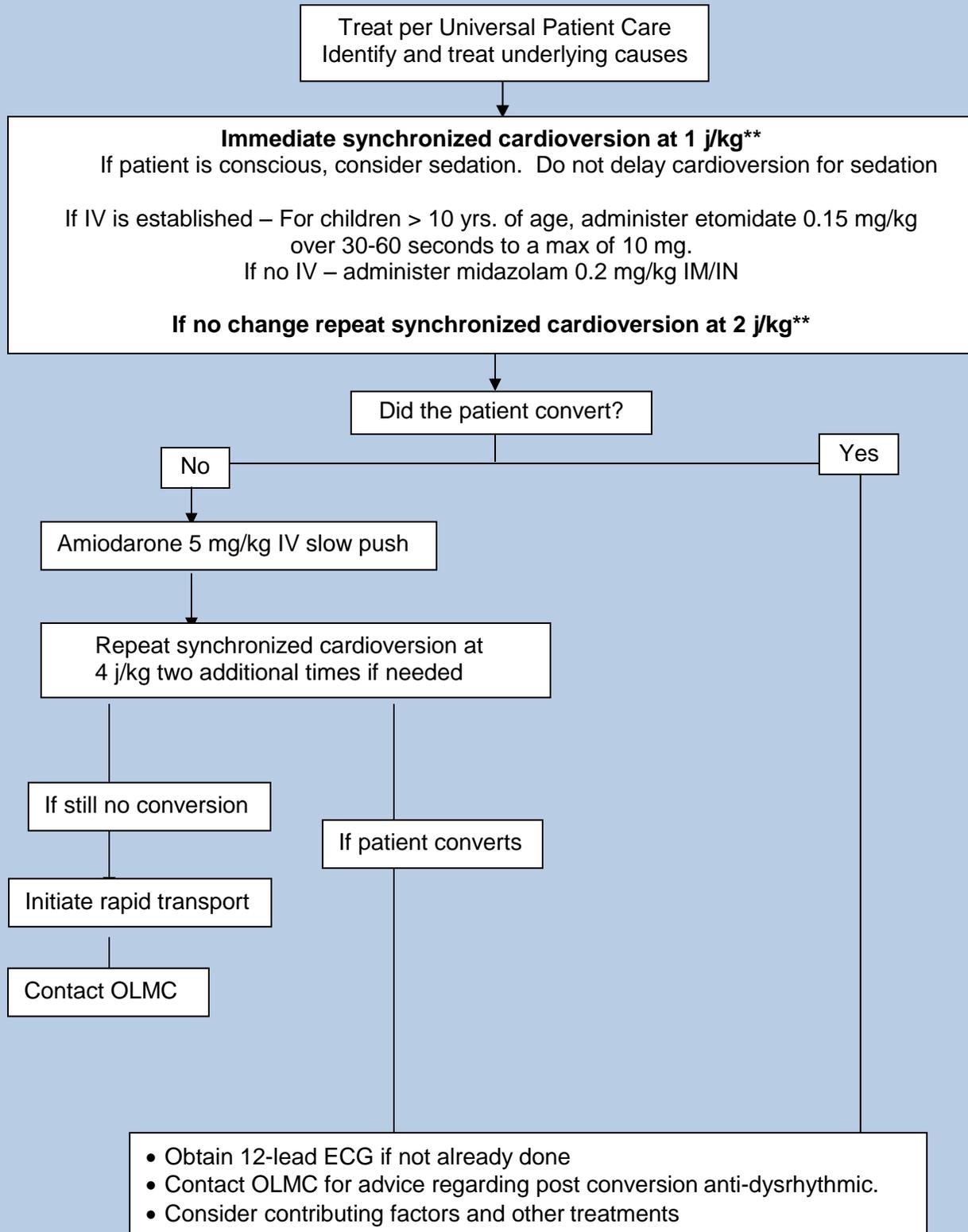
If patient converts

- Obtain 12-lead ECG if not already done
- Contact OLMC for advice regarding post conversion anti-dysrhythmic.
- Consider contributing factors and other treatments

\*\*If patient is in a wide complex irregular tachycardia use defibrillation (un-synchronized)

# Cardiac Dysrhythmias (Tachycardia Unstable) – 10.060

## PEDIATRIC PATIENTS:



## Cardiac Dysrhythmias (Tachycardia Unstable) – 10.060

### NOTES & PRECAUTIONS:

- A. Possible causes of tachycardia include:
  - 1. Acidosis
  - 2. Hypovolemia
  - 3. Hyperthermia/fever
  - 4. Hypoxia
  - 5. Hypo/Hyperkalemia
  - 6. Hypoglycemia
  - 7. Infection
  - 8. Pulmonary embolus
  - 9. Tamponade
  - 10. Toxic exposure
  - 11. Tension pneumothorax
- B. If pulseless arrest develops, follow Cardiac Arrest protocol.
- C. Defibrillation is recommended for wide complex irregular tachycardia
- D. Etomidate may result in myotonic jerking, apnea or pain at the injection site.

Heart Monitor Adult Synchronous Cardioversion Settings (Joules)	
Physio LifePak®	360 j
Philips MRX®	150 j
Zoll E/M Series®	200 j

## Chest Pain/Acute Coronary Syndrome – 10.070

### TREATMENT:

- A. Treat per Universal Patient Care.
- B. Give high flow oxygen if patient is dyspneic, titrate oxygen to the lowest level required to achieve a SpO<sub>2</sub> between 94 – 99% (must have good wave form and consistent number to ensure accuracy).
- C. If an acute ischemic event is suspected, obtain 12-lead ECG if available. This may be done concurrently with other treatment and should not delay treatment or transport.
- D. Administer aspirin 324 mg orally unless contraindicated.
- E. If blood pressure is > 100 mmHg systolic, administer nitroglycerin 0.4 mg sublingual. Repeat every 5 minutes until chest pain is relieved as long as systolic BP remains > 100 mmHg. Vascular access should be done prior to nitroglycerin administration in patients who have not taken nitroglycerin previously or who have a potential for hemodynamic instability.
- F. For pain, unrelieved after three doses of nitroglycerin, consider analgesia per Pain Management protocol. Nitroglycerin may be continued for strong suspicion of acute coronary syndrome.
- G. Treat any dysrhythmias per appropriate Cardiac Dysrhythmia protocol.
- H. PVC's in the setting of an acute ischemic event only (i.e. chest pain, couplets, R on T, runs of VT) may be treated with:
  1. Lidocaine 1.5 mg/kg over 1-2 minutes.
  2. If no change, give 0.75 mg/kg every 5 min up to 3 mg/kg.
  3. When PVC's are suppressed, give 0.75 mg/kg every 10 minutes.
  4. All doses of lidocaine, after the initial bolus, must be reduced to ¼ of the initial bolus in patients with congestive heart failure, shock, hepatic disease, or in patients > 70 years old.
  5. Lidocaine should not be used without OLMC direction if:
    - a. BP is less than 90 mmHg.
    - b. Heart rate is less than 50 beats per minute.
    - c. Periods of sinus arrest.
    - d. Presence of second or third degree AV block.

### PEDIATRIC PATIENTS:

- A. Consider pleuritic causes or trauma.
- B. Contact OLMC for advice.

### NOTES & PRECAUTIONS:

- A. DO NOT DELAY ADMINISTRATION OF ASPIRIN TO OBTAIN 12-LEAD ECG.
- B. **Do not give nitroglycerin to patients with an inferior myocardial infarction (ST elevation in II, III and AVF) as this may result in hypotension due to right ventricle involvement.** The latter is present in 50% of such infarcts.
- C. Do not administer nitroglycerin without OLMC if patient has taken Viagra or other similar drugs in the last 24 hours, or Cialis within the last 48 hours.
- D. Do not administer aspirin in patients who have an allergy or sensitivity to aspirin, who have a history of an active bleeding disorder, GI bleed or ulcer, or who have a suspected aortic dissection.
- E. If initial 12-lead negative or inconclusive consider repeating every 3-5 minutes if symptoms persist or change.

## Chest Pain/Acute Coronary Syndrome – 10.070

### **FIELD IDENTIFIED ST-ELEVATION MI (STEMI)**

#### **Indication:**

12-lead ECG with:

- A. Automatic ECG interpretation of “Acute MI”
- B. Paramedic interpretation of probable STEMI:
  - 1 mm ST elevation in two contiguous limb leads or 2 mm elevation in two contiguous chest leads.
  - No LBBB or paced rhythm

#### **Action:**

- A. Rapid transport to destination hospital ED with interventional capability.
- B. Early notification of destination and advise the receiving hospital of “STEMI patient”.
- C. If available, transmit 12-lead ECG to destination hospital.
- D. Non-diagnostic ECG’s with potential “imitators” of ACS or ECG’s that are clinically concerning should also be transmitted **without** STEMI activation. If transmission is unavailable, describe ECG to receiving hospital or contact OLMC. These may include:
  - Left or right bundle branch block
  - Left ventricular hypertrophy
  - SVT with aberrancy
  - Paced rhythms
  - Pericarditis
  - Benign early repolarization
  - Digitalis effects.

### TREATMENT:

- A. Treat per Universal Patient Care.
- B. Spinal immobilization if indicated and feasible.
- C. Consider pain management.
- D. Evaluate degree of entrapment and viability of extremities (absent pulse, blanched skin, capillary refill, diminished sensation, extremely cold to the touch).
  - a. If one or more extremities are trapped for a prolonged period (> 2-4 hrs), and circulation is compromised or absent consider the placement of tourniquet prior to extrication to reduce reperfusion injuries.
  - b. If extrication of a limb will be prolonged and patient's condition is deteriorating, strongly consider calling Trauma Communications to arrange on-scene management.
- E. During extrication, administer 1000 - 2000 cc NS via IV bolus, then maintain at 500 cc/hr.
- F. Monitor cardiac rhythm for signs of hyperkalemia including peaked T-waves, lowered P-wave amplitude or the loss of the P-wave, prolonged PR interval, second degree AV block, and a widened QRS. If present treat per Hyperkalemia protocol with calcium gluconate, high dose albuterol inhalation and sodium bicarbonate.
- G. Wound care.
  - a. Remove all restrictive dressings (clothing, jewelry, etc).
  - b. Monitor distal pulse, motor and sensation in involved extremity.
  - c. Bandage all open wounds. (Irrigate if needed.)
  - d. Stabilize all protruding foreign bodies (impaled objects).
  - e. Splint/immobilize injured areas.
  - f. For suspected pelvic crushing injuries, follow the Pelvic Wrap procedure if indicated.

### NOTES & PRECAUTIONS:

- A. Crush injury may elevate blood potassium levels (hyperkalemia) causing bradycardia, hypotension, weakness, weak pulse and shallow respiration.
- B. Plan extrication activities to allow for periodic patient assessment. Plan for occasional extrication equipment "shut down" to assess vital signs.
- C. Carefully track vitals, IV fluids, cardiac rhythm, and medications during extrication.
- D. Protect patient from environment (rain, snow, direct sun...). If applicable, begin warming methods to prevent hypothermia. (warm blankets, heated air with blower, warm IV fluids)
- E. Carefully assess collateral injuries that may have occurred during event.
- F. If patient is trapped in a heavy dust environment, consider methods to provide filtered oxygen to the patient. If patient is in respiratory distress, consider dust impaction injuries and prepare to administer nebulized albuterol per OLMC direction.
- G. Do not allow any personnel into extrication area (inner circle) without proper protective equipment and thorough briefing to include evacuation signal.
- H. Notify the receiving Trauma Center through Trauma Communications early in the extrication process to receive additional advice.

### TREATMENT:

- A. Treat per Universal Patient Care.
- B. In order to decrease intraocular pressure, patients should be transported in a sitting position of at least 30 degrees unless contraindicated.
- C. Treat specific injuries as follows:
  1. Chemical Burns
    - a. Administer proparacaine.
    - b. Irrigate from the center of the eye towards the eyelid with lactated ringers (preferred), isotonic saline, or tap water for at least 30 minutes.
    - c. Do not attempt to neutralize acids or bases.
  2. Direct Trauma to Eye (Suspected Rupture/Penetration of Globe)
    - a. Protect the affected eye and its contents with a hard shield or similar device and cover the other eye.
    - b. Follow Pain Management protocol as indicated and consider ondansetron per Nausea and Vomiting protocol.
  3. Foreign body on outer eye
    - a. Do not wipe eye.
    - b. Administer proparacaine.
    - c. Consider irrigation.

### PROPARACAINE ADMINISTRATION:

Instill one drop in the affected eye. If there is no effect within one minute, three additional drops may be instilled at one-minute intervals. For transports longer than 15 minutes, if eye pain returns, 1-4 additional drops may be instilled to continue anesthetic effect.

### NOTES & PRECAUTIONS:

- A. Document new onset of blurring, double vision, perceived flashes of light or other visual changes.
- B. Contact lenses should be removed, if possible.

### TREATMENT:

- A. Treat per Universal Patient Care.
- B. If hyperkalemia is suspected based on history and physical findings:
  - 1. Administer 10% calcium gluconate 10 ml slow IV/IO over 5 – 10 minutes in a proximal port.
  - 2. If no change in rhythm following calcium administration and transport time is prolonged, consider alternate therapy per OLMC contact:
    - a) Glucose and regular insulin if available
    - b) High dose albuterol (10 mg by nebulizer)
    - c) Sodium bicarbonate 50 mEq IV.

### NOTES & PRECAUTIONS:

- A. Treatment is going to be based on patient history. Renal failure may elevate blood potassium levels (hyperkalemia) causing bradycardia, hypotension, weakness, weak pulse and shallow respirations. Other patients who are predisposed to hyperkalemia are those who have muscular dystrophy, paraplegia/quadriplegia, crush injury, or patients who have sustained serious burns > 48 hours. A 12-lead ECG may be helpful.
- B. ECG changes that may be present with hyperkalemia include
  - 1. Peaked T waves.
  - 2. Lowered P wave amplitude or no P waves.
  - 3. Prolonged P-R interval (> 0.20 seconds).
  - 4. Second degree AV blocks.
  - 5. Widened QRS complex.
- C. DO NOT mix sodium bicarbonate solutions with calcium preparations. Slowly flush remaining calcium gluconate from the catheter prior to administering sodium bicarbonate.

### KEY CONSIDERATIONS:

Previous medical history, medications and allergies, trauma

### PEDIATRIC PATIENTS:

Calcium gluconate dosing is 0.5 ml/kg slow IV/IO over 5 – 10 minutes. Max dose 10 ml.

**TREATMENT:**

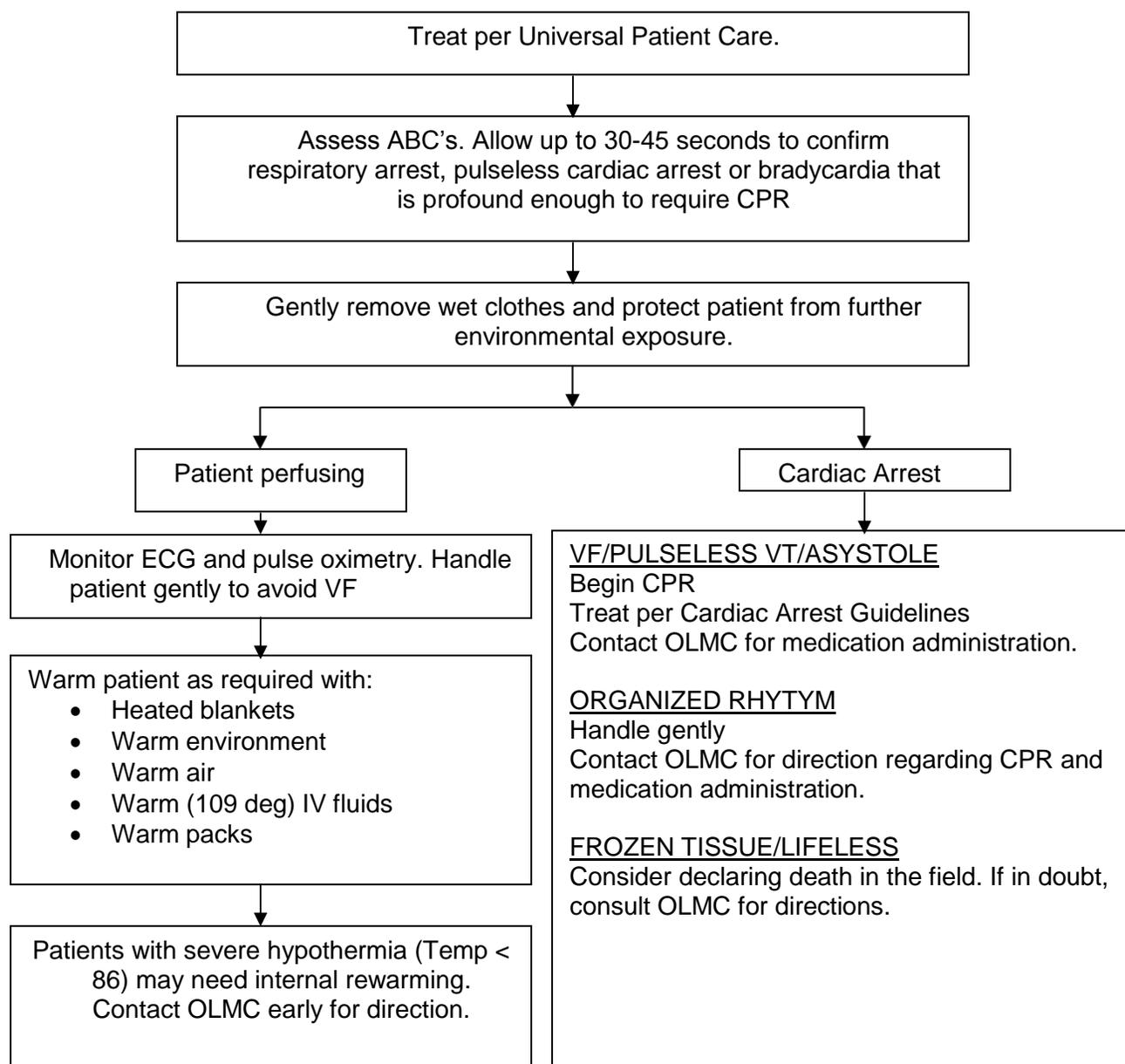
- A. Treat per Universal Patient Care.
- B. Remove clothing and begin cooling measures that maximize evaporation. (Spray bottle with tepid water, cool wipes, fans)
- C. If blood pressure is less than 90 mmHg systolic, treat per Shock Protocol.

**NOTES & PRECAUTIONS:**

- A. Heat stroke is a medical emergency. Differentiate from heat cramps or heat exhaustion. Be aware that heat exhaustion can progress to heat stroke.
- B. Wet sheets over a patient without good airflow will increase temperature and should be avoided.
- C. Do not let cooling measures in the field delay transport.
- D. Suspect hyperthermia in patients with altered mental status or seizures on a hot, humid day.
- E. Consider sepsis and/or contagious disease. Examine patient for rashes or blotches on the skin or nuchal rigidity.

**KEY CONSIDERATIONS:**

History of onset, sweating, patient's temperature, recent infection/illness, medical history, medications and allergies



## NOTES & PRECAUTIONS:

- A. At-risks groups for hypothermia include trauma victims, alcohol and drug abuse patients, homeless persons, elderly, low income families, infants and small children, and entrapped patients.
- B. Hypothermia may be preceded by other disorders (alcohol, trauma, OD) look for and treat any underlying conditions while treating the hypothermia.
- C. The hypothermic heart may be unresponsive to cardiovascular drugs, pacer stimulation or defibrillation.

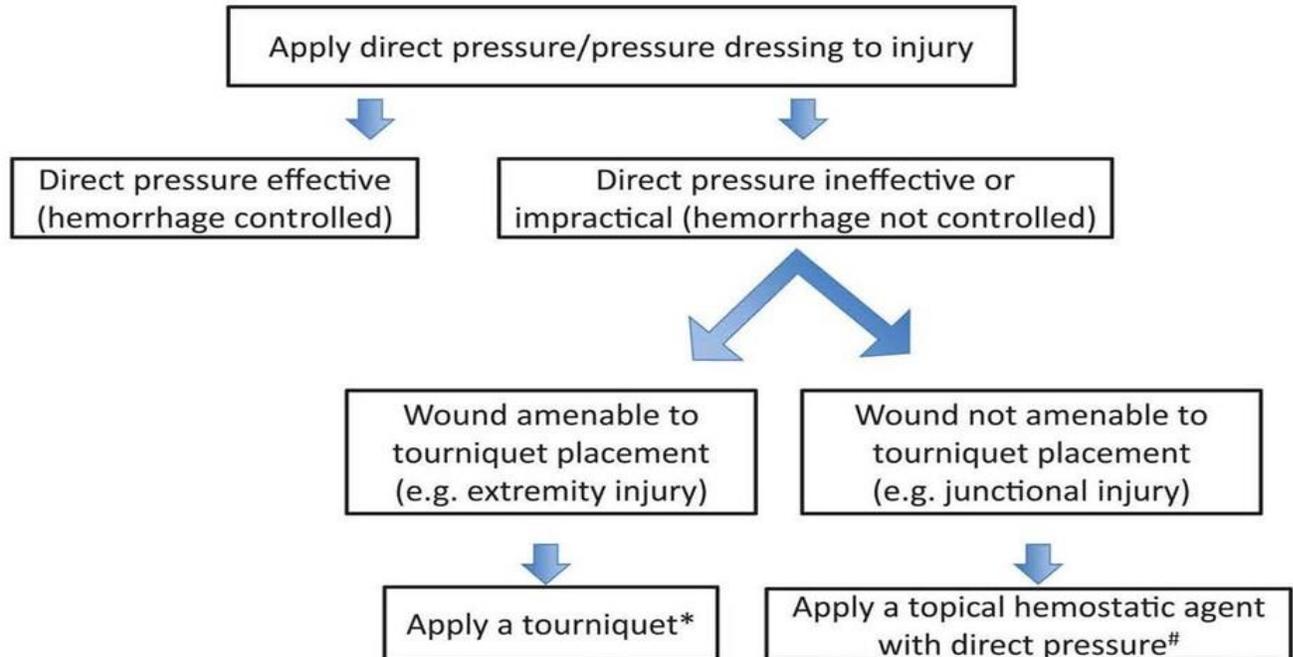
## KEY CONSIDERATIONS:

Submersion, cool rainy weather, wind chill, prolonged exposure

## Musculoskeletal Trauma – Extremity / Hemorrhage – 10.100

### TREATMENT:

- A. Treat per Universal Patient Care.
- B. External bleeding - Control with direct pressure, elevation, hemostatic dressings, and/or tourniquet per flowchart:



- C. Fracture, Sprain or Dislocation
  1. Check for pulses, sensation and movement distal to the injury site before and after immobilization.
  2. Splint fractures/dislocations in the position found. If PMS is compromised distal to fracture, consider applying axial traction to bring extremity into normal anatomical position. If patient complains of increase in pain or resistance is felt, stop and immobilize. If PMS is compromised distal to dislocation, contact OLMC.
  3. If fracture/dislocation is open, place a moist sterile dressing over wound and cover with a dry dressing.
  4. Elevate and/or place cold packs over fracture site if time/injuries allow.
  5. Apply traction splint to femur shaft fractures.
  6. For pelvic fractures, utilize pelvic sling and secure patient to a backboard to minimize movement and blood loss.
- D. Amputation
  1. Cover stump or partial amputation with moist sterile dressing.
  2. Splint partial amputations in anatomical position to avoid torsion and angulation.
  3. Wrap amputated part in a sterile dressing, and place in a plastic bag to keep dry. Place bag in ice water if available.
  4. If transport time is prolonged (extended extrication, etc.) consider sending the amputated part ahead to be prepared for reimplantation.
- E. Treat pain per Pain Management protocol.

## Musculoskeletal Trauma – Extremity / Hemorrhage – 10.100

### PEDIATRIC PATIENTS:

- A. Treat pain per Pain Management protocol.
- B. Consider non-accidental trauma as a cause of injury.

### KEY CONSIDERATIONS:

Mechanism of injury, previous medical history, medications and allergies, time of injury, quality of distal pulses, capillary refill

### NOTES & PRECAUTIONS:

\* Use of tourniquet for extremity hemorrhage is strongly recommended if sustained direct pressure is ineffective or impractical; Use a commercially-produced, windlass, pneumatic, or ratcheting device, which has been demonstrated to occlude arterial flow and avoid narrow, elastic, or bungee-type devices. Utilize improvised tourniquets only if no commercial device is available; Do not release a properly-applied tourniquet until the patient reaches definitive care. **It is imperative to write the letter "T" and the exact time you place the tourniquet on the patients' forehead with permanent marker.**

# Apply a topical hemostatic agent, in combination with direct pressure, for wounds in anatomical areas where tourniquets cannot be applied and sustained pressure alone is ineffective or impractical. Only apply topical hemostatic agents in a gauze format that supports wound packing. Only utilize topical hemostatic agents which have been determined to be effective and safe in a standardized laboratory model.

## Musculoskeletal Trauma - Spinal Injury – 10.100

### TREATMENT:

- A. Treat per Universal Patient Care protocol
- B. Provide initial cervical spine immobilization using manual in-line stabilization.
- C. Apply cervical collar, log roll and immobilize on a long spine board or flat on stretcher if the patient has a mechanism with the potential for causing spinal injury and meets ANY of the following:
  1. Neck or spine pain/tenderness on palpation
  2. Altered mental status or history of LOC.
  3. Drug or alcohol intoxication
  4. Distracting injury (e.g., fracture, dislocation, any injury requiring pain medication) or communication barrier, emotional distress
  5. New neurological deficit (numbness, tingling, weakness or paralysis).
- D. Complete physical and serial neurological exams after immobilization
- E. Treat per Pain Management protocol.
- F. Regularly assess the patient's respiratory status during transport. Loosen straps as needed to avoid respiratory compromise.

### PEDIATRIC PATIENTS:

If using an adult backboard:

- a. Children may require extra padding under the upper torso to maintain neutral cervical alignment.
- b. Consider using a short-spine device (OSS, KED) to immobilize the patient prior to placing on the backboard.

### NOTES & PRECAUTIONS

- A. Decreasing the use of backboards does not imply eliminating the use of spinal immobilization.
- B. Have a very low threshold for placing patients over 65 years of age in spinal precautions, even with a minor mechanism of injury.
- C. If any immobilization techniques cause an increase in pain or neurological deficits, nausea or respiratory distress, immobilize and transport the patient in the position found or position of greatest comfort.
- D. For isolated penetrating head, neck, or torso trauma, immobilization of the cervical spine is unnecessary unless there is a neurologic deficit or an adequate physical examination cannot be performed, e.g. a patient with altered mental status or a patient with distracting injury.
- E. For patients who are awake, alert and do not have neurological deficits, spinal precautions can be maintained by application of a rigid cervical collar and securing the patient firmly to a **flat** EMS stretcher.
- F. Patients in the third trimester of pregnancy should have the right side of the backboard elevated six inches.
- G. Pad backboards for all inter-facility transports. If feasible, especially in prolonged scene transports, pad backboards.
- H. If sports injury, immobilize patient per Sports Equipment Removal protocol.

### KEY CONSIDERATIONS:

Mechanism of injury, neurological deficits, PMS before/after immobilization

# MUSCULOSKELETAL – Spinal Injury

## SIGNIFICANT MECHANISM OF INJURY:

Meets state trauma system entry criteria under mechanism: fall from height (more than 3 ft. or 5 stairs), axial load (e.g. diving, football leading with helmet), motorized vehicle crash > 50 mph, non-motorized vehicle crash > 20 mph, ejection, co-occupant death, auto vs. pedestrian

### Unreliable Patients

Does the PT have any of the following?

- GCS less than 15?
- Language barrier?
- Dementia?
- Distracting injury?
- Evidence of drug/alcohol impairment?

YES

### FULL SMR Including

rigid c-collar, long backboard with padding (raft, vacuum splint, etc.), spider straps, head blocks & tape

NO

### Neuro Exam

- Is the PT talking abnormally?
- Does the patient have any focal weakness?
- Does the patient have any paresthesia's?

YES

### MODIFIED SMR

Rigid c-collar  
Movement to cot while limiting spinal motion  
Seat belts/5-point safety belt

NO

### Normal Spine Exam

- Does the patient have midline C/T/L pain?
- Any tenderness?
- Any deformity?
- Any pain with ROM of neck?

YES

NO

Treat and transport without C-Spine Precautions

# MUSCULOSKELETAL – Spinal Injury

## NON-SIGNIFICANT MECHANISM OF INJURY:

Includes ground-level fall, penetrating trauma, fist fights, other low velocity impacts

### Unreliable patients

Does the PT have any of the following?

- GCS less than 15?
- Language barrier?
- Dementia?
- Distracting injury?
- Evidence of drug/alcohol impairment?

YES

NO

### Neuro Exam

- Is the PT talking abnormally?
- Does the patient have any focal weakness?
- Does the patient have any paresthesia's?

YES

NO

### Spine Exam

- Does the patient have midline C/T/L pain?
- Any tenderness?
- Any deformity?
- Any pain with ROM of neck?

YES

NO

Does patient meet criteria for special consideration? \*\*

YES

NO

**Treat and transport without C-Spine Precautions**

## MODIFIED SMR

Rigid c-collar  
Movement to cot while limiting spinal motion  
Seat belts/5-point safety belt

- Patients needing special consideration include:
- Patients 65 or over with a GLF who have any pain of the head, or shoulders or who have evidence of trauma to other body parts such as the extremities
  - Patients with a history of prior spine fracture or congenital or acquired diseases of the bones or connective tissue such as brittle bone disease, Ehlers-Danlos, Marfan or Down Syndrome
  - Patient who are chronically wheelchair bound

## MUSCULOSKELETAL – Spinal Injury

### GUIDING PRINCIPLES OF SMR:

- Clear, complete documentation is required for patients evaluated for and cleared from SMR.
- **Any hard device used to move patients to cot (scoop stretcher, backboard, slider board, etc.) will be removed after the patient is placed on the stretcher. The only exceptions are those patients who had a severe mechanism of injury and were noted to have a neurologic deficit or who were unresponsive during the assessment.**
- Patients who can self-extricate or who are ambulatory on scene will have a collar placed and will be helped to cot under their own power. **No standing takedowns.**
- Children in car seats with a built-in 5-point harness (not a belt-positioning booster) may remain strapped in the car seat as long as patient care is not hindered.
- An improvised soft collar should only be used if a rigid collar worsens the patient's condition (e.g. airway obstruction, increased pain) or if a rigid collar simply will not fit. If the patient meets criteria for a rigid collar (i.e. Full or modified SMR) and one cannot be placed, an EMT will maintain manual C-spine stabilization en route to the hospital.

### TREATMENT:

- A. Treat per Universal Patient Care.
- B. If shock syndrome is present follow Shock protocol.
- C. Consider fluid challenge in patients exhibiting signs of dehydration.
- D. Consider offering patient an isopropyl alcohol swab and allowing the patient to self-administer the swab by inhalation. Emphasize slow deep inhalation. May be repeated up to 2 times (total of 3 administrations) but should not delay the administration of ondansetron.
- E. Give 8 mg ondansetron orally dissolving tablets (Zofran® ODT) or 4 mg ondansetron slow IV push over 2 minutes, or 4mg IM.
  1. If nausea and/or vomiting are inadequately controlled after 10 minutes, may repeat ondansetron once.
- F. If patient continues to vomit administer fluid challenge and consider other causes.

### PEDIATRIC PATIENTS:

- A. Ondansetron use in patients under 6 months of age requires OLMC consultation except for children in spinal immobilization or children receiving chemotherapy.
- B. For children 6 months - 2 years of age, administer 2 mg ondansetron orally dissolving tablet (Zofran® ODT). For children 2-12 years of age administer 4 mg ondansetron orally dissolving tablet (Zofran ODT) or administer ondansetron 0.1mg/kg via slow IV push over 2 minutes up to a total maximum IV dose of 4mg. Consider IM at same dose if unable to start IV and ODT tablet is contraindicated.

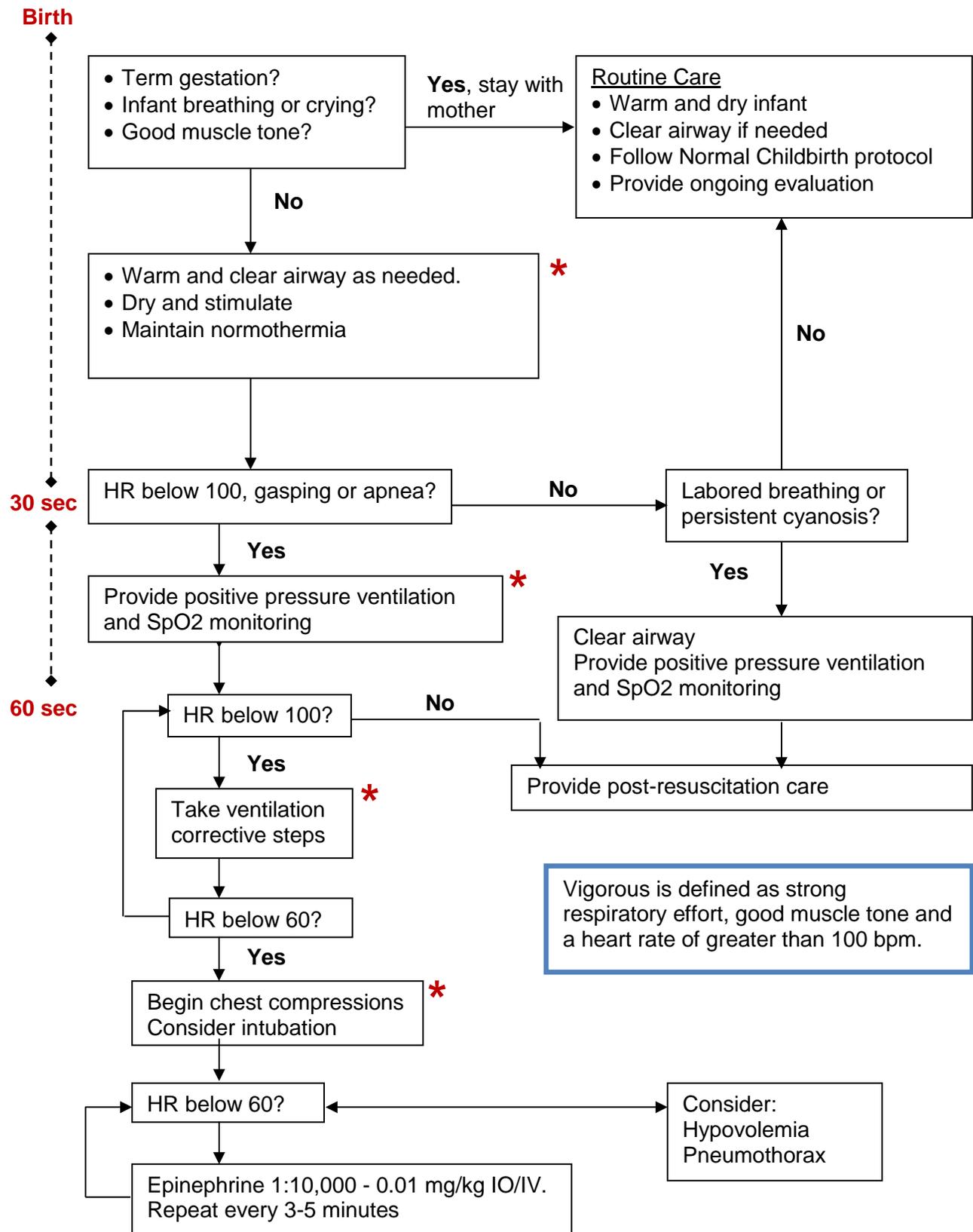
### NOTES & PRECAUTIONS:

- A. Do not administer ondansetron (Zofran®) to patients with a hypersensitivity to the drug or other 5-HT<sub>3</sub> type serotonin receptor agonists (e.g., dolasetron (Anzemet®) and granisetron (Kytril)).
- B. Do not administer alkaline medications or preparations in the same IV as ondansetron as it may cause precipitation.

### KEY CONSIDERATIONS:

Vomiting blood or bile, complaint of nausea, medications and allergies, pregnancy, abdominal pain or trauma, diarrhea, head trauma, orthostatic vital signs.

# Neonatal Resuscitation – 10.120



\* Critical points at which endotracheal intubation should be considered.

### POST RESUCITATION CARE:

- A. Continue to provide assisted ventilation as needed.
- B. Closely monitor respiratory effort, heart rate, blood glucose and pulse oximetry.
- C. **Keep newborn normothermic.** Hypothermia significantly increases risk of morbidity.
- D. Babies who required prolonged PPV, intubation and/or chest compressions are likely to have been severely stressed and are at risk for multi-organ dysfunction that may not be immediately apparent.

### NOTES & PRECAUTIONS:

- A. Tracheal suctioning **is not** indicated in the vigorous infant born with meconium stained fluid, whatever the consistency. Simply use a bulb syringe or large bore catheter to clear secretions from the mouth and nose as needed.
- B. Volume expanders should not be given during resuscitation in the absence of a history or indirect evidence of acute blood loss. Giving a large volume load to a baby whose myocardial function is already compromised by hypoxia can decrease cardiac output. If fluid resuscitation is needed, administer 10 ml/kg NS over 5-10 minutes. Contact OLMC for repeat dosing
- C. An electronic cardiac monitor is the preferred method for assessing heart rate.

### TREATMENT:

#### A. General

1. Treat per Universal Patient Care. Start O2 in all abnormal deliveries.
2. If multiple, or abnormal birth, consider second transport unit.
3. If in third trimester, transport patient on the left side (pillow under right hip or, if on backboard, tilt right side of board up 20 degrees) to keep uterine pressure off inferior vena cava unless delivery is imminent.
4. Vital signs may not be a reliable indicator of shock or respiratory distress in the pregnant patient.

#### B. Toxemia of Pregnancy

1. If in seizure (eclampsia) follow Seizure protocol.
2. Contact OLMC for consideration of use of magnesium sulfate.

#### C. Normal Childbirth

1. Use sterile or clean technique.
2. Guide/control but do not retard or hurry delivery.
3. Check for cord around neck and gently remove if found.
4. After delivery, assess infant per Neonatal Resuscitation protocol. If no resuscitation is needed (term infant, breathing or crying, good muscle tone), proceed as below.
5. Do not suction infant's nose and mouth unless there is meconium present **and** the infant is depressed; or there is a need to clear the airway.
6. Briefly dry infant and place on mother's chest, in skin-to-skin contact. Cover both with a clean, dry blanket.
7. Assess infant using APGAR at time of birth and five minutes later. (Documentation should describe the infant using criteria rather than giving a numerical score.)
8. At 30 to 60 seconds after delivery, clamp and cut the umbilical cord about 6 inches from infant. If resuscitation is needed, cord may be clamped and cut as soon as necessary.
9. Do not delay transport to deliver the placenta. After the placenta has delivered, gently externally massage uterus to encourage contraction and prevent bleeding.
10. If mother has significant postpartum hemorrhage (> 500ml), continue uterine massage, treat for shock, and update receiving facility.
11. Unless infant needs treatment, keep on mother's chest for transport. Monitor vital signs of mother and infant during transport.

#### D. Abnormal Childbirth

1. General
  - a. Transport to nearest appropriate hospital.
  - b. Give receiving hospital earliest possible notification.
  - c. Contact OLMC for advice.
  - d. Transport in position as described in General treatment above.

## Obstetrical Emergencies & Childbirth – 10.130

2. Breech Presentation (buttocks first)
  - a. If delivery is imminent, prepare the mother as usual and allow the buttocks and trunk to deliver spontaneously then support the body while the head is delivered.
  - b. If the head does not deliver within three minutes suffocation can occur.
    1. Place a gloved hand into the vagina, with your palm toward the baby's face.
    2. Form a "V" with your fingers on either side of the baby's nose and push the vaginal wall away from the baby's face to create airspace for breathing.
    3. Assess for the presence of pulse in umbilical cord, if presenting.

### E. Prolapsed Cord

1. With a gloved hand, gently attempt to push the baby back up the vagina several inches.
2. Do not attempt to push the cord back.
3. Assess for the presence of pulse in umbilical cord.

### F. Limb Presentation

1. The presentation of an arm or leg through the vagina is an indication for immediate transport to the hospital.
2. Assess for presence of pulse in umbilical cord, if presenting.

### G. Abruptio Placentae – Occurs in the third trimester of pregnancy when the placenta prematurely separates from the uterine wall leading to intrauterine bleeding.

1. The patient experiences lower abdominal pain and the uterus becomes rigid.
2. Shock may develop without significant vaginal bleeding.

### H. Placenta Previa – Occurs when the placenta covers the cervical opening and can result in vaginal bleeding and prevents delivery of the infant through the vagina. The infant needs to be delivered via caesarian section.

#### **KEY CONSIDERATIONS:**

Due date/prenatal care, last menstrual period, previous childbirth history, single or multiple birth, fetal heart tones, ruptured membranes, vaginal bleeding, contractions, cramping, edema or hypertension, abdominal pain, seizures

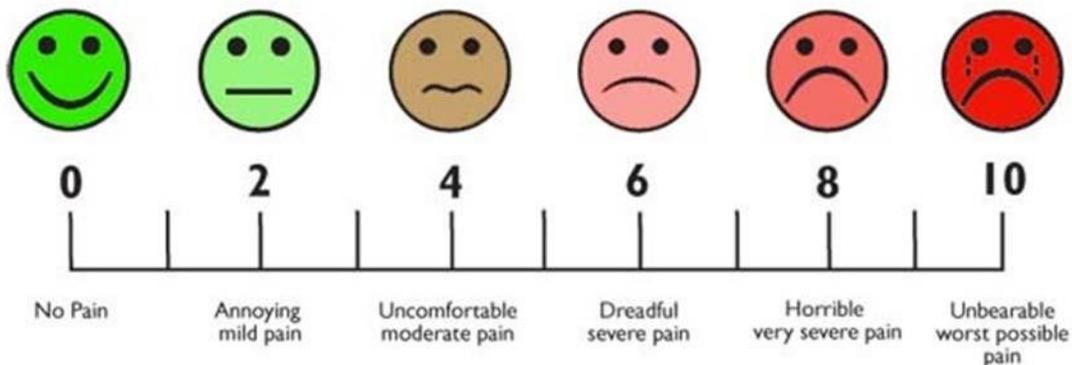
APGAR SCORE	0	1	2
Appearance	Blue/Pale	Body pink, extremities blue	Completely pink
Pulse	Absent	Slow (<100 bpm)	> 100 bpm
Grimace	No response	Grimace	Cough or sneeze
Activity	Limp	Some flexion	Active motion
Respirations	Absent	Slow, irregular	Good, crying

**TREATMENT:**

- A. Treat per Universal Patient Care.
- B. Determine location of pain and severity using numeric scale (1-10) or faces scale.
- C. Consider and treat underlying causes of pain.
- D. Use non-pharmacological pain management (i.e., position of comfort, hot/cold pack, elevation, splinting, padding, wound care, therapeutic calming and communication).
- E. If minor pain with no contraindication to oral medication, consider acetaminophen 1000 mg or ibuprofen 600 mg, if available.
- F. For moderate to severe pain:
  - 1. Fentanyl
    - i. 50–100 mcg IV/IN. May repeat with 25–50 mcg every 5 minutes as needed to a maximum of 400 mcg. If IV/IN not available, give 50-100 mcg IM. May repeat IM every 15 minutes as needed to a maximum 400 mcg.
    - ii. **If BP is less than 100 mmHg and/or pt. has minor altered mental status or respiratory depression**, the first dose fentanyl by any route is 25 mcg, may repeat 25-50 mcg every 5 minutes to a maximum of 400 mcg. Monitor patient closely.

**OR**

- 2. Morphine
  - i. 2-8 mg IV every 5 minutes to a maximum of 40 mg. In IV not available give morphine 5-10 mg IM. May repeat IM with 5 mg every 15 minutes to a maximum of 40 mg.
  - ii. **Do not administer morphine if systolic BP is less than 100 mmHg.**
- G. If patient is still in moderate to severe pain after at least 200 mcg of fentanyl or 20 mg of morphine consider ketamine 15 mg IV/IO. May repeat once after 30 min unless patient develops nystagmus, hallucinations or other psychiatric symptoms. Do not administer ketamine to patients who are pregnant, have eye pain, or have non-traumatic chest pain.
- H. Monitor SPO2 and end-tidal CO2.
- I. Document vital signs, response to treatment and pain scale rating prior to and after each administration of pain medication.



### PEDIATRIC PATIENTS:

- A. Fentanyl dose (not to exceed adult dose)
  - 1 microgram/kg IV. May repeat with 0.5 -1 microgram/kg every 5 minutes as needed to a maximum of 4 micrograms/kg IV
  - 2 microgram/kg IN. May repeat with 1 microgram/kg every 5 minutes as needed to a maximum of 8 micrograms/kg IN
  - If no IV/IN, may give fentanyl 1-2 micrograms/kg IM. May repeat every 15 minutes to a max of 4 micrograms/kg IM.
  - IN is preferred if no IV.
- B. Morphine dose is 0.1 mg/kg IV or IM. (IM may repeat after 15 minutes). Do not exceed adult dosing.
- C. If with no contraindication to oral medication, consider acetaminophen 15 mg/kg PO to a maximum of 1000 mg or ibuprofen 10 mg/kg PO to a maximum of 600 mg, if available.
- D. Do not administer fentanyl or morphine if patient's systolic blood pressure is lower than what is normal for child's age.

### Lowest normal pediatric systolic blood pressure by age:

- Less than one month: > 60 mmHg.
- One month to 1 year: > 70 mmHg.
- Greater than 1 year:  $70 + 2 \times \text{age in years}$

### NOTES & PRECAUTIONS:

- A. Benzodiazepines do not have an analgesic effect. They may potentiate the analgesic effect of opioids but also increase the likelihood of respiratory depression and require OLMC consult for use of midazolam along with opioids for pain management.
- B. Do not give oral medication to patients with abdominal pain, open or obviously angulated fractures.

### FEVER MANAGEMENT:

- A. Document temperature before administration of antipyretic and provide written documentation of temperature to receiving facility
- B. Remove heavy blankets or bundling but avoid shivering
- C. For temperature >102°F (38.9°C) consider, if available:
  1. Acetaminophen 15mg/kg PO to maximum of 1000 mg.  
OR
  2. Ibuprofen 10mg/kg PO to a maximum of 600 mg. Do not give to children with less than 6 months old or with signs of dehydration.

### ***Fever Management Notes and Precautions:***

- A. There is no evidence that treating fever decreases the likelihood of febrile seizure or has other therapeutic benefit. Treatment of fever is to improve patient comfort and is optional.
- B. Do not give acetaminophen if known liver disease, alcohol abuse, acute intoxication or has taken acetaminophen in last 4 hours.
- C. Do not give ibuprofen in infants under 6 months, known renal disease, dehydration, ulcer, GI bleeding, gastric reflux disease (heartburn), pregnancy or has taken within the last 6 hours.
- D. Antipyretics are not indicated for environmental hyperthermia.

**USE PROPER PRECAUTIONS. DECONTAMINATE PT PRIOR TO TREATMENT/TRANSPORT**

### TREATMENT:

- A. Treat per Universal Patient Care.
- B. If systolic BP < 90 mmHg follow Shock Protocol. Goal is to maintain a mean arterial pressure (MAP)  $\geq$  65 mmHg
- C. If unknown poison or overdose and the patient has a decreased level of consciousness, treat per Altered Mental Status protocol. Contact OLMC for advice.
- D. Treat specific poisons/overdoses as outlined below:
  - **Aspirin or acetaminophen:**
    1. If it is less than two hours since ingestion, administer 1 gram/kg of activated charcoal PO/NG.
    2. If ingestion involves more than just aspirin and/or acetaminophen contact OLMC for use of activated charcoal.
  - **Beta blockers:**

Contact OLMC for consideration of glucagon.
  - **Calcium channel blocker:**

Contact OLMC for consideration of calcium gluconate, 10cc of 10% over 5-10 min.
  - **Carbon Monoxide:**
    1. High flow O<sub>2</sub>.
    2. All symptomatic patients (e.g. headache, dizziness, nausea) should be transported.
    3. Transport patients with severe symptoms (e.g. cardiac ischemia, coma, syncope, seizures, loss of consciousness) to the nearest facility with a hyperbaric chamber.
    4. If CO monitor is available and CO reading is  $\geq$  15, transport to nearest facility with a hyperbaric chamber (unless patient meets burn or trauma center criteria).
    5. If cyanide poisoning is also suspected, consider obtaining SpCO, if possible, before administration of Cyanokit<sup>®</sup> since the latter will interfere with the carboxyhemoglobin monitor.
  - **Tricyclic antidepressant:**
    1. If patient exhibits arrhythmias or a widening QRS complex administer sodium bicarbonate 1 mEq/kg IV/IO.
    2. Treat hypotension per Shock protocol.
  - **Organophosphates:**
    1. Prepare to handle copious secretions.
    2. Administer atropine 1 – 2 mg IV/IO until symptoms improve. Contact OLMC for frequency of dosing. See Haz-Mat Protocol for more specifics of treatment.
- E. Contact Poison Control as needed.
- F. Contact OLMC for advice on activated charcoal for other ingested poisons.

## Poisoning & Overdose – 10.140

### PEDIATRIC PATIENTS:

- A. Consider possibility of neglect or abuse.
- B. Contact OLMC for atropine dosing. May be very high in children who have orally ingested organophosphate poisons.
- C. Activated charcoal dose is 1 gram/kg.
- D. For children < 1 yr. dilute sodium bicarbonate by one-half with normal saline prior to administration.

### NOTES & PRECAUTIONS:

- A. SpCO levels may be elevated in smokers. Levels can range from 3-20% depending on the number of packs smoked.
- B. Pulse oximeter may provide a false reading in patients with elevated SpCO levels.
- C. If the patient exhibits extrapyramidal symptoms/dystonias with a history of phenothiazine use, consider diphenhydramine.
- D. For large organophosphate poisonings, refer to Haz Mat protocol.
- E. Do not neutralize acids or alkalis.
- F. Consider Haz Mat Team activation.

### KEY CONSIDERATIONS:

Route of poisoning, amount of ingestion, antidote given, suicidal intent, multiple patients, psychiatric history

CO Clinical Presentation Transport Matrix				
Carbon Monoxide	Yes	Yes	Yes	Yes
Burns	No	Yes	No	Yes
Trauma	No	No	Yes	Yes
Destination	Hyperbaric Center	Burn Center	Trauma Center	Trauma Center

Carbon Monoxide =  $\geq 15$ , Burns = Burn Center Criteria, Trauma = Trauma Center Criteria

TOXIDROME TABLE			
Toxidrome	Examples	Clinical Features	Antidotes
Sympathomimetic	Cocaine Methamphetamine	Agitation Diaphoresis Hypertension Hyperthermia Dilated pupils Tachycardia	Midazolam (OLMC)
Opioid	Heroin Hydromorphone Methadone Oxycodone	Depressed mental status Hypoventilation Constricted pupils	Naloxone
Cholinergic (Anti-cholinesterase)	Pesticides • Carbamates • Organophosphates Nerve agents	Muscarinic* Nicotinic** Central***	Atropine Pralidoximine (2-Pam) (Hazmat, OLMC)
Sedative-Hypnotic	Barbituates Benzodiazepines GHB	Depressed mental status Hypotension Hypothermia	Supportive treatment
Cardiotoxic drugs	Beta-blockers Calcium channel blockers	Bradycardia Conduction issues Hypotension	Glucagon (OLMC) Calcium (OLMC)
Anticholinergic	Atropine Jimson Weed Scopolamine Diphenhydramine	Delirium Hyperthermia Tachycardia Warm, dry skin	Supportive treatment Physostigmine (ED)
Sodium channel blockade	Tricyclic antidepressants Antiarrhythmics • Type 1A – quinidine, procainamide • Type 1C – flecanide, propafenone	Altered mental status Hypotension Seizures Wide complex tachycardia	Sodium Bicarbonate (OLMC)
<b>*Muscarinic</b>		<b>**Nicotinic</b>	<b>***Central</b>
Diarrhea, Urination, Miosis, Bradycardia, Bronchospasm, Bronchorrhea, Emesis, Lacrimation, Salivation, Sweating		Mydriasis, Tachycardia, Weakness, Hypertension, Hyperglycemia, Fasciculations	Confusion, Convulsions, Coma

### TREATMENT:

- A. Treat per Universal Patient Care.
- B. Follow appropriate Airway Management or Cardiac Dysrhythmia protocol if indicated.
- C. Treat patient's clinical impression as follows:
  - **Upper Airway**
    1. Croup & Epiglottitis – Transport in position of comfort, monitor airway
    2. Anaphylaxis – Treat per Anaphylaxis and Allergic Reaction protocol.
    3. Foreign Body – Begin obstructed airway procedures. Remove object using direct laryngoscopy if complete obstruction exists.
    4. Complete Obstruction – If you cannot effectively BVM ventilate the patient and the patient is deteriorating, consider cricothyrotomy.
  - **Pulmonary Edema**
    1. Sit patient upright
    2. If BP < 100 mmHg systolic, treat possible cardiogenic shock drip per Shock protocol.
    3. If BP > 100 mmHg systolic:
      - a. Nitroglycerine 0.4 mg SL, repeat every 3-5 minutes. (Do not administer nitroglycerine without OLMC approval if pt has taken Viagra®, Levitra® or other similar drugs in the last 24 hours, or Cialis® within the last 48 hours).
      - b. If the patient remains in severe respiratory distress (e.g. unable to speak more than 1-2 words, low O<sub>2</sub> saturation (<90%), respiratory rate > 40) start CPAP if available.
      - c. Consider albuterol 2.5 mg by nebulizer. May repeat as needed.
      - d. Furosemide (If systolic BP > 100 and fluid overload state (JVD, rales, peripheral edema, hypertension):
        - i. If patient is not currently taking furosemide, give 20 mg IV.
        - ii. If the patient is taking furosemide, give 40 mg IV.
  - **COPD**
    1. DuoNeb (albuterol 3 mg / ipratropium 0.5 mg) by nebulizer. Repeat every 20 minutes if needed. Do not administer more than three total treatments.
    2. If additional bronchodilator needed, repeat albuterol only 2.5 mg by nebulizer every 20 minutes.
    3. If patient has moderate to severe respiratory distress based on Severity Assessment Guide, give dexamethasone 10mg IV/IO or IM. May also be given orally.
    4. Consider CPAP if available.
    5. If continuous nebulizer treatment is needed contact OLMC.

- **Asthma**
  1. DuoNeb (albuterol 3 mg / ipratropium 0.5 mg) by nebulizer. Repeat every 20 minutes if needed. Do not administer more than three total treatments. If additional bronchodilator needed, repeat albuterol only 2.5 mg by nebulizer every 20 minutes.
  2. If patient has moderate to severe asthma based on Severity Assessment Guide, give dexamethasone 10mg IV/IO/IM/PO.
  3. If patient is deteriorating give epinephrine 0.3 mg IM. Consider using smaller doses for patients > 40 years old.
  4. If transport time is long and asthma is severe, contact OLMC for consideration of magnesium sulfate (usual dose is 2 grams over 20 minutes).
  5. If continuous nebulizer treatment is needed contact OLMC.

### **PEDIATRIC PATIENTS:**

#### **A. Upper Airway**

1. In patients 6 months to 6 years of age with audible stridor at rest, administer 5 ml epinephrine 1:1,000 via nebulizer (racemic epi). May repeat in 20 minutes. Contact OLMC for additional dosing.
2. Treat anaphylaxis and foreign body obstruction per adult guidelines.
3. The usual cause of respiratory arrest in children with croup, epiglottitis or laryngeal edema is exhaustion, not complete obstruction.
  - a. If suspected croup administer dexamethasone 0.6 mg/kg IV/IO/IM/PO up to 10 mg.
  - b. If the child deteriorates, ventilate with a BVM.
  - c. If you cannot effectively ventilate with BVM perform intubation.
4. If complete obstruction is present and you cannot effectively BVM ventilate the patient and the patient is deteriorating, consider needle cricothyrotomy.

#### **B. Asthma**

1. Give albuterol and ipratropium per adult guidelines.
2. If patient is deteriorating give 1:1,000 epinephrine 0.01 mg/kg IM (max dose 0.5 mg). Contact OLMC for additional doses.
3. If patient has Moderate to Severe asthma based on Severity Assessment Guide and is not improving with treatment, consider dexamethasone 0.6 mg/kg IV/IO/IM/PO up to 10 mg.

#### **C. Acute Bronchiolitis (< 2 years old)**

**Mild-moderate respiratory distress (see Infant Respiratory Distress table below)**

1. Give oxygen via blow-by, nasal cannula or mask to keep SpO<sub>2</sub> > 92%. Monitor ETCO<sub>2</sub> if available.
2. If nasal secretions and/or congestion use nasal suction with adapter if available, if secretions are thick may use normal saline to loosen.
3. If wheezing, give albuterol 2.5 mg via nebulizer. If improvement may use every 10 minutes. Discontinue if pts heart rate is > 200.

4. If patient worsens and is still wheezing, give epinephrine 5 mL of 1:1000 via nebulizer. If improvement may use every 10 minutes. Discontinue if pts heart rate is > 200.
5. If unable to keep SpO<sub>2</sub> > 92% with oxygen or patient has continued significant work of breathing despite treatment:
  - a. 30-90 days old - titrate high flow nasal cannula (pediatric) oxygen (HFNCO) starting at 2 LPM up to 4 LPM.
  - b. Greater than 90 days old - titrate high flow nasal cannula oxygen up to 6 LPM.

### **Severe respiratory distress (see Infant Respiratory Distress table below)**

1. Suction nares as described above.
2. Initiate high flow nasal cannula oxygen as described above with ETCO<sub>2</sub> monitoring.
3. If wheezing, give albuterol 2.5 mg via nebulizer. If improvement may use every 10 minutes. Discontinue if pts heart rate is > 200.
4. Prepare for positive pressure ventilation with BVM and intubation for apnea, ETCO<sub>2</sub> > 55 or inability to maintain SpO<sub>2</sub> > 85%.

### **NOTES & PRECAUTIONS:**

- A. In addition to specific interventions for respiratory distress, aggressive airway management, including early intubation, is appropriate for the patient who does not respond to treatment or is rapidly deteriorating.
- B. The best indicator for the cause of respiratory distress is past history. If a person has had COPD or CHF in the past, it is likely the person has the same condition again.
- C. In cases of tachypnea it is essential to consider all causes such as pulmonary embolus, hypoxia, cardiac causes, infection and trauma. Hyperventilation may be a response to an underlying medical problem and should only be considered after these other causes have been excluded. Do not treat hyperventilation by rebreathing CO<sub>2</sub>. Reassurance and oxygen via mask are appropriate.

### **KEY CONSIDERATIONS:**

Speed of onset, recent illness/infection, fever, chills or productive cough, medications and allergies, distended neck veins, peripheral edema, lung sounds, medical history (including asthma, CHF, COPD, pneumonia)

## Respiratory Distress – 10.160

ASTHMA SEVERITY ASSESSMENT GUIDE			
	MILD	MODERATE	SEVERE
<b>Short of breath</b>	Walking	Talking	At rest
<b>Able to speak</b>	In sentences	In phrases	In words
<b>Heart rate</b>	< 100	100 - 120	> 120
<b>Respiratory rate</b>	Elevated	Elevated	> 30
<b>Lung sounds</b>	End expiratory wheezes	Full expiratory wheezes	Wheezes both phases or absent
<b>Accessory muscle use</b>	Not usually	Common	Usually
<b>Alertness</b>	Possibly agitated	Usually agitated	Usually agitated
<b>ETCO2</b>	20 - 30	30 - 40	>50

INFANT RESPIRATORY DISTRESS ASSESSMENT GUIDE			
	Mild	Moderate	Severe
<b>Respiratory Rate</b>			
≤ 2 months	≤ 60	61-69	≥ 70
2-12 months	≤50	51-59	≥ 60
1-2 years	≤ 40	41-44	≥ 45
<b>Retractions</b>	Subcostal or intercostal	2 of: subcostal, intercostal, substernal retractions, OR nasal flaring	3 of: subcostal, intercostal, substernal, suprasternal, supraclavicular retractions, OR nasal flaring OR head bobbing
<b>Dyspnea</b>	1 of: difficulty feeding, decreased vocalization or agitation	2 of: difficulty feeding, decreased vocalization or agitation	Stops feeding, no vocalization OR drowsy and confused
<b>Auscultation</b>	End-expiratory wheeze only	Expiratory wheeze only	Inspiratory and expiratory wheezing OR diminished breath

**TREATMENT:**

- A. Treat per Universal Patient Care.
- B. If patient is in status seizure (continuous seizure or repetitive seizures without regaining consciousness):
  1. Administer midazolam 2.5 mg IV/IO. Repeat every 5 minutes until seizure stops.
  2. If no IV access, administer midazolam 5 mg IM/IN. Repeat every 5 minutes until seizure stops.
  3. Monitor patient's respiratory status closely after midazolam administration.
- C. Check blood glucose and treat per Altered Mental Status protocol.
- D. Place patient on their left side for transport.
- E. Transport may be unnecessary if patient becomes fully oriented, is taking their anti-seizure medication as prescribed, has a physician, and is experiencing their usual frequency of seizure activity. If patient is not transported have the patient (or guardian) sign a Patient Information Form and document the patient's mental status.
- F. All first-time seizure patients require medical evaluation by a physician. Contact OLMC if patient refuses transport.

**PEDIATRIC PATIENTS:**

- A. If patient is in status seizure (continuous seizure or repetitive seizures without regaining consciousness):
  1. Administer midazolam 0.3 mg/kg IN/IM. Repeat every 5 minutes until seizure stops.
  2. If an IV is available, may administer midazolam 0.1 mg/kg IV/IO. Repeat every 5 minutes until seizure stops.
  3. Monitor patient's respiratory status closely after midazolam administration.
- B. Febrile seizures are generally found between the ages of 1- 6 and are usually short in duration.
- C. If, on arrival, the patient is not actively seizing (post-ictal) an IV is not required.
- D. All hypoglycemic or first time pediatric seizure patients should be transported.

**NOTES & PRECAUTIONS:**

- A. Seizures in patients > 50 years of age can be caused by dysrhythmias. Monitor rhythm and treat per appropriate protocol.
- B. New onset of seizures in a pregnant patient, especially in the third trimester, may indicate toxemia of pregnancy. Contact OLMC for consideration of magnesium sulfate. Normal dose is 4 grams IV over 15-20 minutes.
- C. Remember to check a pulse once a seizure stops. Seizure activity may be the sign of hypoxia or dysrhythmias.

**TREATMENT:**

- A. Treat per Universal Patient Care
- B. Maintain O<sub>2</sub> sat above 95%
- C. If suspected infection and two or more of the following qSOFA criteria are met:
  - Systolic Blood Pressure < 100 mmHg
  - Respiratory rate > 22 breaths/min
  - Altered mental status
- D. Notify the receiving hospital with a Sepsis Alert.
- E. **If available**, check point of care lactate and notify receiving hospital if > 4 mMol.
- F. If systolic BP < 90 mmHg, start IV and treat per shock protocol. Target mean arterial pressure (MAP) > 65 mmHg.

**NOTES & PRECAUTIONS:**

- A. 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.
- B. 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.
- C. qSOFA – Quick Sepsis-related Organ Failure Assessment (see below)

## What is qSOFA?



**ALTERED  
MENTAL STATUS**

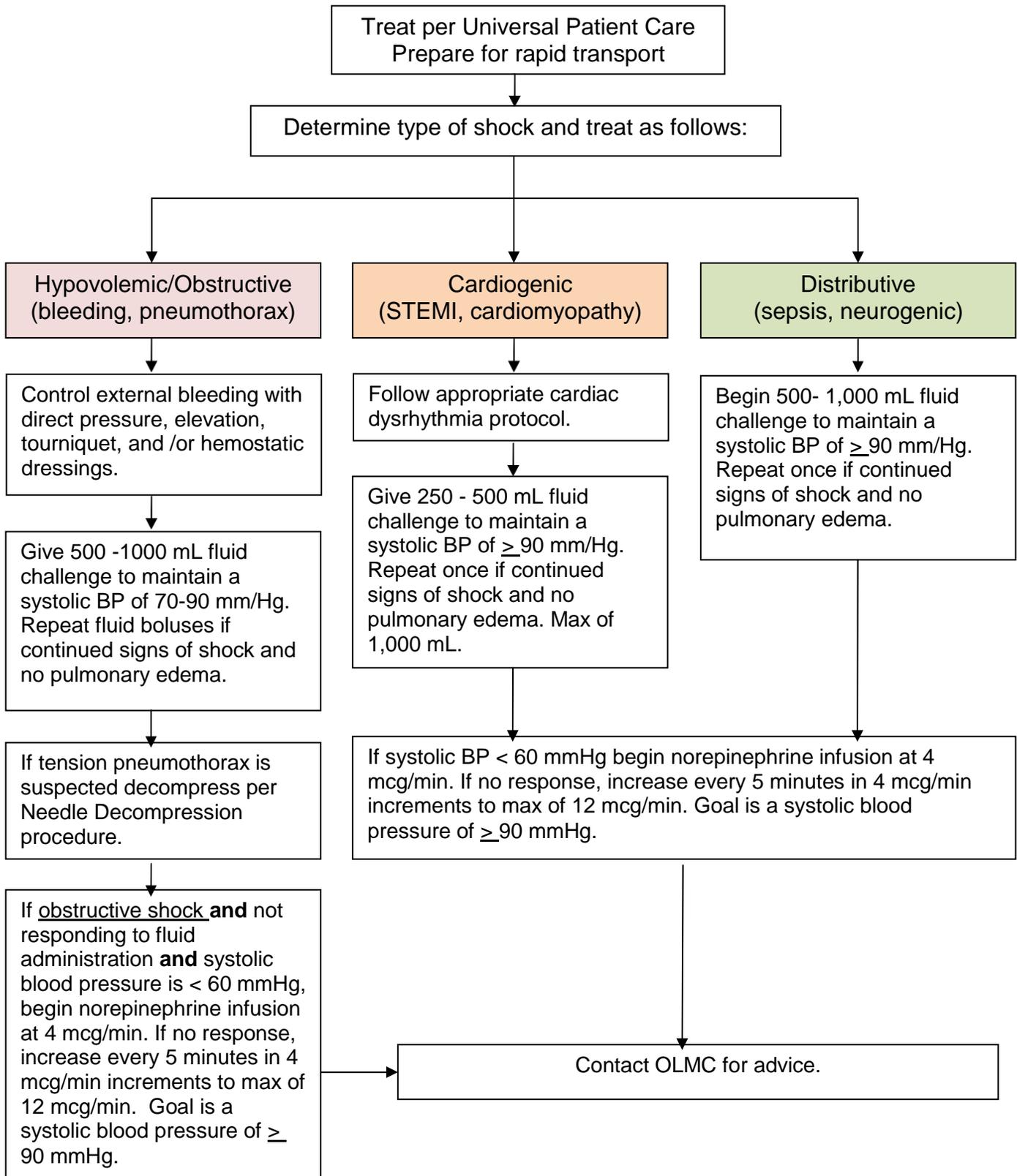


**FAST RESPIRATORY  
RATE**

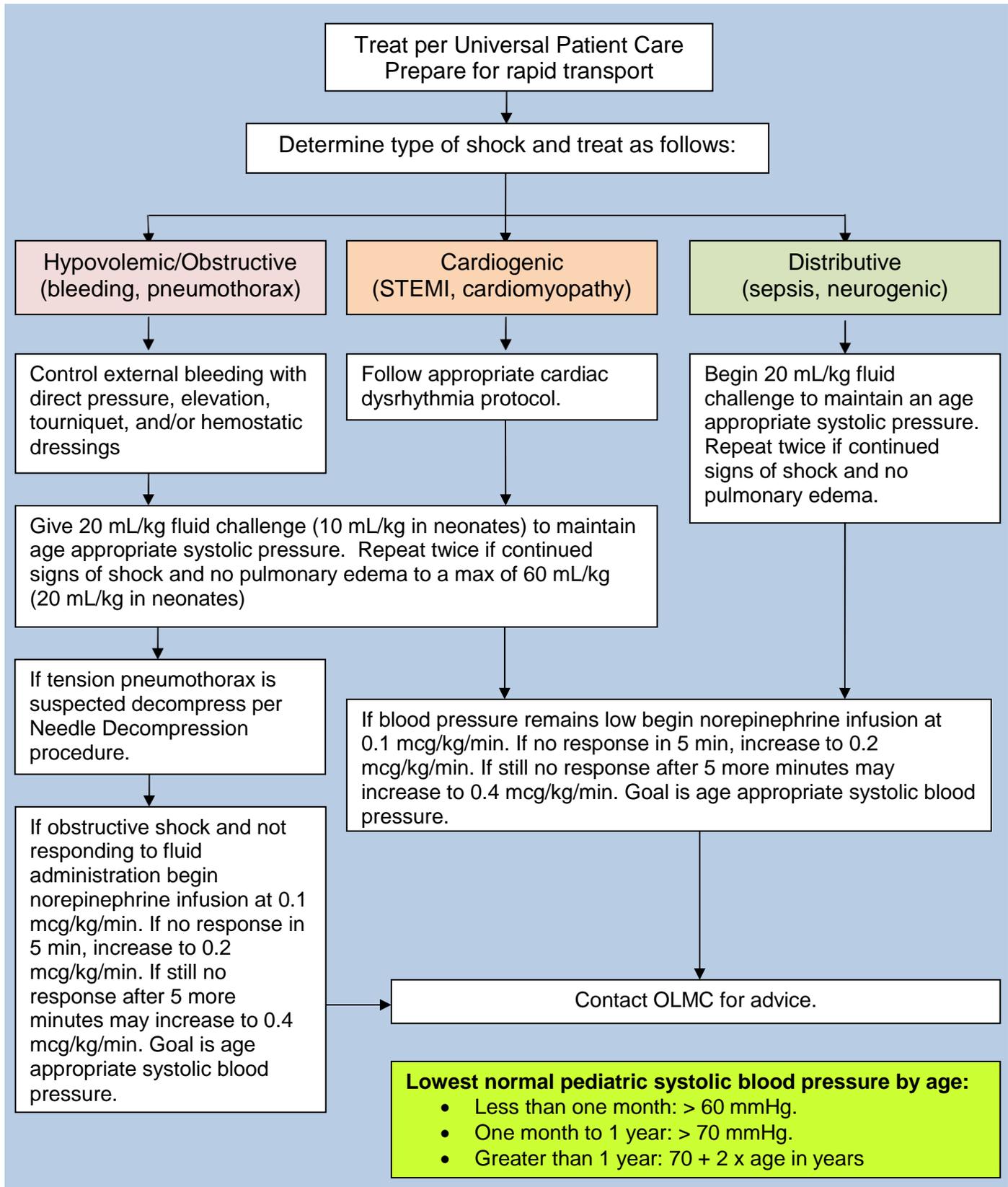


**LOW BLOOD  
PRESSURE**

The qSOFA score (also known as quickSOFA) is a bedside prompt that may identify patients with suspected infection who are at greater risk for a poor outcome outside the intensive care unit (ICU). It uses three criteria, assigning one point for low blood pressure (SBP $\leq$ 100 mmHg), high respiratory rate ( $\geq$ 22 breaths per min), or altered mentation (Glasgow coma scale $<$ 15).



## PEDIATRIC PATIENTS:



### NOTES & PRECAUTIONS:

- A. Closely monitor patient's respiratory status and vital signs. Avoid fluid overload.
- B. Mean Arterial Pressure targets:
  - a. Uncontrolled traumatic hemorrhagic shock without TBI or suspected AAA, target MAP is 55-65 mmHg (SBP 70-90)
  - b. Uncontrolled traumatic hemorrhagic shock with TBI or shock from all other causes, target MAP is  $\geq 65$  mmHg (SBP  $\geq 100$ )
- C. For patients in shock with known or suspected adrenal insufficiency (AI) consider administration of dexamethasone 10 mg (0.6 mg/kg for pediatric patients) in addition to fluids and/or nor-epinephrine.

### KEY CONSIDERATIONS:

Mechanism of injury, medications, recent illness, medical history

**TREATMENT:**

- A. Treat per Universal Patient Care.
- B. If CBG is low, treat per Altered Mental Status guidelines.
- C. Complete **Modified Los Angeles Prehospital Stroke Screen (LAPSS)**.
- D. If LAPSS is positive, perform Cincinnati – **Stroke Triage Assessment Tool (C-STAT)**
  - 1. If LAPSS and C-STAT positive ( $\geq 2$ ) transport to nearest interventional stroke center if less than 20 minutes away otherwise transport to nearest stroke capable center.
  - 2. If LAPSS positive and C-STAT negative, notify receiving facility of acute stroke alert as soon as feasible.
  - 3. When contacting receiving hospital notify them that patient is either CSTAT positive or negative.
- E. Transport patient in supine position with < 15 degree of head elevation if tolerated.
- F. Document serial neurologic examinations.

**NOTES & PRECAUTIONS:**

- A. Do not treat hypertension or give aspirin.
- B. All potential stroke patients should be transported to a stroke center.

1      MODIFIED LOS ANGELES PREHOSPITAL STROKE SCREEN			
1. Age over 45 years	Yes	No	Unknown
2. No prior history of seizure disorder	Yes	No	Unknown
3. New onset of neurologic symptoms in last 24 hours	Yes	No	Unknown
4. Patient was ambulatory at baseline (prior to event)	Yes	No	Unknown
5. CBG between 60 & 400	Yes	No	
Neurological examination	Normal	Abnormal	
Facial smile/grimace (ask patient to smile/show teeth) Normal: both sides of face move equally well Abnormal: one side of face does not move as well as the other	Yes	Right	Left
Arm drift (patient closes eyes and hold both arms out palms up) Normal: both arms move the same or do not move at all Abnormal: One arm does not move or drifts down compared to other	Yes	Right	Left
Hand grip (have patient squeeze both hands simultaneously) Normal: equal grip strength Abnormal: unequal grip strength	Yes	Right	Left
<b>If questions 1 – 5 are all answered “Yes” or “Unknown” and at least 1 of the 3 neurological examination findings are abnormal and unilateral, patient is considered to have a POSITIVE screen. Continue to C-STAT evaluation.</b>			

2

## C-STAT – CINCINNATI STROKE TRIAGE ASSESSMENT TOOL

	Points	
<b>Gaze Preference</b> – Deviation of eyes <b>away</b> from side of weakness, toward side of stroke.		
Absent	0	
Present	2	
<b>Arm Weakness</b> - Cannot hold up arm(s) for 10 seconds		
Absent	0	
Present	1	
<b>Level of Consciousness</b> - Incorrectly answers at least one of two LOC questions <b>AND</b> does not follow at least one of two commands.		
Absent	0	
Present	1	

\*\*\*\*\* POSITIVE C-STAT SCORE IS  $\geq 2$  \*\*\*\*\*

### TREATMENT:

- A. Treat per Universal Patient Care.
- B. If there is any doubt as to mechanism of injury or any possibility of cervical injury, immobilize patient and consider Trauma System entry.
- C. If indicated, treat per Hypothermia protocol.
- D. If patient is in cardiac arrest, do not attempt resuscitation if patient has been submerged for more than 30 minutes, with the following exceptions:  
Resuscitation may be initiated if the patient is recovered within 60 minutes if:
  1. Children < 6 years of age and water temperature at recovery depth of < 40 deg F.
  2. Patients who may have been trapped in an underwater air pocket.
  3. Water temperature at recovery depth is < 40 deg F and information suggests that patient may have been swimming on the surface for at least 15 minutes prior to becoming submerged.
  4. Paramedic discretion (contact OLMC)

### NOTES & PRECAUTIONS:

- A. If patient is still in the water rescue should be performed by properly trained and equipped personnel only.
- B. Be prepared to manage vomiting.
- C. Even if patient initially appears fine, delayed pulmonary edema is likely to occur.

### KEY CONSIDERATIONS:

Medical history, length of submersion, water temperature at recovery depth, medications and allergies, events prior to submersion

### TREATMENT:

- A. Treat per Universal Patient Care.
- B. Patient evaluation should include best GCS to help categorize injury severity.
  1. Mild injury GCS of 13-15
  2. Moderate GCS 9-12
  3. Severe GCS  $\leq 8$
- C. Avoid hypoxia at all times. Place a non-rebreather face mask on ALL patients with potential TBI.
- D. Prevent hypotension (Goal SBP  $\geq 100$ )
  1. Initiate a bolus of normal saline or lactated ringers.
  2. Continue fluid boluses to maintain the systolic blood pressure  $>100$  mmHg.
- E. If patient is unable to maintain airway, consider oral airway (nasal airways should not be used in the presence of significant facial injury or possible basal skull fracture)
- F. Place an advanced airway (oral endotracheal intubation, supraglottic device, surgical airway) if BVM ventilation ineffective in maintaining oxygenation or if airway is continually compromised. Nasal intubation should not be attempted.
- G. If the patient has an airway placed (oral or advanced), carefully manage ventilations in order to minimize hyperventilation.
  1. Monitor ETCO<sub>2</sub> with goal of ETCO<sub>2</sub> of 40 mmHg.
  2. If available, use a pressure-controlled bag (PCB) and ventilation rate timer (VRT)
  3. If a transport ventilator is available, begin with the following settings:
    - i. Tidal volume of 7ml/kg,
    - ii. Rate of 10 BPM. Adjust rate to keep ETCO<sub>2</sub> within target range
- H. If there are signs of herniation, then MILD hyperventilation to an ETCO<sub>2</sub> of 35 mmHg may be performed. Signs of herniation include:
  1. Blown pupil
  2. Posturing
- I. Consider and treat reversible causes of altered mental status including hypoxia, hypoglycemia, and overdose.

### PEDIATRIC PATIENTS:

- A. Manage hypoxia. Place a non-rebreather face mask in ALL patients with potential TBI.
- B. Manage blood pressure. Avoid hypotension
  1. Initiate a 20ml/kg bolus of normal saline or lactated ringers
  2. Continue fluid boluses to maintain SBP goals:
    - i. Infants/children age  $<10$ : 70 mmHg + (age X 2)
    - ii. Children age  $\geq 10$ : 100 mmHg (same as adults)
- C. If patient unable to maintain airway, consider oral airway (nasal airways should not be used in the presence of significant facial injury or possible basal skull fracture)
- D. Place an advanced airway (oral endotracheal intubation, supraglottic device, surgical airway) if BVM ventilation ineffective in maintaining oxygenation or if airway is continually compromised. Nasal intubation should not be attempted.
- J. If an airway is placed (oral or advanced), then carefully manage ventilations in order to minimize hyperventilation.
  1. Monitor ETCO<sub>2</sub> on all patients with goal of ETCO<sub>2</sub> of 40 mmHg.
  2. If available, use a pressure-controlled bag (PCB) and ventilation rate timer (VRT)
  3. If a transport ventilator is available, set a tidal volume of 7ml/kg. Adjust rate to keep ETCO<sub>2</sub> within target range.

- 4. Pediatric ventilatory rates:
  - i. Infants: (age 0-24 months): 25 breaths per minute (bpm);
  - ii. Children: (age 2-14): 20 bpm;
  - iii. > 15 years: 10 bpm (same as adults)
- E. If there are signs of herniation, then MILD hyperventilation to an ETCO<sub>2</sub> of 35 mmHg may be performed. Signs of herniation include:
  - 1. Blown pupil
  - 2. Posturing

**NOTES & PRECAUTIONS:**

- A. The main goal is to avoid the three Hs that increase mortality:
  - 1. Avoid hypoxia
  - 2. Avoid hyperventilation
  - 3. Avoid hypotension
- B. A single episode of hypoxia is independently associated with DOUBLING of the mortality rate.
- C. Hyperventilation is independently associated with a mortality rate that is between TWO and SIX times higher.
- D. Inadvertent hyperventilation happens reliably if not meticulously prevented by proper external means.
- E. A single episode of hypotension is independently associated with DOUBLING of the mortality rate and persistent hypotension is independently associated with a mortality rate that is eight times higher.

# Medications

**OLMC REQUIRED: No**

**SUPPLIED:**

Acetaminophen liquid 160 mg/5 mL

Acetaminophen 325 mg and 500 mg tablets, capsules, gel, suppositories

**PHARMACOLCOGY AND ACTIONS:**

Acetaminophen (paracetamol) targets the cyclooxygenase enzymes that produce prostaglandins responsible for pain and fever. It has little anti-inflammatory effect. It is metabolized into toxic and non-toxic products in the liver by:

- [Glucuronidation](#) (45-55%)
- Sulfate conjugation (20–30%)
- N-hydroxylation and dehydration, then GSH conjugation (less than 15%)

All three pathways yield final products that are non-toxic. In the third pathway, however, the intermediate product NAPQI is toxic. At usual doses, NAPQI is quickly detoxified by conjugation with glutathione. In over dose, glutathione is used up and the toxic metabolite can cause potentially fatal [liver damage](#). It is metabolized by the liver and is [hepatotoxic](#). Toxicity is multiplied when combined with alcoholic drinks, and very likely in [chronic alcoholics](#) or patients with liver damage.

**INDICATIONS:**

- A. Mild to moderate pain
- B. Fever

**CONTRAINDICATIONS**

- A. Known liver disease
- B. Current alcohol abuse
- C. Acute intoxication
- D. Has taken acetaminophen in last 4 hours

**ADULT & PEDIATRIC DOSING:**

Acetaminophen 15mg/kg PO to maximum of 1000 mg

**Approximate dosing using 160 mg/5 mL liquid**

Weight	Dose	Volume
11 lbs/5kg	80 mg	2.5 mL
22 lbs/10 kg	160 mg	5 mL
45lbs/20 kg	320 mg	10 mL
66 lbs/30 kg	480 mg	15 mL
88 lbs/40 kg	640 mg	20 mL
110 lbs/50 kg	800 mg	25 mL
130 lbs/60 kg	960 mg	30 mL

## Activated Charcoal – 20.010

### **OLMC REQUIRED:**

- A. Aspirin and acetaminophen with time of ingestion > two hours.
- B. All other poisons or ingestions regardless of time from ingestion.

**SUPPLIED:** 25 grams / 120 ml bottle.

### **PHARMACOLOGY AND ACTIONS:**

Activated charcoal adsorbs toxic substances ingested and inhibits GI adsorption by forming an effective barrier between the particulate material and the gastrointestinal mucosa. The effect is greatest if used within one hour of ingestion.

### **INDICATIONS:**

Management of poisoning or overdose of many substances.

### **CONTRAINDICATIONS:**

- A. Patients with altered mental status or the inability to maintain their own airway.
- B. Patients who have aspirated or with a potential for aspiration.

### **PRECAUTIONS:**

- A. Activated charcoal may be ineffective in some ingestions.
- B. Milk, ice cream and other dairy products will decrease the adsorption capacity substantially.

### **SIDE EFFECTS AND NOTES:**

May cause nausea, vomiting, and constipation.

### **ADULT DOSING:**

- Poisoning & overdose -**  
1 gram / kg PO or NG.

### **PEDIATRIC DOSING:**

- Same as adult.

**OLMC REQUIRED:** No

**SUPPLIED:** 6 mg / 2 ml and 12 mg / 4 ml pre-filled syringes

**PHARMACOLOGY AND ACTIONS:**

Adenosine is a naturally occurring nucleoside that has the ability to slow conduction through the AV node. Since most cases of PSVT involve AV nodal re-entry, adenosine is capable of interrupting the AV nodal circuit and stopping the tachycardia, restoring normal sinus rhythm. It is eliminated from the circulation rapidly and has a half-life in the blood of less than ten seconds.

**INDICATIONS:**

To convert PSVT to a normal sinus rhythm, including PSVT that is associated with accessory bypass tracts (e.g. Wolff-Parkinson-White Syndrome).

**CONTRAINDICATIONS:**

- A. Second or third degree heart block.
- B. Sick Sinus Syndrome
- C. Known hypersensitivity
- D. Atrial fibrillation

**PRECAUTIONS:**

- A. When doses larger than 12 mg are given by injection there may be a decrease in blood pressure secondary to a decrease in vascular resistance.
- B. The effects of adenosine are antagonized by methylxanthines such as theophylline and caffeine. Larger doses of adenosine may be required.
- C. Adenosine effects are potentiated by dipyridamole (Persantine) resulting in prolonged asystole.
- D. In the presence of carbamazepine (Tegretol), high degree heart block may occur.
- E. Adenosine is not effective in converting atrial fibrillation, atrial flutter or ventricular tachycardia.
- F. All doses of adenosine should be reduced to one-half (50%) in the following clinical settings:
  - a. History of cardiac transplantation.
  - b. Patients who are on carbamazepine (Tegretol) and dipyridamole (Persantine).
  - c. Administration through any central line.
- G. Adenosine should be used with caution in patients with asthma as it may cause a reactive airways response in some cases.

**SIDE EFFECTS AND NOTES:**

May cause facial flushing, shortness of breath, chest pressure, nausea, headache and lightheadedness.

**ADULT DOSING:**

6 mg rapid IV. May repeat with 12 mg IV x 2 if patient fails to convert after 6 mg dose. Use a large proximal IV site with fluid bolus flush.

**PEDIATRIC DOSING:**

0.1 mg/kg rapid IV. May repeat with 0.2 mg/kg once if patient fails to convert after first dose. Use a large proximal IV site with fluid bolus flush.

**OLMC REQUIRED:**

For use in hyperkalemia patients including crush injury.

**SUPPLIED:** 2.5 mg / 3 ml vial individually or 3 mg packaged with 0.5 mg ipratropium (Duo-Neb).

**PHARMACOLOGY AND ACTIONS:**

Albuterol is a potent, relatively selective beta-2 adrenergic bronchodilator and is associated with relaxation of bronchial smooth muscle and inhibition of release of mediators of immediate sensitivity from cells, especially MAST cells. The onset of improvement in pulmonary function is within 2 – 15 minutes after the initiation of treatment and the duration of action is from 4 – 6 hours. Albuterol has occasional beta-1 overlap with clinically significant cardiac effects.

**INDICATIONS:**

- A. To treat bronchial asthma and reversible bronchial spasm that occurs with chronic obstructive pulmonary disease.
- B. To treat hyperkalemia.

**CONTRAINDICATIONS:**

None in the prehospital setting.

**PRECAUTIONS:**

- A. The patient's rhythm should be observed for arrhythmias. Stop treatment if frequent PVC's develop or any tachyarrhythmias other than sinus tachycardia appears or if heart rate increases by more than 20 beats/minute.
- B. Paradoxical bronchospasm may occur with excessive administration.

**SIDE EFFECTS AND NOTES:**

Clinically significant arrhythmias may occur, especially in patients with underlying cardiovascular disorders such as coronary insufficiency and hypertension.

**ADULT DOSING:****Respiratory distress -**

3.0 mg via DuoNeb (albuterol/ipratropium). May repeat twice every 20 minutes if needed.

2.5 mg via nebulizer if no response to DuoNeb. May repeat every 20 minutes if needed.

**Hyperkalemia -**

10 mg via nebulizer. OLMC contact required.

**Hyperkalemia secondary to crush injury -**

OLMC contact required.

**PEDIATRIC DOSING:**

Same as adult

## Amiodarone (Cordarone®) – 20.040

**OLMC REQUIRED:** See contraindications.

**SUPPLIED:** 150 mg / 3 ml pre-filled syringe or vial.

### PHARMACOLOGY AND ACTIONS:

Amiodarone depresses automaticity of the SA node. It slows conduction and increases refractoriness of the AV node. Amiodarone increases atrial and ventricular refractory period and prolongs the QT interval. When given IV it is rapidly distributed. No dosage adjustments are needed for patients with renal, liver or heart failure, or advanced age.

### INDICATIONS:

- A. Ventricular fibrillation.
- B. Ventricular tachycardia with pulses.

### CONTRAINDICATIONS:

- A. None in cardiac arrest.
- B. Do not use in perfusing pts in the following situations without OLMC approval:
  1. Systolic BP is less than 90 mmHg.
  2. Heart rate is less than 50 beats per minute.
  3. Periods of sinus arrest are present.
  4. Second or third degree heart blocks are present.

### PRECAUTIONS:

- A. In high concentrations (> 3 mg / ml ) amiodarone can cause phlebitis. Infusion concentrations should not exceed 2 mg / ml.
- B. Amiodarone will precipitate if administered in the same IV line as sodium bicarbonate or heparin.

### SIDE EFFECTS AND NOTES:

- A. In perfusing patients, amiodarone may cause hypotension, prolonged QT interval, pro-arrhythmic effects (Torsades and ventricular fibrillation), severe bradycardia and atrioventricular block.
- B. Non-cardiac toxicities are usually related to chronic administration and include pulmonary infiltrates, hepatic and/or thyroid dysfunction and peripheral neuropathy.

### ADULT DOSING:

#### V Fib, pulseless V Tach -

300 mg IV/IO. May repeat once with 150 mg.

#### V Tach with a pulse -

150 mg IV/IO. Mix with 100 ml of NS (in Buretrol or 100 ml bag) and infuse over 10 minutes via drip or pump.

### PEDIATRIC DOSING:

#### V Fib, pulseless V Tach -

5 mg/kg IV/IO. May repeat once with 2.5 mg/kg.

#### Tachycardia - Unstable -

5 mg/kg IV/IO. Mix with 2 ml/kg of NS (in Buretrol or 100 ml bag) and infuse over 10 minutes via drip or pump.

**OLMC REQUIRED:** No

**SUPPLIED:** 81 mg chewable tablets (Children's aspirin)

**PHARMACOLOGY AND ACTIONS:**

Aspirin inhibits prostaglandins and disrupts platelet function for the life of the platelet. It is also a mild analgesic and anti-inflammatory agent.

**INDICATIONS:**

In unstable angina and acute myocardial infarction, aspirin has been shown to lower mortality and is indicated in patients with suspected ischemic chest pain.

**CONTRAINDICATIONS:**

- A. Allergy to aspirin or aspirin induced asthma.
- B. History of bleeding disorder (i.e. hemophilia)
- C. Current ulcer or GI bleeding.
- D. Suspected aortic dissection.

**SIDE EFFECTS AND NOTES:**

- A. High doses of aspirin can cause ringing in the ears.
- B. May cause heartburn, nausea and vomiting.

**ADULT DOSING:**

Chest pain (acute myocardial infarction)  
324 mg orally.

**PEDIATRIC DOSING:**

Not indicated for pediatric patients

**OLMC REQUIRED:** No

**SUPPLIED:** 1 mg / 10 ml pre-filled syringe, 2 mg / 0.7 ml autoinjector, 8 mg / 20 ml vial.

**PHARMACOLOGY AND ACTIONS:**

Atropine is a muscarinic-cholinergic blocking agent. As such, it has the following effects:

- A. Increases heart rate (by blocking vagal influences).
- B. Increases conduction through the AV node.
- C. Reduces motility and tone of the GI tract.
- D. Reduces action and tone of the urinary bladder (may cause urinary retention).
- E. Dilates pupils.

**INDICATIONS:**

- A. To increase the heart rate in bradycardia or pacemaker failure.
- B. To improve conduction in second and third degree heart block.
- C. As an antidote for some insecticide exposures (e.g. anti-cholinesterases, organophosphates) and nerve gases.
- D. To counteract excessive vagal influences causing some bradysystolic and asystolic arrests.
- E. For bradycardia, not due to hypoxia when using succinylcholine.

**CONTRAINDICATIONS:**

- A. **Atrial fibrillation and atrial flutter because increased conduction may speed ventricular rate excessively.**
- B. **Not used in neonatal resuscitation.**

**PRECAUTIONS:**

Bradycardia in the setting of an acute myocardial infarction is common and probably beneficial. Do not treat unless there are signs of poor perfusion (low blood pressure, mental confusion).

**SIDE EFFECTS AND NOTES:**

- A. Atropine blocks cholinergic (vagal) influences already present. If there is little cholinergic stimulation present, effects will be minimal.
- B. Remember in cardiac arrest situations, atropine dilates pupils.

**ADULT DOSING:**

**Bradycardia (cardiac) -**

0.5 mg IV/IO. May repeat every 3-5 minutes to max of 3 mg.

**Bradycardia secondary to RSI -**

0.5 mg IV/IO.

**Organophosphate poisoning -**

1-2 mg IV/IO until symptoms improve. Contact OLMC for frequency of dosing.

**PEDIATRIC DOSING:**

**Bradycardia (cardiac) -**

0.02 mg/kg IV/IO. Minimum single dose 0.1 mg, max single dose 0.5 mg. May repeat once.

**Bradycardia secondary to RSI -**

0.02 mg/kg IV/IO. Minimum dose 0.1 mg. Do not exceed adult dose.

**Organophosphate poisoning -**

0.02 mg/kg IV/IO. Contact OLMC for frequency of dosing.

## Calcium Gluconate – 20.070

### **OLMC REQUIRED:**

Suspected calcium channel blocker overdose except in cardiac arrest.

**SUPPLIED:** 98 mg (4.65 mEq) of 10% solution / 10 ml vial.

### **PHARMACOLOGY AND ACTIONS:**

Calcium is the most common cation in the human body. The majority of the body stores of calcium are located in bone. It plays an important role in many physiologic functions and is essential for proper nerve and muscle function.

### **INDICATIONS:**

- A. Suspected calcium channel blocker overdose.
- B. Hyperkalemia.

### **CONTRAINDICATIONS:**

- A. **Hypercalcemia and hypercalciuria (hyperthyroidism, Vitamin D overdose, bone metastases).**
- B. **Patients on digoxin.**

### **PRECAUTIONS:**

- A. Extravasation of calcium salts will cause necrosis of tissue. The IV should be secured and free blood return into the syringe should be checked 2-3 times during administration. If extravasation does occur, immediately stop administration.
- B. Administer slowly (no faster than 2ml/min) and stop if patient complains of distress. Inject using a small needle in a large vein.
- C. Calcium gluconate will precipitate if mixed with sodium bicarbonate. Flush catheter completely before administering one medication after another.

### **SIDE EFFECTS AND NOTES:**

- A. Rapid injection of calcium gluconate may cause vasodilatation, decreased blood pressure, bradycardia, cardiac arrhythmias, syncope and cardiac arrest.
- B. One vial of 10 ml calcium gluconate 10% contains 1 gram of calcium gluconate salt (= 93 mg elemental calcium or 4.6 mEq calcium or 2.3 mmol calcium)

### **ADULT DOSING:**

**Hyperkalemia, calcium channel blocker overdose -**  
10 ml slow IV/IO over 5 – 10 minutes. Use a proximal port.

### **PEDIATRIC DOSING:**

**Hyperkalemia, calcium channel blocker overdose -**  
0.5 ml/kg slow IV/IO over 5 – 10 minutes. Use a proximal port. Max dose 10 ml.

## Dexamethasone (Decadron<sup>®</sup>) – 20.075

**OLMC REQUIRED:** No

**SUPPLIED:** 10 mg / 1 ml vial

**PHARMACOLOGY AND ACTIONS:**

Dexamethasone is a synthetic steroid that has suppresses acute and chronic inflammation. In addition, it potentiates vascular smooth muscle relaxation by beta-adrenergic agonists and may alter airway hyperactivity.

**INDICATIONS:**

- A. Moderate to severe asthma/COPD
- B. Severe allergic reaction.
- C. Croup

**CONTRAINDICATIONS:**

**Do not use in patients with known hypersensitivity to corticosteroids.**

**PRECAUTIONS:**

May cause hypertension and hyperglycemia.

**SIDE EFFECTS AND NOTES:**

May cause nausea, vomiting, headache, or dizziness.

**ADULT DOSING:**

**Respiratory distress, severe allergic reaction, anaphylaxis -**

10 mg IV/IO/IM/PO. Flavoring may be used if available if for oral dosing.

**PEDIATRIC DOSING:**

**Respiratory distress, severe allergic reaction, anaphylaxis, croup -**

0.6 mg/kg IV/IO/IM/PO to a max of 10 mg. Flavoring may be used if available if for oral dosing.

**OLMC REQUIRED:** No.

**SUPPLIED:** 25 g/50 ml pre-filled syringe 50%. 25 gr/250 ml bag 10%

**PHARMACOLOGY AND ACTIONS:**

Glucose is the body's basic fuel. It produces most of the body's quick energy. Its use is regulated by insulin which stimulates storage of excess glucose outside the bloodstream, and glucagon, which mobilizes stored glucose into the bloodstream.

**INDICATIONS:**

- A. Hypoglycemia
- B. Unconscious patient when history is unobtainable.

**CONTRAINDICATIONS:**

None

**PRECAUTIONS:**

- A. Extravasation of dextrose may cause necrosis of tissue and the patency of the IV should be secured during administration. If extravasation does occur, immediately stop administration.
- B. Report any extravasation to receiving hospital personnel and document on the Prehospital Care Report.

**SIDE EFFECTS AND NOTES:**

Hyperglycemia may complicate or worsen a number of medical conditions (e.g. myocardial infarction and stroke). Dextrose should be given whenever hypoglycemia is documented by blood glucose meters. If these findings are not available, the EMT should use judgement based on signs and history.

**ADULT DOSING:**

**Hypoglycemia/Altered mental status -**  
10 - 25 grams slow IV/IO.

**PEDIATRIC DOSING –**

For infants < 10 kg (birth to 1 year) with CBG < 40 mg% and children 10 kg – 35kg with CBG < 60 mg% give:

**Dextrose 10%** - 5 ml/kg IV by infusion to a maximum dose of 250 ml

**Dextrose 12.5%** - 4 ml/kg by infusion to a maximum dose of 200 ml  
**(if diluting D50)**

## Diphenhydramine (Benadryl®) – 20.090

**OLMC REQUIRED:** No

**SUPPLIED:** 50 mg / ml vial

### **PHARMACOLOGY AND ACTIONS:**

Diphenhydramine is an antihistamine which blocks the action of histamines released from cells during an allergic reaction. It has direct CNS effects, which may be stimulant, or more commonly depressant, depending on individual variation. Diphenhydramine also has an anticholinergic and antiparkinsonian effect which is used to treat acute dystonic reactions to antipsychotic drugs (e.g. Haldol®, Thorazine®, Compazine®, Inapsine®). These reactions include oculogyric crisis, acute torticollis, and facial grimacing.

### **INDICATIONS:**

- A. The second-line drug in anaphylaxis and severe allergic reactions (after epinephrine).
- B. To counteract acute dystonic and dysphoric reactions to anti-psychotic drugs.

### **CONTRAINDICATIONS:**

None

### **PRECAUTIONS:**

- A. May have an additive effect with alcohol or other CNS depressants.
- B. Although useful in acute dystonic reactions it is not an antidote for anti-psychotic toxicity or overdose.
- C. May cause hypotension when given IV.

### **SIDE EFFECTS AND NOTES:**

Diphenhydramine is rarely necessary in the field. It is not the first-line drug for allergic reactions, but may be useful for long transports.

### **ADULT DOSING:**

**Anaphylaxis, extrapyramidal symptoms -**  
1 mg/kg IV/IM to a max of 50 mg.

### **PEDIATRIC DOSING:**

**Anaphylaxis, extrapyramidal symptoms -**  
1 mg/kg IV/IM to a max of 50 mg.

## Dopamine (Intropin<sup>®</sup>) – 20.100

**OLMC REQUIRED:** No.

**SUPPLIED:** 800 mg / 10 ml vial or 400 mg / 10 ml vial

### PHARMACOLOGY AND ACTIONS:

Dopamine is the chemical precursor of norepinephrine which occurs naturally in humans and which has both alpha and beta receptor stimulating actions. Its actions differ with the dosage given:

- 1 – 2 mcg/kg/min – dilates renal and mesenteric blood vessels. No effect on heart rate or blood pressure.
- 2 – 10 mcg/kg/min – beta effects on the heart which usually increase cardiac output without increasing heart rate or blood pressure.
- 10 – 20 mcg/kg/min – alpha peripheral effects cause peripheral vasoconstriction and increased blood pressure.

### INDICATIONS:

- A. Primary indication is cardiogenic shock.
- B. May be useful in other forms of shock, except hypovolemic.

### CONTRAINDICATIONS:

**Hypovolemic shock**

### PRECAUTIONS:

- A. May induce tachyarrhythmias, in which case infusion should be decreased or stopped.
- B. High doses may cause extreme peripheral vasoconstriction. Conversely, low doses may cause a decreased blood pressure due to peripheral dilatation.
- C. Should not be added to sodium bicarbonate or other alkaline solutions since dopamine will be inactivated in alkaline solutions.

### SIDE EFFECTS AND NOTES:

- A. The most common side effects include ectopic beats, nausea, and vomiting.
- B. Angina has been reported following treatment.
- C. Tachycardia and arrhythmias are less likely than with other catecholamines.
- D. Can precipitate hypertensive crisis in susceptible individuals (i.e. patients on MAO inhibitors such as Parnate, Nardil or Marplan).
- E. Consider hypovolemia and treat this with appropriate fluids before administration of dopamine.
- F. Dopamine is best administered by infusion pump if available. Monitor closely.

### ADULT DOSING:

#### **Bradycardia -**

Begin at 2 mcg/kg/min and increase as needed to a maximum of 10 mcg/kg/min titrating to effect.

#### **Cardiogenic shock -**

5 mcg/kg/min IV drip. Increase by 5 mcg/kg/min every 5 minutes to max of 20 mcg/kg/min or until systolic BP is at least 90 mmHg and signs of shock have been alleviated.

### PEDIATRIC DOSING:

**Same as adult.**

**OLMC REQUIRED:**

Asthma – Patients > 40 y/o or for additional doses.

**SUPPLIED:** 1:10,000 – 1 mg / 10 ml pre-filled syringe 1:1,000 – 30 mg / 30 ml vial or 1 mg/ml amps

**PHARMACOLOGY AND ACTIONS:**

Epinephrine is a catecholamine with both alpha and beta effects. In general, the following cardiovascular responses can be expected: increased heart rate, increased myocardial contractile force, increased systemic vascular resistance, increased arterial blood pressure, increased myocardial oxygen consumption, increased automaticity.

Epinephrine is also a potent bronchodilator.

**INDICATIONS:**

Epinephrine is indicated in the following situations: ventricular fibrillation, asystole, pulseless electrical activity, systemic allergic reactions, asthma in patients < 40, children 6 months to 6 years with audible stridor at rest.

**CONTRAINDICATIONS:**

None

**PRECAUTIONS:**

- A. Epinephrine increases cardiac work load and can precipitate angina, MI, or major dysrhythmias in individuals with ischemic heart disease.
- B. Wheezing in an elderly person is pulmonary edema or pulmonary embolus until proved otherwise

**SIDE EFFECTS AND NOTES:**

- A. May cause anxiety, tremor and headache.
- B. Cardiac side effects include tachycardia, PVC's, angina and hypertension.

**ADULT DOSING:****V Fib, asystole, PEA -**

1 mg 1:10,000 IV/IO every 3-5 minutes.

**Asthma -**

0.3 mg 1:1000 SQ / IM or 0.3 mg 1:10,000 IV/IO. (OLMC contact required for asthma patients > 40 years old).

**Anaphylaxis -**

- 1:1,000, 0.3 - 0.5 mg IM. Repeat once in 5-15 minutes if patient is still in extremis. **Or, if IV established,**
- 1:10,000 - 0.1 mg boluses IV every 5 min titrated to effect. Max dos 0.5 mg.

**OR**

- Infusion IV at 2 mcg/min (2 mcg/ml) titrated to effect.

**Bradycardia**

Infusion at 2 mcg/min and increasing as needed to a maximum of 10 mcg/min titrating to effect

### **PEDIATRIC DOSING:**

#### **V Fib, asystole, PEA -**

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

#### **Asthma -**

0.01 mg/kg 1:1000 IM or 1:10,000 IV to a max single dose of 0.5 mg. Contact OLMC for additional doses.

#### **Anaphylaxis**

- Epinephrine 1:1,000, 0.01 mg/kg IM to a max of 0.5 mg. Repeat once in 5-15 minutes if patient is still in extremis. **Or, if IV established,**
- Epinephrine 1:10,000 0.01 mg/kg (max 0.1 mg) IV boluses every 3-5 min titrated to effect. Max dose 0.5 mg. **OR**
- Epinephrine infusion IV at 0.01 mcg/kg/min (2 mcg/ml) titrated to effect.

**Respiratory distress with audible stridor at rest (pts 6 months to 6 years old) -**  
5 ml of 1:1,000 via nebulizer. Contact OLMC for additional doses.

### **Epinephrine Drip Preparation**

**Mix 1 mg of 1:1,000 epinephrine in 500 ml of NS (2 mcg/ml), deliver by micro-drip or infusion pump.**

## Etomidate (Amidate<sup>®</sup>) – 20.115

**OLMC REQUIRED:**

None

**SUPPLIED:** 40 mg / 20 ml pre-filled syringe or 2 mg/ml in 40 mg vial

**PHARMACOLOGY AND ACTIONS:**

Etomidate is a hypnotic drug without any analgesic activity. Intravenous injection of Etomidate produces hypnosis characterized by rapid onset of action; usually within one minute. Duration of hypnosis is dose dependent but relatively brief, usually 3-5 minutes.

**INDICATIONS:**

As an induction agent for use in rapid sequence intubation.

**CONTRAINDICATIONS:**

**Etomidate is contraindicated in patients who have a known hypersensitivity to the drug.**

**PRECAUTIONS:**

Excessively rapid injection may cause a fall in blood pressure.

**SIDE EFFECTS AND NOTES:**

- A. The most frequent adverse reactions are transient injection site pain and transient skeletal muscle movements (myoclonus).
- B. Etomidate may also cause nausea and/or vomiting.

**ADULT DOSING:**

**Induction agent for rapid sequence intubation -**

0.3 mg / kg IV/IO slow push.

**Synchronized cardioversion for unstable tachycardia -**

0.15 mg / kg IV/IO over 30-60 seconds to a max of 10 mg.

**PEDIATRIC DOSING:**

Same as adult

**OLMC REQUIRED:** No

**SUPPLIED:** 100 micrograms / 2 ml vial

**PHARMACOLOGY AND ACTIONS:**

Fentanyl is a potent synthetic opioid analgesic that produces analgesia and sedation. It is about 50-100 times more potent than morphine on a weight basis. Onset of action when given is 2-3 minutes. Peak effect occurs at 3-5 minutes and lasts 15-45 minutes.

**INDICATIONS:**

- A. Pain due to musculoskeletal injury or burns.
- B. Suspected ischemic chest pain.

**CONTRAINDICATIONS:**

- A. **Known allergy to fentanyl**
- B. **Moderate to severe respiratory depression**

**PRECAUTIONS:**

- A. Fentanyl can cause respiratory depression that is reversible with naloxone. Respiratory depression can also be exacerbated by underlying lung disease and the use of other respiratory depressant drugs (benzodiazepines, alcohol, cyclic antidepressants). Have naloxone and respiratory support available when administering fentanyl.
- B. If administered rapidly and in very large doses, fentanyl can cause muscle spasm and chest wall rigidity. The only reliable treatment for this is neuromuscular blockade.
- C. The action of fentanyl is prolonged and its elimination is slower in the elderly. Smaller maintenance doses are advisable.
- D. Fentanyl must be used cautiously in patients who have already received morphine for prehospital analgesia.

**SIDE EFFECTS AND NOTES:**

- A. If hypotension develops, it is usually responsive to naloxone administration and Trendelenburg position. If hypotension continues, follow Shock protocol.
- B. Check and document vital signs and patient response after each dose.
- C. The goal of fentanyl administration is patient comfort, not the total elimination of pain but the reduction in the perception of pain by the patient.

**ADULT PAIN DOSING:**

IV/IN - 50-100 mcg. May repeat 25-50 mcg every 5 minutes as needed to a maximum of 500 mcg. IM – 50-100 mcg. May repeat every 15 minutes as needed to a maximum of 500 mcg. If BP < 100 mmHg and/or pt has minor altered mental status or respiratory depression - first dose fentanyl is 25 mcg, may repeat 25-50 mcg every 5 minutes to a maximum of 500 mcg. Monitor closely.

**PEDIATRIC PAIN DOSING:**

1 microgram/kg IV/IN. May repeat with 0.5 -1 microgram/kg every 5 minutes as needed to a maximum of 4 micrograms/kg. If no IV/IN, may give fentanyl 1-2 micrograms/kg IM. May repeat every 15 minutes to a max of 4 micrograms/kg. Do not exceed adult dosing. IN is preferred if no IV.

**OLMC REQUIRED:**

Respiratory Distress – Second dose.  
Patients  $\leq$  18 years of age.

**SUPPLIED:** 40 mg / 4 ml pre-filled syringe or 40 mg / 4 ml vial

**PHARMACOLOGY AND ACTIONS:**

Furosemide is a potent diuretic with a rapid onset of action and short duration of effect. It acts primarily by inhibiting sodium reabsorption in the kidney. Increase in potassium excretion occurs along with the sodium excretion. As an IV bolus, causes immediate (3-4 minute) increase in venous capacitance. This decreases venous pre-load and probably accounts for its immediate effect in pulmonary edema. Peak effect is one-half to one hour after IV administration with a duration of about two hours. (Duration if taken orally is 6-8 hours with peak effect in 1-2 hours)

**INDICATIONS:**

In acute pulmonary edema to decrease the extracellular volume and reduce pressure on the lungs in cardiac failure.

**CONTRAINDICATIONS:**

- A. Hypovolemia or hypotension.
- B. Pregnancy

**PRECAUTIONS:**

- A. May lead to profound diuresis with resultant shock and electrolyte depletion. Monitor patient closely after administration.
- B. Hypovolemia, hypotension, hyponatremia and hypokalemia are the main toxic effects. Other toxic effects are usually not related to single-dose use.
- C. Patients who are on digitalis and are having arrhythmias consistent with digitalis toxicity (atrial tachycardia with conduction block, nonparoxysmal junction tachycardia, sinus arrest, etc.) may need lower doses of Furosemide. Contact OLMC.
- D. Because of the potency and need for close monitoring, furosemide should only be given with specific indications.

**ADULT DOSING:**

**Respiratory distress with pulmonary edema and systolic BP > 100 mmHg -**  
If patient is not currently taking furosemide, give 20 mg IV. If the patient is taking furosemide, give 40 mg IV.

**PEDIATRIC DOSING:**

**Not indicated for pediatric patients**

**OLMC REQUIRED:**

Beta blocker overdose

**SUPPLIED:** 1 mg vial of powder / 1 ml vial of diluent

**PHARMACOLOGY AND ACTIONS:**

Glucagon is a hormone that causes glucose mobilization in the body. It works opposite to insulin, which causes glucose storage. It is released at times of insult or injury when glucose is needed and mobilizes glucose from body glycogen stores. Return to consciousness should be within 20 minutes of an IM dose if patient is hypoglycemic.

**INDICATIONS:**

- A. Known hypoglycemia (preferably demonstrated by blood glucose determination) when patient is confused or comatose and dextrose is not available or an IV cannot be started.
- B. Possible beta blocker overdose per OLMC.

**CONTRAINDICATIONS:**

None

**PRECAUTIONS:**

IV Dextrose is the treatment of choice for hypoglycemia in the patient who cannot tolerate oral glucose. The use of glucagon is restricted to patients who are seizing, comatose, combative, or with collapsed veins and in whom an IV cannot be started.

**SIDE EFFECTS AND NOTES:**

- A. Nausea and vomiting may occur with administration.
- B. Persons with no liver glycogen stores (malnutrition, alcoholism) may not be able to mobilize any glucose in response to glucagon.

**ADULT DOSING:**

**Hypoglycemia -**

1 mg IM

**Beta blocker overdose –**

Contact OLMC for dosing

**PEDIATRIC DOSING:**

**Hypoglycemia -**

0.02 mg/kg IM to a maximum of 1 mg

**Beta blocker overdose –**

Contact OLMC for dosing

**OLMC REQUIRED:** No

**SUPPLIED:** 15 - 24 grams glucose in gel tubes

**PHARMACOLOGY AND ACTIONS:**

Glucose is the body's basic fuel and it produces most of the body's quick energy. Its use is regulated by insulin that stimulates storage of excess glucose from the bloodstream and glucagon that mobilizes stored glucose into the bloodstream.

**INDICATIONS:**

Oral glucose is indicated in the conscious patient where a suspicion of hypoglycemia exists or a blood glucose measurement indicates a low blood glucose level.

**CONTRAINDICATIONS:**

**Do not give to patients who cannot adequately protect their own airway.**

**PRECAUTIONS:**

To give solutions orally, a patient must be continually assessed for the ability to protect his or her own airway.

**SIDE EFFECTS AND NOTES:**

- A. Research suggests that hyperglycemia may complicate, or worsen, a number of medical conditions (i.e. myocardial infarction, stroke). Oral glucose should be given to a conscious patient whenever hypoglycemia is documented by blood glucose meter. If these objective findings are not available, the EMT should use judgment based on signs and history.
- B. Effects will be delayed in the elderly and people with poor circulation.
- C. May be more tolerable if administered with liquid between dosages.
- D. Patient's condition may require more than one dose of oral glucose.

**ADULT DOSING:**

**Hypoglycemia -**

One tube or equivalent. Repeat as needed.

**PEDIATRIC DOSING:**

**Same as adult**

## Hydroxocobalamin (Cyano-Kit<sup>®</sup>) – 20.145

### **OLMC REQUIRED:**

Repeat dose.

**SUPPLIED:** 5 grams powder in vial for reconstitution with 200 ml NS. Kit has one vial.

### **PHARMACOLOGY AND ACTIONS:**

Hydroxocobalamin (vitamin B12a) is an effective antidote in the treatment of cyanide poisoning based on its ability to bind cyanide ions. Each Hydroxocobalamin molecule can bind one cyanide ion to form cyanocobalamin (vitamin B12), which is then excreted in the urine. Cyanide is an extremely potent toxic poison. In the absence of rapid and adequate treatment exposure to a high dose of cyanide can result in death within minutes due to inhibition of cytochrome oxidase resulting in arrest of cellular respiration.

### **INDICATIONS:**

Cyanide poisoning or smoke inhalation with suspected cyanide poisoning due to the presence of coma, persistent hypotension or cardiorespiratory arrest.

### **PRECAUTIONS:**

Hydroxocobalamin has physical (particulate) and chemical incompatibilities with many medications and it is best to administer other drugs or products (e.g. blood) through a separate intravenous line.

### **SIDE EFFECTS AND NOTES:**

- A. The most frequently occurring side effects are chromaturia (red colored urine) and erythema (skin redness) which occur in nearly all patients.
- B. Other reported serious side effects include allergic reactions, temporary increases in blood pressure, nausea, headache and infusion site reactions.
- C. Because of its deep red color, hydroxocobalamin has also been found to interfere with certain laboratory tests based on light absorption including co-oximetric measurements or carboxyhemoglobin, methemoglobin and oxyhemoglobin.

### **ADULT DOSING:**

**Cyanide poisoning or smoke inhalation with suspected cyanide poisoning -**  
5 grams IV or IO over 15 minutes. Contact OLMC regarding second dose.

### **PEDIATRIC DOSING:**

**Cyanide poisoning or smoke inhalation with suspected cyanide poisoning -**  
70 mg / kg IV or IO over 15 minutes. Contact OLMC regarding second dose.

**OLMC REQUIRED: No**

**SUPPLIED:**

Liquid - 100 mg/5 mL (Children's) ; 50 mg/1.25 mL (Infant's)  
200 mg tablets, capsules

**PHARMACOLCOGY AND ACTIONS:**

Ibuprofen, from isobutylphenylpropanoic acid, is a nonsteroidal anti-inflammatory drug (NSAID) used for relieving pain, lowering fever and reducing inflammation. Like other NSAIDs, it works by inhibiting the synthesis of prostaglandins, involved in mediating inflammation (swelling), pain, and fever. It achieves this effect on prostaglandin synthesis by inhibiting cyclooxygenase, an enzyme that is present in various tissues of the body.

**INDICATIONS:**

- A. Mild to moderate pain
- B. Fever

**CONTRAINDICATIONS**

- A. Known hypersensitivity to ibuprofen
- B. Previous asthma, urticarial or allergic reaction after taking aspirin or other NSAID
- C. Recent heart surgery
- D. Has taken ibuprofen in last 6 hours
- E. Unable to take oral medication
- F. Any signs of dehydration in pediatric patients
- G. Patient's less than 6 months old

**PRECAUTIONS:**

Ibuprofen may cause a severe allergic reaction, especially in people who are allergic to aspirin. May cause stomach bleeding especially in patients:

- Older than 60 yrs
- Who have had stomach ulcers or bleeding problems
- Take blood thinners
- Take other medications containing NSAIDs.

**ADULT & PEDIATRIC DOSING:**

10 mg/kg PO to maximum of 600 mg

**Pediatric dosing using 100 mg/5 mL liquid**

Weight	Dose	Volume
18 lbs / 7.5 kg	75 mg	3.75 mL
24 lbs / 10 kg	100 mg	5 mL
36 lbs / 15 kg	150 mg	7.5 mL
48 lbs / 20 kg	200 mg	10 mL
60 lbs / 25 kg	250 mg	12.5 mL
72 lbs / 30 kg	300 mg	15 mL

## Ipratropium Bromide – 20.150

**OLMC REQUIRED:** No

**SUPPLIED:** 0.5 mg / 2.5 ml vial individually or 0.5 mg packaged with 3 mg albuterol (Duo-Neb).

**PHARMACOLOGY AND ACTIONS:**

Ipratropium is an atropine derivative used for inhalation therapy. For severe asthma, Ipratropium taken in addition to a short acting beta agonist (such as Albuterol) can provide greater bronchodilation and clinical benefit than the beta agonist alone. It has no anti-inflammatory effects and does not decrease bronchial hyper-responsiveness.

**INDICATIONS:**

As a supplement to albuterol in patients with asthma and COPD.

**CONTRAINDICATIONS:**

**Do not use in patients with severe glaucoma.**

**PRECAUTIONS:**

Ipratropium in the meter dose inhaler and auto-inhaler formulations should not be administered to individuals allergic to soy lecithin or related food products (e.g. soy beans, peanuts). The nebulized formulation may be administered to these patients.

**SIDE EFFECTS AND NOTES:**

- A. Dry mouth.
- B. Pharyngeal irritation.
- C. Increased intra-ocular pressure in glaucoma patients.

**ADULT DOSING:**

**Asthma/ COPD -**

0.5 mg via nebulizer. May repeat twice every 20 minutes if needed.

**PEDIATRIC DOSING:**

**Same as adult dosing**

## Ketamine Hydrochloride - 20.155

### **OLMC REQUIRED:**

None

**SUPPLIED:** 500mg/10ml vial.

### **PHARMACOLOGY AND ACTIONS:**

Ketamine is a dissociative anesthetic agent, structurally similar to phencyclidine (PCP), which interrupts the connection between the thalamo-neocortical tracts and the limbic system. In addition, it stimulates many different receptors, including the opioid and catecholamine receptors. It is unique among sedative agents in that it also provides analgesia in addition to the amnestic and sedative effects. The sympathomimetic effects cause an increase in heart rate, blood pressure, and cardiac output. It is also a bronchodilator, and thus may be beneficial in patients with bronchospasm requiring intubation.

### **INDICATIONS:**

As an induction agent for use in rapid sequence intubation.  
Pain control refractory to standard treatment with fentanyl or morphine.

### **CONTRAINDICATIONS:**

- A. Suspected elevated ICP (Cushing's triad, focal findings such as blown pupil, etc)
- B. Eye pain or trauma
- C. Known pregnancy
- D. Non-traumatic chest pain

### **SIDE EFFECTS AND NOTES:**

- A. Increased blood pressure due to catecholamine release.
- B. Emergence reaction can occur in 5-30% of patients. Duration of action is 10-20 minutes and continued sedation must be provided before the induction agent has worn off when used for RSI.

### **ADULT DOSING:**

**Induction agent for rapid sequence intubation -**  
2 mg / kg IV/IO slow push

**Pain control refractory to at least 200 mcg of fentanyl or 20 mg of morphine (in adults) –**  
15 mg IV/IO. May repeat a second dose after 30 min.

### **PEDIATRIC DOSING:**

**Induction agent for rapid sequence intubation -**  
Same as adult

**\*\* Not approved for use in pain control in pediatric patients \*\***

**OLMC REQUIRED:** See Contraindications.

**SUPPLIED:** 100 mg / 5 ml of 2% solution in pre-filled syringe

**PHARMACOLOGY AND ACTIONS:**

Lidocaine depresses the automaticity of Purkinje fibers, raising stimulation threshold in the ventricular muscle fibers which makes the ventricles less likely to fibrillate. It has little antiarrhythmic effect on the atrial muscle in normal doses. The effect of a single bolus on the heart disappears in 10-20 minutes due to redistribution in the body. The metabolic half-life of lidocaine is about 2 hours.

**INDICATIONS:**

- A. Recurrent ventricular fibrillation
- B. Stable ventricular tachycardia or recurrent ventricular tachycardia if clinical condition is not rapidly deteriorating.
- C. Following successful defibrillation or cardioversion from ventricular fibrillation or ventricular tachycardia.
- D. PVC's in a suspected ischemic event.

**CONTRAINDICATIONS:**

**Do not use in perfusing pts in the following situations without OLMC approval:**

- A. Systolic BP is less than 90 mmHg.
- B. Heart rate is less than 50 beats per minute.
- C. Periods of sinus arrest are present.
- D. Second or third degree heart block are present.

**PRECAUTIONS:**

- A. Lidocaine is not recommended in the treatment of supra-ventricular arrhythmias.
- B. If administering maintenance dosing and the patient begins seizing, stop the Lidocaine dosing and treat per Seizure protocol.

**SIDE EFFECTS AND NOTES:**

- A. CNS side effects include sleepiness, dizziness, disorientation, confusion, and convulsions.
- B. Hypotension
- C. Lidocaine is metabolized in the liver and, therefore, patients with hepatic disease, shock or congestive heart failure will have decreased metabolism. All doses after the initial dose must be decreased to one-quarter of the initial dose.
- D. Toxicity is more likely in elderly patients.

**ADULT DOSING:**

**VFib/Pulseless VT, PVC's -**

Bolus dose - 1.5 mg/kg IV/IO. Repeat to a max of 3 mg/kg if needed.

Maintenance dose - 0.75 mg/kg IV/IO every 10 minutes.

**Pain management for IO placement –**

0.5 mg/kg IO - not to exceed 50 mg

**PEDIATRIC DOSING:**

Same as adult.

## Magnesium Sulfate – 20.170

### **OLMC REQUIRED:**

Asthma and seizures in eclampsia/pre-eclampsia

**SUPPLIED:** 1 gram (50%) / 2 ml vial

### **PHARMACOLOGY AND ACTIONS:**

Magnesium is a cation that is present in human cells and intercellular fluids. It acts as an antiarrhythmic agent and may convert ventricular fibrillation and ventricular tachycardia.

### **INDICATIONS:**

- A. In cardiac arrest after defibrillation, epinephrine, lidocaine and amiodarone in the treatment of ventricular fibrillation and pulseless ventricular tachycardia.
- B. For the treatment of seizures in women with pre-eclampsia/eclampsia with OLMC approval.
- C. In severe asthma as a smooth muscle relaxant and inhibitor of histamine with OLMC approval.

### **CONTRAINDICATIONS:**

**None in the emergency setting.**

### **PRECAUTIONS:**

In the non-arrest patient, magnesium sulfate may cause hypotension, bradycardia, decreased reflexes and respiratory depression.

### **ADULT DOSING:**

#### **Eclampsia/Pre-eclampsia -**

Contact OLMC for dosing in this situation. Normal dose is 4 grams IV over 15-20 minutes

#### **Asthma -**

Contact OLMC for dosing in this situation. Normal dose is 2 grams over 15-20 minutes.

### **PEDIATRIC DOSING:**

#### **V Fib / V Tach -**

25 mg/kg IV/IO over 1-2 minutes.

#### **Asthma -**

Contact OLMC for dosing in this situation.

### **DILUTING FOR IV ADMINISTRATION**

- A. Dilute each gram (2 ml) of magnesium sulfate in 8 ml of normal saline.  
(Example: Mix 1 gram (2 cc) in 8 cc's of NS; mix 2 grams (4 cc) in 16'cc of NS)
- B. For use with IV pump, dilute either 2 grams or 4 grams of magnesium sulfate in 100 ml of normal saline (in Buretrol or 100 ml bag).

**OLMC REQUIRED:** No  
**SUPPLIED:** 10 mg / 2 ml vial

## **PHARMACOLOGY AND ACTIONS:**

Midazolam is a benzodiazepine with potent sedative, anti-anxiety, and anticonvulsant properties. It also causes significant antegrade amnesia when administered IV.

## **INDICATIONS:**

- A. Status seizure (any seizure that has lasted longer than 2 minutes or two consecutive seizures without regaining consciousness)
- B. To relieve anxiety, and produce amnesia during cardioversion, pacing or paralytic intubation.
- C. To facilitate restraint in patients whose cause of agitation is likely drug ingestion (especially stimulants) or withdrawal or postictal state.

## **CONTRAINDICATIONS:**

**In seizures, do not give unless patient is actively seizing.**

## **PRECAUTIONS:**

Midazolam causes respiratory depression and/or hypotension especially if administered rapidly. Monitor patient closely.

## **SIDE EFFECTS AND NOTES:**

- A. Common side effects include drowsiness, hypotension, respiratory depression and apnea. These are like more likely to occur in the very young and the elderly. Rarely, patients may experience paradoxical agitation.
- B. Respiratory depression is more likely in patients who have taken other CNS depressant drugs such as opioids alcohol and barbiturates, or when given rapidly.
- C. Midazolam is metabolized in the liver and excreted by the kidney. Doses should be adjusted accordingly in patients with underlying hepatic or renal diseases and low flow states such as congestive heart failure.

## **ADULT DOSING:**

### **Seizures/Pacing -**

2.5 mg IV/IO or 5 mg IM/IN. Repeat every 5 minutes until seizure stops.

### **Chemical restraint -**

2.5 mg IV or 5 mg IM. Max 5 mg IV or 10 mg IM. Call OLMC for additional.

### **Pre-medication for RSI -**

10 mg if systolic BP is  $\geq$  100 mmHg.

5 mg if systolic BP < 100 mmHg.

### **Sedation after intubation & for induced hypothermia-**

2.5 - 5 mg IV/IO if systolic BP is  $\geq$  100 mmHg. Repeat as necessary to maintain sedation.

**PEDIATRIC DOSING:**

**Seizures -**

0.1 mg / kg IV to a max of 2.5 mg, or  
0.3 mg / kg IM/IN to a max of 5 mg, or

\* Repeat every 5 minutes until seizure stops.

**Chemical restraint -**

0.1 mg/kg IV/IO to a max single dose of 2.5 mg (5 mg total), or  
0.2 mg/kg IM/IN to a max single dose of 5 mg (10 mg total),

\* Call OLMC for additional.

**Pre-medication for RSI -**

0.2 mg/kg IV/IO not to exceed adult dose

**Sedation after intubation with or without paralytics -**

0.1 mg/kg IV not to exceed adult dose.

**Sedation before cardioversion -**

0.2 mg/kg IM/IN not to exceed adult dose.

**OLMC REQUIRED:** No

**SUPPLIED:** Varies

**PHARMACOLOGY AND ACTIONS:**

Morphine is a narcotic analgesic that induces drowsiness, mental clouding and mood changes. It also increases venous capacitance, decreases venous blood return (preload) and reduces systemic vascular resistance at the arteriolar level (afterload). This may lead to decreases in myocardial oxygen demand. Onset of action when given IV is 2-3 minutes and peak effect occurs at 7-10 minutes. Duration is 3-5 hours.

**INDICATIONS:**

- A. Suspected ischemic chest pain unresponsive to nitroglycerin.
- B. Pain due to burns or musculoskeletal injury.

**CONTRAINDICATIONS:**

- A. Known allergy to morphine or sulfates (Sulfa drugs are not sulfates)
- B. Blood pressure less than 100 mmHg systolic.
- C. Trauma or pain of the head or abdomen.
- D. Respiratory rate less than 14 breaths per minute or oxygen saturation less than 90%. For pediatric patients, vital signs should be maintained within the normal age-appropriate range.

**PRECAUTIONS:**

- A. Morphine causes respiratory depression that is reversible with naloxone. This respiratory depression is exacerbated by underlying lung disease (COPD, etc.) and other depressant drugs (Valium, alcohol, cyclic anti-depressants). Naloxone and respiratory support must be available when using morphine.
- B. If hypotension develops it is usually responsive to naloxone administration and Trendelenburg position. If hypotension persists, follow Shock protocol.

**SIDE EFFECTS AND NOTES:**

- A. The goal of morphine administration is patient comfort (not the total elimination of pain but reduction in perception of pain by the patient).
- B. Morphine is a Schedule II controlled substance. Follow your agencies Controlled Substance policy or procedure for control and monitoring of use.

**ADULT DOSING:**

**Pain - Musculoskeletal injuries, burns, chest pain -**

2-8 mg IV. Repeat every 5 to max of 40 mg. If no IV give 5-10 mg IM. May repeat IM with 5 mg every 15 minutes to a maximum of 40 mg.

**PEDIATRIC DOSING (< 20kg):**

**Pain - Musculoskeletal injuries, burns, chest pain -**

0.1 mg / kg IV/IM. May repeat IM after 15 minutes. Do not exceed adult dosing.

**OLMC REQUIRED:** No

**SUPPLIED:** 2 mg / 2 ml pre-filled syringe

**PHARMACOLOGY AND ACTIONS:**

Naloxone is an opioid antagonist which competitively binds to opioid receptor sites but which exhibits almost no pharmacologic activity of its own. Duration of effect is 1-4 hours.

**INDICATIONS:**

- A. Reversal of opioid effects, particularly respiratory depression, due to opioid drugs either ingested or injected or administered in the course of treatment. Opioid drugs include Fentanyl, Morphine, Demerol, Dilaudid, Percodan, Codeine.
- B. Diagnostically in coma of unknown etiology to rule out or reverse opioid depression.

**CONTRAINDICATIONS:**  
**Do not use in neonates.**

**PRECAUTIONS:**

- A. In patients physically dependent on opioids, violent withdrawal symptoms may occur. Be prepared to restrain the patient.
- B. Some opioid intoxications may require up to 8 mg of naloxone to reverse symptoms (e.g. Methadone, designer drugs).

**SIDE EFFECTS AND NOTES:**

- A. The duration of some opioids is longer than naloxone, repeat doses may be necessary. Monitor the patient closely. Patients who have received naloxone must be transported to the hospital because coma may reoccur when naloxone wears off.
- B. Side effects are rare. Do not hesitate to use if indicated.
- C. If no effect is seen from naloxone administration, consider other causes of coma.

**ADULT DOSING:**

**Reversal of opioid effects, coma of unknown etiology –**

0.5 mg IV, repeat q 2 minutes up to 2 mg titrating to respirations. If no IV, give 2 mg IM/IN. If no response to initial dose, may repeat at 2 mg q 5 min (IV/ IM/IN) up to a maximum of 8 mg.

**PEDIATRIC DOSING:**

**Reversal of opioid effects, coma of unknown etiology –**

0.1 mg / kg IV/IM/IN up to 2 mg. May repeat q 3-5 minutes up to 2 mg / dose.  
Max total dose 8 mg. Do not use in neonates.

**OLMC REQUIRED:** See Contraindications (B)

**SUPPLIED:** 0.4 mg metered dose spray, 0.4 mg tablets.

**PHARMACOLOGY AND ACTIONS:**

Nitroglycerin is an organic nitrate and is a vasodilating agent. Its cardiovascular effects include: reduced venous tone (causing pooling of blood in the peripheral veins and decreased return of blood to the heart), decreased peripheral resistance, and dilation of coronary arteries. It also is a general smooth muscle relaxant.

**INDICATIONS:**

- A. Chest pain thought to be related to cardiac ischemia.
- B. Pulmonary edema.

**CONTRAINDICATIONS:**

- A. Blood pressure less than 100 mmHg systolic.
- B. Do not give to patients with an inferior myocardial infarction (ST elevation in II, III and AVF)
- C. Patients who have taken Viagra® (sildenafil citrate) or Levitra® (vardenafil HCl) within 24 hours, or who have taken Cilais® (tadalafil) within 48 hours. Contact OLMC for direction.

**PRECAUTIONS:**

- A. Generalized vasodilatation may cause profound hypotension and reflex tachycardia.
- B. IV should be established prior to administration in patients who have not taken Nitroglycerin previously, or who have a potential for hemodynamic instability.

**SIDE EFFECTS AND NOTES:**

- A. Common side effects are headache, flushing or dizziness.
- B. Because nitroglycerin causes generalized smooth muscle relaxation, it may be effective in relieving chest pain caused by esophageal spasm.

**ADULT DOSING:**

**Chest pain, pulmonary edema -**

0.4 mg SL every 5 minutes until pain is relieved as long as systolic BP is greater than 100 mmHg.

**PEDIATRIC DOSING:**

Contact OLMC for dosing.

# Norepinephrine (Levophed®) – 20.225

**OLMC REQUIRED:** No.

**SUPPLIED:** 4 mg/4ml ampules or vials

**PHARMACOLOGY AND ACTIONS:**

Norepinephrine stimulates alpha receptors in the peripheral vasculature, producing vasoconstriction related increase in systemic blood pressure. Concurrent beta receptor stimulation may produce increases in heart rate and mild bronchodilation.

**INDICATIONS:**

Obstructive, cardiogenic and distributive shock unresponsive to fluid administration.

**CONTRAINDICATIONS:**

**Hypovolemic shock**

**PRECAUTIONS:**

- A. Norepinephrine should be given in a large, patent vein (i.e. antecubital or larger). Do not administer through a hand or leg vein as these are more likely to be affected by vaso-occlusive diseases and more prone to ischemic complications.
- B. Extravasation of norepinephrine into tissue may cause necrosis. The IV should be checked for patency prior to administration and monitored continuously.
- C. Norepinephrine is a potent vasoconstrictor and may cause hypertension. The rate of flow should be carefully monitored and blood pressures checked often.
- D. Consider hypovolemia and treat this with appropriate fluids before administration of norepinephrine.

**SIDE EFFECTS AND NOTES:**

- A. Symptoms may include headache, palpitations, tachycardia, chest pain and eventual hypertension.
- B. Reflex bradycardia can result from an increase in blood pressure.

**ADULT DOSING:**

**Cardiogenic/Distributive/Obstructive shock -**

Begin at 4 mcg/min. If no response, increase every 5 minutes in 4 mcg/min increments to max of 12 mcg/min. Goal is a systolic blood pressure of  $\geq 90$  mmHg.

**PEDIATRIC DOSING:**

Begin at 0.1 mcg/kg/min. If no response in 5 min, increase to 0.2 mcg/kg/min. If still no response after 5 more minutes may increase to 0.4 mcg/kg/min. Goal is age appropriate systolic blood pressure.

**MIXING/ADMINISTRATION:**

Add one 4 mg ampule or vial to 500 ml of NS or LR, or two 4 mg ampules or vials to 1000 ml of NS or LR for a concentration of 8 mcg/ml. Administer via 60 drop/mL infusion set.

**Adults (8 mcg/ml concentration)**

Mcg/min	4	8	12
Drops/min	30	60	90

**OLMC REQUIRED: No**

**SUPPLIED:**

10 mg orally dissolving tablets

**PHARMACOLOGY AND ACTIONS:**

1. Dopamine and serotonin (5-HT) antagonist, along with anticholinergic, antihistaminic, and anti-alpha adrenergic effects.
2. Has anxiolytic properties
3. Low incidence of extrapyramidal effects

**INDICATIONS:**

1. Patients between 18-65 years
2. Anxious and/or mildly agitated patient who is willing to take an oral agent to help relieve stress of transport
3. To avoid the need for physical or chemical restraint.

**CONTRAINDICATIONS**

- A. Patients less than 18 or greater than 65 years of age.**

**PRECAUTIONS:**

1. May prolong QT but unlikely in single dose. Obtain EKG before administration if known history or suspicion for prolonged QT or cardiovascular disease.
2. Known hypersensitivity.
3. Use with caution in suspected drug overdose.
4. Elderly patients with dementia-related psychosis are at increased risk of death with most deaths attributed to cardiovascular events including heart failure and sudden death.
5. Can cause orthostatic hypotension or bradycardia.

**ADULT DOSING (Age 18 – 65):**

10mg PO - Administer tablet immediately once it is removed from the blister unit. Tablets disintegrate in the mouth and can be swallowed subsequently with saliva or with liquid.

**OLMC REQUIRED:**

Patients < 6 months except for children in spinal immobilization or children receiving chemotherapy.

**PHARMACOLOGY AND ACTIONS:**

Ondansetron is a potent, highly selective serotonin (5-HT<sub>3</sub>) receptor agonist. Its precise mode of action in the control of nausea is not known. Pharmacologic agents and other triggers may cause release of 5-HT<sub>3</sub> receptors. Ondansetron blocks the initiation of this reflex. Ondansetron is commonly used in the treatment of nausea in patients who are receiving chemotherapy or as a postoperative nausea treatment. Peak plasma concentrations of the drug occur 10 minutes after IV administration, and 40 minutes after IM injection. Both routes have the same elimination half-life of 4 hours.

**INDICATIONS:**

Prevention and control of uncomplicated nausea and vomiting.

**CONTRAINDICATIONS:**

**Known hypersensitivity to Zofran or similar medications.**

**PRECAUTIONS:**

- A. Hypersensitivity reactions have been reported in patients who have exhibited hypersensitivity to other 5-HT<sub>3</sub> medications (Anzemet®, Kytril®)
- B. Patients with bowel obstruction should be monitored closely following administration.
- C. Ondansetron may precipitate if mixed with alkaline solutions.
- D. ECG changes including QT interval prolongation and Torsade de Pointes have been observed in patients receiving ondansetron. Monitor pts ECG closely.

**SIDE EFFECTS AND NOTES:**

- A. The most common side effects include headache, dizziness, drowsiness and shivers.
- B. Body aches, agitation, dysuria, hypotension and rash have also been reported in a very small number of patients.

**ADULT DOSING:****Nausea & vomiting -**

8 mg oral tablet or 4 mg IV/IM. Give slowly over two minutes if giving IV. If nausea and/or vomiting are inadequately controlled after 10 minutes, may repeat dose once.

**PEDIATRIC DOSING:****Nausea & vomiting (children 6 months - 2 yrs)**

2 mg orally dissolving tablet

**Nausea & vomiting (children 2 yrs - 12 yrs)**

4 mg oral tablet **or**

0.1 mg/kg IV/IM. Give slowly over two minutes if giving IV. Do not exceed 4 mg.

**OLMC REQUIRED:** None

**SUPPLIED:** Various. D cylinder contains 415 liters at 2,000 psi.

**PHARMACOLOGY AND ACTIONS:**

Oxygen added to the inspired air raises the amount of oxygen in the blood and the amount delivered to the tissues. Breathing in most persons is regulated by small changes in acid/base balance and CO<sub>2</sub> levels and it takes a large drop in oxygen concentration to stimulate respiration.

**INDICATIONS:**

- A. Suspected hypoxemia or respiratory distress from any cause.
- B. Acute chest pain in which cardiac ischemia or myocardial infarction is suspected.
- C. Shock from any cause.
- D. Major trauma.
- E. Carbon monoxide poisoning.

**CONTRAINDICATIONS:** None

**PRECAUTIONS:**

- A. If the patient is not breathing adequately on their own the treatment of choice is ventilation with oxygen, not just supplemental oxygen.
- B. In a small percentage of patients with chronic lung disease, administration of oxygen will decrease respiratory drive. Do not withhold oxygen because of this possibility. Be prepared to assist ventilation if needed.
- C. Titrate oxygen to the lowest level required to achieve an SpO<sub>2</sub> between 94 – 99%

**SIDE EFFECTS AND NOTES:**

- A. Non humidified oxygen is drying and irritating to mucous membranes.
- B. Restless may be an important sign of hypoxia.
- C. Oxygen toxicity is not a risk in acute administration.
- D. Nasal cannula prongs work equally well on nose and mouth breathers.

**DELIVERY:**

<b>Nasal cannula -</b>	
2-8 lpm	24 – 40% inspired O <sub>2</sub>
<b>Simple face mask -</b>	
6 lpm	50 – 60% inspired O <sub>2</sub>
<b>Rebreather mask -</b>	
10-12 lpm	90% inspired O <sub>2</sub>
<b>Bag valve mask -</b>	
Room air	21% inspired O <sub>2</sub>
12 lpm	40% inspired O <sub>2</sub>
With reservoir	+ 90% inspired O <sub>2</sub>

## **Pralidoxime (2-Pam<sup>®</sup>) – 20.250**

**OLMC REQUIRED:** For IV use.

**SUPPLIED:** 600 mg / 2 ml auto-injector, 1 gm powder vial – reconstitute with 20 ml NS

### **PHARMACOLOGY AND ACTIONS:**

The principal action of Pralidoxime is to reactivate cholinesterase which has been inactivated by an organophosphate pesticide or related compound. The drug's most critical effect is in relieving paralysis of respiratory muscles. Atropine is always required concurrently to block the effect of acetylcholine.

### **INDICATIONS:**

- A. As an antidote in the treatment of poisoning due to organophosphate pesticides and chemicals.
- B. Control of overdose by anticholinesterase drugs (e.g. treatment of myasthenia gravis).

### **CONTRAINDICATIONS:**

None in the emergency setting.

### **PRECAUTIONS:**

- A. Rapid IV injection may cause tachycardia, laryngospasm, muscle rigidity and transient neuromuscular blockade. Administration should be done slowly and preferably by infusion.
- B. Pralidoxime is a relatively short acting drug, repeat dosing may be necessary.

### **SIDE EFFECTS AND NOTES:**

Dizziness, blurred vision, diplopia, headache, drowsiness, nausea, tachycardia and muscle weakness have been reported following administration.

### **ADULT DOSING:**

Refer to Haz-Mat Protocol – Organophosphate Poisoning for dosing.

### **PEDIATRIC DOSING:**

Refer to Haz-Mat Protocol – Organophosphate Poisoning for dosing.

**OLMC REQUIRED:** No

**SUPPLIED:** 0.5% solution in 15 ml bottle

**PHARMACOLOGY AND ACTIONS:**

Proparacaine hydrochloride is a short-acting local anesthetic of the ester type with an onset of action within 30 seconds. Duration is up to 15 minutes.

**INDICATIONS:**

Superficial foreign bodies or chemical burns to the eye.

**CONTRAINDICATIONS:**

**Known hypersensitivity to any component of the solution.**

**PRECAUTIONS:**

Systemic effects are rare with topical use.

**SIDE EFFECTS AND NOTES:**

Instillation of Proparacaine in the recommended concentration and dosage produces little or no initial irritation, stinging or burning, these effects may occur several hours after use.

**ADULT DOSING:**

**Chemical burns or foreign body to outer eye -**

Instill one drop in the affected eye. If there is no effect within one minute, three additional drops may be instilled at one-minute intervals. For transports, longer than 15 minutes, if eye pain returns, 1-4 additional drops may be instilled to continue anesthetic effect.

**PEDIATRIC DOSING:**

**Same as adult**

**OLMC REQUIRED:** No

**SUPPLIED:** 100 mg in 10 mL vial

**PHARMACOLOGY AND ACTIONS:**

Rocuronium is a non-depolarizing neuromuscular blocking agent causing skeletal muscle relaxation. Rocuronium produces a pure reversible competition between antagonist molecules and acetylcholine (Ach) for occupancy at the Ach binding site. Neuromuscular blockade occurs within 90 seconds for induction dose and 1 to 3 minutes for maintenance dose. Time to recovery is 20 to 30 minutes. Metabolism is 5 to 35% renal and the remainder by the liver.

**INDICATIONS:**

- A. For sustained neuromuscular blockade in the intubated patient.
- B. For induction intubation (RSI) in the patient when succinylcholine is contraindicated or unavailable

**CONTRAINDICATION:**

**Maintenance of paralysis in patients in status epilepticus**

**PRECAUTIONS:**

- A. Use of pulse oximetry is required.
- B. Rocuronium does not substantially affect heart rate or rhythm, systolic or diastolic blood pressure, mean arterial pressure, cardiac output or systemic vascular resistance.
- C. Rocuronium has no effect on consciousness and must be used with a sedative or induction agent.
- D. Rocuronium should not be administered simultaneously with furosemide, methylprednisolone, or sodium bicarbonate.

**ADULT AND PEDS DOSING:**

**Maintenance of post-intubation paralysis - 0.5 mg/kg IV/IO.**

**Induction for intubation - 1 mg/kg IV/IO.**

**OLMC REQUIRED:**

Crush injury, Hyperkalemia.

**SUPPLIED:** 50 mEq / 50 ml pre-filled syringe.

**PHARMACOLOGY AND ACTIONS:**

Sodium bicarbonate is an alkalotic solution which neutralizes acids found in the blood. Acids are increased in the blood when body tissues become hypoxic due to cardiac or respiratory arrest. Acidosis depresses cardiac contractility and cardiac response to catecholamines, and makes the heart more likely to fibrillate and less likely to defibrillate. In the non-perfusing patient sodium bicarbonate, has been shown to increase the intracellular acidosis and worsen acid/base balance, thus it is not recommended in the routine cardiac arrest sequence.

**INDICATIONS:**

- A. To control arrhythmias or asystole in cyclic antidepressant overdose or hyperkalemia.
- B. Acidosis caused by prolonged cardiac arrest.

**CONTRAINDICATIONS: None****PRECAUTIONS:**

- A. Addition of too much bicarbonate may result in alkalosis that is difficult to reverse and may cause as many problems in resuscitation as acidosis.
- B. May increase cerebral acidosis, especially in diabetics who are ketotic.
- C. Do not mix sodium bicarbonate with calcium preparations. Slowly flush one drug from the catheter before administering the other.

**SIDE EFFECTS AND NOTES:**

Each amp of sodium bicarbonate contains 50 mEq of sodium. This may increase intravascular volume and hyperosmolarity resulting in cerebral impairment.

**ADULT DOSING:****Tri-cyclic antidepressant overdose -**

1 mEq / kg IV or IO

**V Fib, pulseless V Tach, asystole -**

1 mEq / kg IV or IO. May repeat q 10 minutes at 0.5 mEq / kg.

**Hyperkalemia -**

50 mEq IV or IO. OLMC required.

**Crush injury -**

Contact trauma physician through OLMC for advice.

**PEDIATRIC DOSING:**

- A. Use same dosing as for adult with exception of hyperkalemia, call OLMC for dosing in that situation.
- B. For children less than 10 kg (1 yr), dilute by one-half with normal saline prior to administration.

**OLMC REQUIRED:** None

**SUPPLIED:** 200 mg / 10 ml vial

### **PHARMACOLOGY AND ACTIONS:**

Succinylcholine is a short acting motor nerve depolarizing skeletal muscle relaxant. It competes with acetylcholine to combine with cholinergic receptors in the motor end plate causing depolarization inhibiting neuromuscular transmission. After intravenous injection paralysis is obtained within 1-2 minutes and persists for approximately 4-6 minutes. Effects then start to fade and return to normal. It has no effect on consciousness. Muscle relaxation begins in the eyelids and jaw, then progresses to the limbs, abdomen, diaphragm and finally intercostal muscles. Succinylcholine is hydrolyzed by plasma pseudocholinesterase and is excreted by the kidneys.

### **INDICATIONS:**

To achieve temporary paralysis where endotracheal intubation is indicated.

### **CONTRAINDICATIONS:**

- A. Hypersensitivity to the drug.
- B. Major burns and crush injuries between 48 hours and 6 months old.
- C. Stroke or spinal cord injuries with profound residual deficits between 48 hours and 6 months old.
- D. Neuromuscular disease (e.g. muscular dystrophy, multiple sclerosis)
- E. Suspected hyperkalemia (e.g. end-stage renal disease patients who have missed dialysis).

### **PRECAUTIONS:**

- A. Succinylcholine shall not be administered unless personnel trained and authorized in this procedure are present and ready to perform the procedure.
- B. Oxygen, ventilation equipment and resuscitation drugs should be readily available.
- C. Succinylcholine produces paralysis, but does not alter a person's level of consciousness. Paralysis in the conscious patient is very frightening, therefore, sedation should be provided to the patient during the procedure. Verbal explanations should be provided to the patient during the procedure, even if you do not think they can hear you.

### **SIDE EFFECTS AND NOTES:**

In rare individuals, because of pseudocholinesterase deficiency, paralysis may persist for a prolonged period of time. Be prepared to continue to assist ventilations as needed.

### **ADULT DOSING:**

**Rapid sequence intubation -**  
1.5 mg/kg IV/IO for patients  $\geq$  6 years old.

### **PEDIATRIC DOSING:**

**Rapid sequence intubation -**  
2 mg/ kg IV/IO for patients < 6 years old.

## Vecuronium (Norcuron<sup>®</sup>) – 20.290

**OLMC REQUIRED:** No

**SUPPLIED:** 10 mg vial of powder and 10 ml vial of diluent solution

### **PHARMACOLOGY AND ACTIONS:**

Vecuronium is a non-depolarizing neuromuscular blocking agent causing skeletal muscle relaxation. It reversibly binds the acetylcholine receptor, blocking the action of acetylcholine. Neuromuscular blockade occurs within 2-3 minutes. Time to recovery is 30-45 minutes. Vecuronium metabolism is 5-35% renal with the remainder done in the liver.

### **INDICATIONS:**

- A. For sustained neuromuscular blockade in the intubated patient.
- B. As the first line agent for rapid sequence intubation (RSI) in the patient where succinylcholine is contraindicated.

### **CONTRAINDICATIONS:**

**Patients in status epilepticus who require intubation.**

### **PRECAUTIONS:**

- A. Patients with renal or hepatic failure may experience prolonged paralysis.
- B. Vecuronium has no effect on consciousness and must be used with a sedative or induction agent.

### **SIDE EFFECTS AND NOTES:**

- A. Vecuronium exhibits minimal side effects and does not substantially affect heart rate or rhythm, systolic or diastolic blood pressure, mean arterial pressure, cardiac output, or systemic vascular resistance.
- B. Vecuronium can be used to maintain paralysis even if intubation was performed without Succinylcholine.

### **ADULT DOSING:**

**Rapid Sequence Induction -**  
0.1 mg/kg IV/IO.

### **PEDIATRIC DOSING:**

**Same as adults.**

# Procedures

## Airway Management / General - 30.010

### **PURPOSE:**

Proper airway management is the first priority of the EMS Provider/Paramedic.

### **INDICATIONS:**

- A. Airway control and protection.
- B. Inadequate ventilation and/or oxygenation.

### **Oxygenation, Maintenance of Airway and Ventilation:**

- A. Supplemental oxygen:
  - a. A Nasal cannula is useful for small amounts of supplemental oxygen.
  - b. Partial Rebreather masks (PRB) are recommended when higher flow and concentrations of oxygen need to be delivered.
  - c. "Blow-by" oxygen should be used for infants and toddlers.
- B. Nasopharyngeal Airway (NPA) or Oropharyngeal Airway (OPA) should be used for patients who are unable to maintain their own airway.
- C. A Bag-Valve-Mask (BVM) should be used when inadequate ventilation is present.
- D. CPAP should be considered for MEDICAL patients complaining of moderate to severe respiratory distress meeting ALL the criteria described in Continuous Positive Airway Pressure (CPAP) procedure.
- E. End-tidal CO<sub>2</sub> shall be utilized on all intubated patients.
- F. PEEP valve should be considered when ventilating a patient with COPD or emphysema to maintain alveolar inflation during exhalation

### **NOTES & PRECAUTIONS:**

In trauma patients, airway maintenance with cervical spine control is the primary concern. If unable to establish or maintain an airway, transport the patient to the closest hospital. This includes patients entered into the Trauma System.

### DEFINITION:

An AICD is an implanted defibrillator device that consists of: a lead system that senses cardiac activity, logic circuitry to analyze sensed signals, a power supply for device function and generating high voltage, and a capacitor that stores and delivers shocks. This device activates when brady and/or tachyarrhythmias are detected within programmed parameters.

### INDICATIONS:

For verified frequent and recurrent inappropriate AICD discharges, a doughnut magnet may be utilized to deactivate “runaway” devices. Inhibition of AICD devices should be considered when continuous ECG monitoring verifies malfunction and ACLS is readily available.

### PROCEDURE:

- A. Contact OLMC.
- B. Monitor ECG and verify sinus rhythm AND inappropriate defibrillator discharge.
- C. Locate the position of the AICD device.
- D. Place doughnut magnet directly over the device.
- E. After proper positioning and AICD deactivation, tape magnet securely in place and transport.

### NOTES & PRECAUTIONS:

- A. It is very important to make the correct diagnosis before utilizing this protocol. Be sure that the ECG is showing a normal sinus rhythm without ectopy AND indications of recurrent AICD discharges.
- B. Some AICD devices will emit varying beeping or continuous tones when magnets are applied, other will not. Disregard these tones.
- C. If the magnet placement is successful in overriding the pulse generation of the AICD, **DO NOT REMOVE THE MAGNET**. Some units will return to normal operation after removal from the magnetic field.
- D. Magnets should be stored so as not to come into contact with magnetic sensitive materials, i.e., monitor screens, tapes, credit cards, magnetic door entry cards, and other electronic equipment.
- E. A small percentage of AICDs are impervious to magnetic fields (AICD recipients who normally work around magnetic fields have these special units). This will not be deactivated with the doughnut magnet. In such cases, advise OLMC and transport.
- F. Consider use of the AICD magnet in deactivating cardiac pacemaker malfunctions. Call OLMC.
- G. Identification information of the AICD type, date implanted, and location of implantation should accompany the patient to the hospital. This information is typically found on a wallet card that the patient has.

## Behavioral Health Emergencies – 30.025

### **Purpose:**

To establish criteria for EMS assessment, triage and treatment of patients with potential behavioral/mental health emergencies and direct transport for Behavioral Health.

### **Definition:**

Behavioral health encompasses behavioral factors in chronic illness care, care of physical symptoms associated with stress rather than diseases, and health behaviors, as well as mental health and substance abuse conditions and diagnoses.

### **Inclusion Criteria:**

- A. Voluntary patient, or patient on police or mental health director hold.
- B. Primary 911 call or police request.
- C. Age between 18-65 years.
- D. Mental health complaint (depression, psychosis, suicide or homicidal ideation), substance abuse or behavioral disorder with no acute medical or traumatic condition requiring treatment.
- E. Alert and oriented to person, place, and time.
- F. No evidence of trauma other than minor abrasions.
- G. Able to perform activities of daily living (ambulate, bathe, toileting, eat and drink) independently.
- H. If CBG is obtained, between 60 and 300 mg/dl.

### **Vital Signs:**

- A. HR 60-110
- B. RR 12-25
- C. O2 sat > 90%
- D. Systolic BP 90-160 mmHg
- E. Diastolic BP <110 mmHg
- F. Temperature between 96.0 F and 100.4 F (38 C) if taken

### **Exclusion Criteria:**

- A. Possible drug overdose or acute intoxication impairing ability to ambulate or perform activities of daily living.
- B. Acute medical or traumatic condition including altered level of consciousness, chest or abdominal pain, significant bleeding, respiratory distress, or other acute illness or injury.
- C. Patients with abnormal vital signs or physical findings.
- D. Patients who require chemical restraint (olanzapine ODT IS NOT an exclusion)
- E. Signs/symptoms of acute drug/alcohol withdrawal (tachycardia, hypertension, tremor, visual hallucinations).
- F. visual hallucinations).

### **Procedure:**

- A. Assess and assure scene safety.
- B. If police or Crisis Intervention Team (CIT) is on scene, EMS assessment and intervention should not be delayed, however, police or the CIT may need to diffuse the situation in order to allow for EMS to safely assess the patient. EMS crews should get an initial report from the officer before approaching the patient. If EMS is first on scene, give an initial report to officer.
- C. Approach the patient in a calm, slow, reassuring and honest manner. Multiple people attempting to intervene may increase the patient's confusion and agitation.

## Behavioral Health Emergencies – 30.025

- D. Consider offering olanzapine ODT 10 mg for agitation or anxiety.
- E. Protect the patient, bystanders and rescuers from injury. Consider restraint and follow Restraint Procedure, if indicated.
- F. Obtain history, physical and mental status examination.
- G. Assess and treat any medical conditions per EMS protocol and then determine if patient is eligible for transport to UBHH.
- H. All patients will be assessed and evaluated by EMS regardless of transport status.

### **Specific Precautions:**

- A. Red Flags that this might not be a psychiatric condition:
  - 1. Waxing and waning level of consciousness
  - 2. Abnormal vital signs
  - 3. Dilated or pinpoint pupils
  - 4. First psychotic episode over the age of 30
  - 5. Acute onset over hours/days (consider substance abuse)
- B. Psychiatric signs/symptoms.
  - 1. Mood disorder: depression, mania, suicide ideation, anxiety
  - 2. Thought disorder: hallucinations, pressured speech, racing thoughts, grandiose or paranoid ideation, delusions.
- C. Medical illnesses including hypoglycemia, hypoxia, stroke, head injury, CNS infection may mimic psychiatric illness. Do not assume the patient's condition is purely psychiatric.

## Continuous Positive Airway Pressure – 30.032

### DEFINITION:

Continuous Positive Airway Pressure (CPAP) has been shown to rapidly improve vital signs, gas exchange, and to decrease the work of breathing, the sense of dyspnea, and the need for endotracheal intubation in patients who suffer from shortness of breath secondary to CHF/Pulmonary edema or COPD. In patients with CHF, CPAP improves hemodynamics by reducing preload and afterload.

### INDICATIONS:

**Medical patients** complaining of moderate to severe respiratory distress meeting **ALL** the following criteria:

- A. Is awake, oriented and has the ability to maintain an open airway.
- B. Has signs and symptoms consistent with either CHF/pulmonary edema or COPD.
- C. Has a systolic blood pressure above 100 mmHg.
- D. Is over 12 years old and is able to fit the CPAP mask.

### CONTRAINDICATIONS:

- A. Respiratory arrest.
- B. Non-cooperative patient.
- C. Suspected pneumothorax.
- D. Hemodynamically unstable.
- E. Inability to maintain mask seal.
- F. Active vomiting.

### PROCEDURE:

- A. EXPLAIN and COACH THE PATIENT ON THE PROCEDURE.
- B. Ensure adequate oxygen supply to ventilation device.
- C. Place the patient on continuous pulse oximetry and end-tidal CO<sub>2</sub>.
- D. Turn on device. Set device to minimum flow (2-5 cmH<sub>2</sub>O).
- E. Place the CPAP over the patient's mouth and nose (consider having the patient hold the mask against their face initially to reduce anxiety).
- F. Secure the mask with the provided straps.
- G. Check for air leaks.
- H. Monitor and document the patient's respiratory response to the treatment.
- I. Continue to coach patient to keep mask in place and readjust as needed to a maximum of 10 cmH<sub>2</sub>O.
- J. IF RESPIRATORY STATUS DETERIORATES, REMOVE THE DEVICE AND CONSIDER BAG VALVE MASK VENTILATION AND/OR ENDOTRACHEAL INTUBATION.

### REMOVAL PROCEDURE:

CPAP therapy needs to be continuous and should not be removed unless the patient cannot tolerate the mask or experiences continued or worsening respiratory failure.

## Continuous Positive Airway Pressure – 30.032

### **SPECIAL NOTES:**

- A. If unable to maintain oxygen saturation > 90%, administer positive airway pressure via BVM and PEEP valve.
- B. Contact the receiving hospital as soon as possible that a patient with CPAP is enroute to their hospital so they can be prepared for patient.
- C. Reassessment of the patient's status is critical and documentation should be performed every 5-10 minutes until patient is stable.
- D. CPAP mask may be removed temporarily to administer nitroglycerin.
- E. Suctioning of secretions may be required on some patients.
- F. Watch for gastric distention and/or nausea.
  
- G. Estimated CPAP pressures for oxygen flow type devices:

#### **Boussignac CPAP:**

- 5 cm H<sub>2</sub>O @ 15 lpm,
- 7.5 cm H<sub>2</sub>O @ 20 lpm,
- 10 cm H<sub>2</sub>O @ 25 lpm

#### **Flow-Safe CPAP:**

- 3-4 cm H<sub>2</sub>O @ 15 lpm,
- 6-7 cm H<sub>2</sub>O @ 20 lpm,
- 8.5-10 cm H<sub>2</sub>O @ 25 lpm

#### **PORTO<sub>2</sub>VENT CPAP:**

- Monitor the airway pressure and your patient;
- Start at 10 cm H<sub>2</sub>O @ 20 lpm
- Increase or decrease to the patients need and condition

#### **O<sub>2</sub> RESQ SYSTEM CPAP:**

- Monitor the airway pressure and your patient;
- Start at 5 cm H<sub>2</sub>O @ 15-25 lpm
- Increase to 7.5 cm H<sub>2</sub>O @ 15-25 lpm
- Increase to 10 cm H<sub>2</sub>O @ 15-25 lpm
- Increase or decrease to the patients need and condition

## INDICATIONS:

- A. Airway obstruction
- B. Need for airway protection
- C. Respiratory failure

## PROCEDURE:

- A. Assemble equipment:
  1. Two O<sub>2</sub> tanks w/regulators,
  2. Nasal cannula
  3. Mask and BVM,
  4. Intubation equipment
  5. Suction
  6. Rescue devices (bougie, rescue airway)
- B. Attach pulse oximeter, cardiac end-tidal CO<sub>2</sub> monitors
- C. Establish IV or IO, if not already done.
- D. Unless patient needs spinal precautions, position patient by aligning the ear canal with sternal notch.
- E. Pre-oxygenate (open airway if necessary)
  1. Place nasal cannula in the patient's nares and administer oxygen at 15 lpm. Continue apneic oxygenation during procedure
  2. If breathing, administer oxygen via NRB mask
  3. If not breathing, use a BVM with OPA/NPA.
  4. If unconscious, consider cricoid pressure when using a BVM
- F. Unless the patient is in cardiac arrest, administer ONE of the following for sedation:
  1. Etomidate 0.3 mg/kg IV/O **or**
  2. Ketamine 2 mg/kg IV **or**
  3. Midazolam 0.2 mg/kg maximum of 10 mg (not preferred)
- G. Immediately following etomidate or midazolam administer a paralytic. If using ketamine wait 60 seconds before administering paralytic. Use **one** of the following:
  1. Succinylcholine
    - Age >6 years or over 20 kg give 1.5 mg/kg
    - 6 < years old or under 20 kg give 2 mg/kg
  2. Vecuronium 0.1 mg/kg
  3. Rocuronium 1.5 mg/kg
- H. Perform intubation approximately 60 seconds after succinylcholine or rocuronium and 2-3 minutes after vecuronium.
- I. If intubation unsuccessful use BVM and rescue airway, (i.e. extraglottic device)
- J. If unable to ventilate with BVM or rescue airway, proceed to cricothyrotomy
- K. If SpO<sub>2</sub> < 93%, ventilate with BVM using 100% oxygen before next attempt.
- L. If bradycardia occurs, first assure ventilation and if persistent, administer atropine 0.5 mg IV/IO (age < 2 years old: 0.02 mg/kg IV/IO, maximum 0.5 mg)

## Endotracheal Intubation – 30.040

- M. Verify placement of ET tube using ETCO<sub>2</sub> and five-point check.
- N. Continue ETCO<sub>2</sub> monitoring and pulse oximetry at all times.
- O. Insert an oral airway or compatible bite-block device.
- P. Secure the endotracheal tube and record the depth.
- Q. Recheck and document ET tube placement after every patient movement or change in vital signs.
- R. After successful airway placement, administer midazolam<sup>®</sup> 2.5 - 5 mg IV/IO if systolic BP is >100 mmHg. Repeat every 15 minutes as necessary to maintain sedation. (Pediatric dose is 0.1 mg/kg up to 2.5 mg). ALL patients who received ketamine should receive at least one dose of midazolam.
- S. Consider fentanyl per Pain Management protocol to a maximum of 100 mcg.
- T. If additional paralysis is needed, administer vecuronium 0.1 mg/kg or rocuronium 0.5 mg/kg IV/IO.
- U. Consider orogastric tube placement.

### NOTES & PRECAUTIONS:

**If unable to establish and/or maintain an adequate airway, transport patient including trauma patient to the nearest hospital to obtain definitive airway control.**

- A. An attempt is defined as the insertion of the laryngoscope blade or rescue airway past the teeth.
- B. In most situations, intubation attempts should be limited to 2 per paramedic (with a maximum of 4 attempts prior to transport).
- C. **DO NOT** rely solely on monitoring equipment. Auscultate for lung sounds and/or re-visualize with laryngoscope.
- D. Continuously monitor the patient's overall condition including vital signs, cardiac rhythm, perfusion, and ease of bagging post-intubation.
- E. Succinylcholine, rocuronium and vecuronium do not affect the level of consciousness and should be used with etomidate/midazolam/ketamine.
- F. Succinylcholine is contraindicated in the following:
  - 1. Known hypersensitivity
  - 2. Major burns and crush injuries between 48 hours and 6 months old.
  - 3. Stroke or spinal cord injuries with profound residual deficits between 48 hours and 6 months old.
  - 4. Neuromuscular disease (e.g. muscular dystrophy)
  - 5. Suspected hyperkalemia (patients who have missed dialysis)
- G. Avoid vecuronium and rocuronium in patients suspected of having status seizures.
- H. Ketamine can cause laryngospasm and may have an emergence reaction with vivid dreams. Preparing the patient if awake, giving midazolam and waking in a calm environment are helpful.
- I. Pre-oxygenation can be challenging (e.g. ARDS). Consider a BVM with PEEP valve.
- J. If the patient is less than 8 years old, only consider intubation if you have thermal burns present or the patient is in anaphylactic shock and the airway is compromised.

### DOCUMENTATION:

- A. Visualization of the cords (if applicable), size and depth of tube, number of attempts, 5-point check and equal chest expansion, ETCO<sub>2</sub> device used/reading, any other devices/ techniques used, reconfirmation of placement after each patient movement.

## Emergency Cricothyrotomy – 30.060

### INDICATIONS:

This technique is to be used only when other attempts to establish an airway have been unsuccessful (i.e., you are unable to intubate or ventilate using BVM) and respiratory obstruction exists. Such conditions are most likely to be found with foreign-body obstruction; facial and laryngeal trauma; inhalation, thermal, or caustic injury to the upper airway; angioneurotic edema; upper airway bleeding; epiglottitis; and severe croup.

### PROCEDURE:

Place the patient in a supine position with support under the shoulders and mild hyperextension of the neck. Palpate the neck in the midline and locate the slight depression just below the notch of the thyroid cartilage. This is the position of the cricothyroid membrane.

### PerTrach

- A. Locate the cricothyroid membrane.
- B. Palpate the cricothyroid membrane with gloved hand.
- C. Pinch the skin, and make a 1-2 cm vertical incision, cutting away from the patient.
- D. Firmly grasp the trachea and insert the needle.
- E. Aspirate for air with a syringe.
- F. Remove syringe, and thread dilator through needle.
- G. Squeeze wings of needle and open out to split needle. Carefully remove needle.
- H. Insert dilator into airway, place tube in functional position, (faceplate against skin.)
- I. Remove dilator.
- J. Inflate cuff with 1-8 ccs of air.
- K. Secure the device to the neck and ventilate.
- L. Consider sedation with Versed® as with RSI if not already given.

### QuickTrach (Size 4.0= 77lbs and higher - Size 2.0=22lbs to 76lbs)

- A. Place the patient in a supine position. Assure stable positioning of the neck region and hyperextend the neck.
- B. Locate the cricothyroid membrane (in the midline between the thyroid cartilage and the cricoid cartilage).
- C. Pinch the skin and make a vertical incision in a downward motion with a scalpel over the cricothyroid membrane large enough to introduce the device.
- D. Secure the larynx laterally between the thumb and middle finger and reconfirm the location of the cricoid membrane.
- E. Firmly hold the device and puncture the cricothyroid membrane at a 90-degree angle.
- F. After puncturing the cricothyroid membrane, check entry of the needle into the trachea by aspirating air through the syringe. If air is aspirated the needle is in the trachea.
- G. Change the angle of the needle to 60 degrees and advance the device forward into the trachea to the level of the stopper.
- H. Remove the stopper being careful not to advance the device further into the trachea with the needle still attached.
- I. Hold the needle and syringe firmly and slide only the plastic cannula along the needle into the trachea until the flange rests on the neck. Carefully remove the needle and syringe.
- J. Secure the device to the neck.
- K. Apply the connecting tube to the device and ventilate.
- L. Consider sedation with Versed® as with RSI if not already given.

## Emergency Cricothyrotomy – 30.060

### **Surgical Cricothyrotomy (Patients > 40 kg)**

- A. Cleanse the site with antiseptic.
- B. Using your non-dominant hand (thumb and middle finger), stabilize the trachea. Your index finger is available to maintain location of the cricothyroid membrane throughout the procedure.
- C. Locate the cricothyroid membrane
- D. May make a vertical incision through the skin. **NOTE:** There may be significant bleeding.
- E. Make a horizontal incision through the cricothyroid membrane large enough to pass the tube.
- F. Insert the tracheal hook or dilator through the cricoid membrane, if using the hook secure the superior edge of the cricothyroid cartilage and apply caudal displacement.
- G. Insert a 6.5 or smaller tube (rotate at 90° if necessary).
- H. Remove tracheal hook.
- I. Inflate the cuff.
- J. Secure device.
- K. Attach end-tidal CO2 adapter and BVM.
- L. Consider sedation if necessary.

### **Needle Cricothyrotomy – (pediatric patients 12 years and younger).**

- A. Assemble equipment. 14 ga or 16 ga angiocath, 3cc syringe, 3.0 ETT adapter, oxygen, BVM.
- B. Place the patient in a supine position with support under the shoulders and mild hyperextension of the neck unless C-Spine injury is suspected.
- C. Palpate the neck in the midline and locate the slight depression just below the notch of the thyroid cartilage. This is the position of the cricothyroid membrane.
- D. Prepare the area with antiseptic solution.
- E. Stabilize the airway between thumb and forefingers.
- F. Insert the needle with catheter into the cricothyroid membrane at a 30-degree angle caudally (toward the pts feet).
- G. When the needle is through the membrane. Stop and aspirate for air to ensure tracheal entry.
- H. Advance the catheter over the needle and then remove the needle.
- I. Attach the 3.0 ETT adapter to the hub of the catheter and begin ventilations with the BVM.
- J. Secure the cannula with tape after confirming correct placement by auscultation for breath sounds (5-point check). Observe for kinking of cannula.
- K. Consider sedation with Versed® as with RSI if not already given.

## Emergency Cricothyrotomy – 30.060

### NOTES & PRECAUTIONS:

- A. Hazards in performing this procedure are primarily those of damage to nearby structures - major vessels to either side of the midline, to the vocal cords if the puncture is made too high, or a through and through injury of the trachea if the puncture is made too deeply. The latter is more commonly seen in infants and children whose tracheas may be deceptively narrow.
- B. Palpation of the cricothyroid membrane is very difficult in the infant and young child. The key to success is immobilization of the trachea throughout the procedure.
- C. Needle cricothyrotomy is only a temporizing measure providing oxygenation not adequate ventilation.

## End-Tidal CO<sub>2</sub> Monitoring – 30.070

### **INDICATIONS:**

For use to measure effectiveness of ventilation by measuring the amount of carbon dioxide in exhaled air.

### **PROCEDURE:**

1. Manage airway according to appropriate Airway Management Procedure.
2. Apply ET<sub>CO<sub>2</sub></sub> monitor, if available. Maintain ET<sub>CO<sub>2</sub></sub> output between 35-40 mmHg.

*The following approximates the degree of ventilation:*

**> 40 mmHg = Hypoventilation**

**35 – 40 mmHg = Normal ventilation**

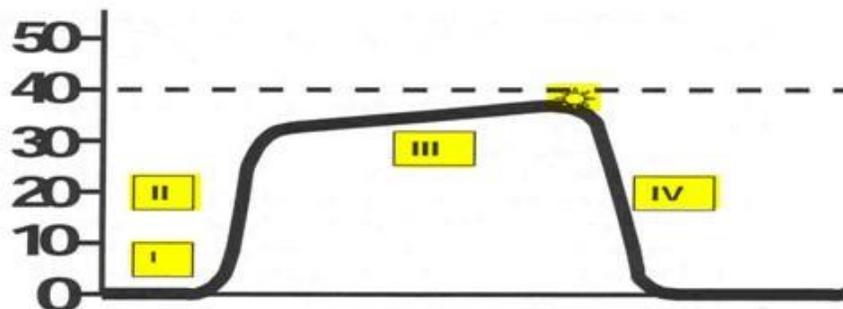
**30 – 35 mmHg = Hyperventilation**

**< 30 mmHg = Aggressive hyperventilation. This should be avoided in all patients!**

3. If there are signs of traumatic brain injury (TBI) and herniation then MILD hyperventilation to an ET<sub>CO<sub>2</sub></sub> of 35 may be performed.

### **NOTES & PRECAUTIONS:**

- A. **Remember, pulse oximetry does not equate ventilation.** You can have a poorly ventilated patient displaying an oxygen saturation of 100%. Excessively high PaCO<sub>2</sub> levels can be detrimental to your patient's outcome.
- B. A sudden drop in CO<sub>2</sub> output from normal (35-40 mmHg) to 15-20 mmHg and an obvious change in waveform is indicative of tube displacement, most likely into the hypopharynx. Re-assess tube placement immediately and take corrective action.
- C. **DO NOT** rely on pulse oximetry or ET<sub>CO<sub>2</sub></sub> monitoring solely to determine the efficacy of intubation.



- **PHASE I:** Respiratory Baseline, CO<sub>2</sub> free dead space air, normally 0.
- **PHASE II:** Expiratory Upstroke, rapid rise due to mixing of dead space air and alveolar air, should be steep.
- **PHASE III:** Expiratory Plateau, exhalation of mostly alveolar air
- : Peak Et CO<sub>2</sub> Level, end of exhaled air, peak end tidal CO<sub>2</sub> level, normally 35-45mmHg
- **PHASE IV:** Inspiratory Downstroke, inhalation of CO<sub>2</sub> free gas, quickly returns to the baseline.

## Intranasal Medication Administration – 30.078

### DEFINITION:

In the absence of an established IV, intranasal is a rapid route offering high level of bioavailability of the medication being administered. The intranasal route can reduce the risk of needle sticks while delivering effective medication levels. The rich vasculature of the nasal cavity provides a direct route into the bloodstream for medications that easily cross the mucous membranes.

### INDICATIONS:

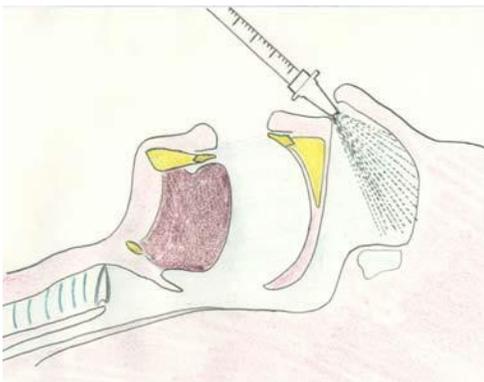
- A. Patient without IV access requiring urgent medication administration (e.g., active seizure, respiratory arrest secondary to opiate overdose)
- B. Alternate administration route for fentanyl administration for pain management.

### CONTRAINDICATIONS:

- A. Epistaxis
- B. Nasal Trauma
- C. Nasal septal abnormalities
- D. Nasal congestion or discharge

### PROCEDURE:

- A. Patient should be in a supine or recumbent position. If the patient is sitting, then compress the nares after administration.
- B. Draw up medication into a syringe using appropriate transfer device.
- C. Remove air from syringe
- D. Remove transfer device and place atomizer onto syringe and confirm it is secure.
- E. Administer medication by briskly compressing the plunger to expel and atomize the medication administering a maximum of 1cc of solution per nare.
- F. Evaluate medication effectiveness and continue with treatment protocol



## DEFINITION:

Intraosseous cannulation is an alternative technique for establishing IV access in critical adult and pediatric patients when peripheral IV access is difficult or time-sensitive.

## INDICATIONS:

- A. Intraosseous infusion is indicated in emergency situations when life-saving fluids or drugs should be administered and IV cannulation is difficult, impossible or too time-consuming to perform.
- B. If a peripheral IV cannot be established after two attempts or within 60–90 seconds of elapsed time *and* in:
- C. Adult and pediatric patients, within the proper weight range, who present with one or more of the following clinical conditions:
  1. Cardiac arrest.
  2. Hemodynamic instability (BP <90 mmHg and clinical signs of shock).
  3. Imminent respiratory failure
  4. Status epilepticus with prolonged seizure activity greater than 10 minutes, and refractory to IM anticonvulsants. Hemodynamic instability (BP <90 mmHg and clinical signs of shock).
  5. Toxic conditions requiring immediate IV access for antidote.
- D. IO placement may be considered prior to peripheral IV attempts in cases of cardiopulmonary or traumatic arrest, in which it may be obvious that attempts at placing an IV would likely be unsuccessful and or too time consuming, resulting in a delay of life-saving fluids or drugs.

## EZ-IO™ PROCEDURE:

- A. Determine patient's weight.
- B. Assemble all necessary equipment
  1. The Standard (25 mm) EZ-IO® needle can be utilized on patients who weigh  $\geq 3$  kg
  2. The EZ-IO 15 mm® needle should be used on patients who weigh between 3–39 kg (approximately 6–87 lbs.).
- C. Site Selection (patient's weighing  $\geq 40$  kg).
  1. Proximal Humerus (**primary site**)
    - a) Insertion site is located directly on the most prominent aspect of the greater tubercle. Slide thumb up the anterior shaft of the humerus until you feel the greater tubercle, this is the surgical neck. Approximately 1 cm (depending on patient anatomy) above the surgical neck is the insertion site.
    - b) Ensure that the patient's hand is resting on the abdomen and that the elbow is adducted (close to the body).
  2. Tibial (**secondary site**)
    - a) Palpate the landmarks at the proximal tibia (patella and tibial tuberosity).
    - b) Insertion site should be approximately one finger width to the medial side of the tibial tuberosity.
    - c) An alternate site may be used at the distal tibia, two finger widths proximal to the medial malleolus along the midline of the tibia.

### D. Needle Insertion

1. Prep the surface with Betadine® and wipe dry with a sterile gauze pad.
2. Stabilize patient's leg or shoulder and begin insertion from a 90-degree angle to the plane of the insertion site. Push the needle set through the skin until the tip touches the bone. At least one black line (5 mm) must be visible outside the skin to assure adequate needle length.
3. Gently advance the needle set into position—do not force. Stop when you feel the “pop” on smaller patients.
4. When needle is in proper position, remove stylet (if insertion fails, leave the needle in place and clamp the EZ-Connect; do not attempt second insertion on same leg).
5. Connect extension tubing or EZ-Connect, primed with saline, to IO hub.
6. Confirm the catheter position (catheter is stable at a 90-degree angle to the bone, able to aspirate blood, and fluids flow without evidence of extravasation).
7. Rapid bolus or “power” flush with approximately 10 ml normal saline when using the EZ-IO AD® needle, and 5 ml normal saline when using the EZ-IO PD® needle.
8. Connect IV tubing and bag to extension tubing or EZ-Connect.
9. Consider additional bolus of saline if flow rates slower than expected.
10. Utilize a blood pressure cuff or pressure bag to help infuse fluids.
11. Dress site, secure tubing, and apply wristband.

### DI. Pain Management

1. If the procedure is performed on a conscious patient, immediately following placement of the IO needle, administer 0.5 mg/kg 2% lidocaine (not to exceed 50 mg) *slowly* through the IO site. Wait approximately 30–60 seconds before flushing with normal saline.
2. In the event a patient regains consciousness and complains of severe pain secondary to the IO insertion, temporarily stop infusing the fluids, and administer lidocaine as in E.1 above. Wait approximately 30–60 seconds before continuing fluid administration.
3. If fluids do not flow freely, flush IO site with an additional 10 cc normal saline.

### **PEDIATRIC EZ-IO™ PROCEDURE (patients weighing 3-39 kg)**

- A. Assemble all equipment. The EZ-IO PD® should be used on patients who weigh between 3-39 kg (approximately 6-87 lbs.)
- B. Site Selection (Patients weighing 3-39 kg)
  1. Palpate the landmarks at the proximal tibia (patella and tibial tuberosity).
  2. Insertion site should be one finger width below the tibial tuberosity, then medial along the flat aspect of the tibia.
  3. If the tibial tuberosity cannot be identified on the child, then the insertion site may be two finger widths below the patella, then medial along the flat aspect of the tibia.

### C. Needle Insertion

1. Prep the surface with Betadine and wipe dry with a sterile gauze pad.
2. Stabilize patient's leg and begin insertion from a 90-degree angle to the plane of the tibial plateau . Push the needle set through the skin until the tip touches the bone. At least one black line (5 mm) must be visible outside the skin to assure adequate needle length.
3. Gently advance the needle set into position—do not force. Stop when you feel the “pop.”
4. When needle is in proper position, remove stylet (if insertion fails, leave the needle in place and clamp the EZ-Connect; do not attempt second insertion on same leg).
5. Connect extension tubing or EZ-Connect, primed with saline, to IO hub.
6. Confirm the catheter position (catheter is stable at a 90-degree angle to the bone, able to aspirate blood, and fluids flow without evidence of extravasation).
7. Rapid bolus or “power” flush with approximately 5 ml normal saline when using the EZ-IO PD<sup>®</sup> needle.
8. Connect IV tubing and bag to extension tubing or EZ-Connect.
9. Consider additional bolus of saline if flow rates slower than expected.
10. Utilize a blood pressure cuff or pressure bag to help infuse fluids.
11. Dress site and secure tubing.

### **PEDIATRIC PROCEDURE WITH MANUAL IO DEVICE:**

- A. Assemble equipment
  1. Approved bone marrow needles, 15 or 18-gauge size
  2. Betadine<sup>®</sup> swabs
  3. Two small syringes (3-5cc)
  4. One large Luer-lock<sup>®</sup> syringe (35-50cc)
  5. Flush solution
  6. Sterile gauze pads and tape
- B. Site Selection – Proximal tibia. Palpate the landmarks and note the entry point that is the anteromedial flat surface 1-3 cm below the tibial tuberosity.
- C. Prep the surface with Betadine<sup>®</sup> and wipe dry with a sterile gauze pad.
- D. Needle Insertion
  1. Insert the needle at the proximal tibial site, directing the needle caudally. The needle should penetrate the skin and subcutaneous tissue and be pushed through the cortex of the bone using rotation (avoid rocking the needle) until a “pop” or loss of resistance is felt.
  2. Confirm placement of the needle by:
    - a. Firm fixation of the needle and free aspiration of marrow/blood.
    - b. Infusion of 2-3 cc of NS, palpating for extravasation or noting significant resistance. If extravasation occurs, further attempts at the site should be avoided.
    - c. It is not always possible to aspirate blood/marrow but the line may be patent.
- E. Tape and secure IO needle firmly in place.

## Intraosseous Access & Infusion - 30.080

### F. Start Infusion

1. Although gravity drainage may suffice, pressurized infusions may be needed during resuscitation.
2. When infusing medications via an IO route, pressure must be applied to the fluid bag in order to maintain flow rates. The EMT must continually monitor the rate of infusion.

### **CONTRAINDICATIONS:**

- A. Fracture of the bone selected for IO insertion.
- B. Previous significant orthopedic procedures (IO within 24 hours, prosthesis)
- C. Infection at the site of insertion.
- D. Excessive tissue at insertion site with the absence of landmarks.

### **NOTES & PRECAUTIONS:**

- A. Osteomyelitis, growth plate injury (in pediatric patients), and extravasation of fluid with compression of popliteal vessels or the tibial nerve may occur.
- B. Airway and breathing should be established first in accordance with other protocols.
- C. Do not perform more than one attempt in each tibia.
- D. Any ALS medication may be administered IO.
- E. Do not give Hypertonic Saline through an IO line.

### INDICATIONS:

- A. Normal Saline is indicated for replacement of fluid volume losses such as in trauma, burns, dehydration, or shock.
- B. A saline lock may be substituted for an IV line in all situations, except where IV fluid is the therapy of choice for volume replacement. If an IV line is started it should be a regular macro drip unless otherwise indicated.

### PROCEDURE FOR IV ACCESS:

- A. IV access:
  - 1. Select vein and appropriate gauge catheter for the vein according to the patient's condition.
  - 2. Prep the skin with an antiseptic solution. If using 2% chlorhexidine allow to dry before covering with dressing.
  - 3. Insert the needle with the bevel up.
  - 4. Advance the catheter into the vein. Never reinsert the needle through the catheter.
  - 5. Remove tourniquet.
  - 6. Connect IV line or saline lock. For trauma system and burn patients, connect extension set between the IV hub and the solution bag and tubing.
  - 7. Assure free flow of the fluid.
  - 8. Cover the site with a sterile dressing.
  - 9. Label the IV with date and time, catheter gauge, and name/ID of the person starting the IV.
  
- B. IV access with a saline lock:
  - 1. Establish IV access as above.
  - 2. Connect pre-flushed extension set to IV hub.
  - 3. Flush with normal saline checking for extravasation.
  - 4. If the IV lock system is used for the administration of medication, the line must be flushed after each administration.

### PROCEDURE FOR IV MEDICATION INFUSION:

- A. Using a Buretrol®, Volutrol®, or Soluset® volume control type device:
  - 1. Establish IV access and prepare solution.
  - 2. Connect the volume control device between the IV bag and the IV catheter.
  - 3. Place one hour's solution into the chamber and close the connection between the volume control device and the IV bag.
  - 4. Begin infusing solution at the appropriate rate.
  - 5. If necessary, additional solution may be placed in the volume control device chamber.
  - 6. Do not place more than one hours' worth of solution in the chamber.
  
- B. Using an infusion pump:
  - 1. Establish IV access and prepare solution.
  - 2. Connect IV tubing to infusion pump according to manufacturer's directions.
  - 3. Begin infusing solution at the appropriate rate.

## Intravenous Access & Infusion – 30.090

### NOTES & PRECAUTIONS:

- A. Normal Saline should be used with caution in patients with renal impairment (hyperkalemia), cardiac and respiratory disorders (fluid overload), or extremes of age.
- B. Avoid having the tourniquet on longer than two minutes as this can result in hemolysis and vasospasm in the extremity.
- C. If possible, avoid wrist area as shown below secondary to possible radial nerve damage.
- D. If patient has had a mastectomy or lymphectomy, avoid start IV on that side as there is an increased risk of complications to the patient.

### IV CATHETER FLOW RATES:

SIZE	ML/Min
18G x 1 1/4"	110
20G x 1"	65
20G x 1 1/4"	63
22G x 1"	38
24G x 5/8"	24

### AVOID IV START IN THIS AREA:



## Induced Hypothermia – 30.102

### **PURPOSE:**

To define the procedures for inducing hypothermia following post-resuscitation from sudden cardiac arrest, with the aim to reduce the patient's body temperature to 33 – 36 degrees C.

### **INDICATIONS (Must meet all indications):**

- A. Patients with return of spontaneous circulation (ROSC)
- B. Unconscious and without purposeful response to pain or verbal stimuli.
- C. Systolic BP  $\geq$  100 mmHg (may use pressors to maintain pressure)

### **CONTRAINDICATIONS:**

- A. Age < 13 years old.
- B. Traumatic cardiac arrest or suspected significant hemorrhage.
- C. Hypothermia already present.
- D. Pulmonary edema.
- E. Known pregnancy.
- F. Refractory or recurrent VF/VT, 2<sup>nd</sup> or 3<sup>rd</sup> degree heart blocks.

### **COOLING METHODS:**

- A. Exposure combined with ice packs, and/or
- B. Chilled normal saline (NS); stored at a temperature of approximately 4 degrees C (39 F)

### **PROCEDURE:**

- A. Remove patient's clothing (undergarments may remain in place)
- B. Obtain 12-lead ECG if feasible. If STEMI is identified, follow STEMI protocol.
- C. Cooling can be initiated with ice packs applied to the groin and axilla (wet towels may be used along with ice packs). Alternatively, consider infusion of up to 1 liter of chilled normal saline.
- D. Do not administer medications at the same time through the same IV line as the chilled saline. If patient begins to shiver, move, or have an increased level of consciousness administer midazolam 2.5 - 5 mg IV/IO if systolic BP is  $\geq$  100 mmHg. Repeat as necessary to maintain sedation.

# King Airway® Placement – 30.105

**DEFINITION:**

The KING LT-D is a disposable supraglottic airway created as an alternative to tracheal intubation or mask ventilation. The KING LT-D is designed for positive pressure ventilation as well as for spontaneously breathing patients.

**INDICATIONS:**

Use of the King LTD airway is indicated if endotracheal intubation cannot be performed and the patient needs a secure airway.

**CONTRAINDICATIONS:**

- A. Intact gag reflex
- B. Airway obstruction.
- C. Patients under 3 feet in height.
- D. Known or suspected caustic ingestion.
- E. Known esophageal disease.

**PROCEDURE:**

- A. Attach pulse oximeter and monitor oxygen saturation.
- B. If vomitus, blood or other foreign material is present in the hypopharynx, rapid and aggressive suctioning and/or manual removal must be done prior to placement of the King Airway.
- C. Ventilate with BVM to optimize oxygen saturation prior to King LTD intubation especially if several endotracheal intubations were attempted.
- D. Estimate patient's height (for sizing of King LTD airway) and select proper tube size.

Type	LTD	LTD	LTS-D	LTS-D	LTS-D
Size	2	2.5	3	4	5
Tube Color	Green	Orange	Yellow	Red	Purple
Patient Height	3-3.5 feet	3.5 feet	4-5 feet	5-6 feet	Greater than 6 feet
Inflation Volume	25-35 mL	30-40 mL	40-55 mL	50-70 mL	60-80 mL
Age	4-8 years	5-10 years	Adult		

- E. Lubricate the posterior distal end of the King Airway with a water-soluble gel.
- F. Place patients head into a “sniffing” position. If suspected or potential cervical spine injury keep patients head in neutral position during insertion.
- G. Using a midline approach, introduce tip into mouth and advance behind base of tongue. The blue orientation line on the tube should face the chin of the patient.
- H. Without using excessive force, advance tube until the base of the connector is aligned with the teeth and/or gums. Never force the tube into position.
- I. Inflate the cuff using the appropriate volume of air (see table above).

- J. Attach bag valve device to the tube with supplemental oxygen. While gently bagging the patient to assess ventilation, simultaneously withdraw the King Airway until ventilation is easy and free-flowing (large tidal volume with minimal airway pressure).
- K. Listen for lung sounds in both lung fields and over epigastrium.
- L. As soon as feasible, secure the King Airway with an endotracheal tube holder.
- M. Monitor oxygen saturation, chest rise, and attach continuous ETCO2 monitor.
- N. After successful placement, continue to monitor for adequate ventilations and possible displacement or cuff failure.

### **SUCTIONING THROUGH THE KING LTS-D:**

- A. Use of the gastric access lumen for suctioning and removal of stomach contents will be at the discretion of the user.
- B. Attach a maximum size 18 Fr suction catheters to a portable suction unit
- C. If necessary, lubricate the catheter with a water-soluble gel.
- D. Insert the suction catheter into the opening of the gastric access lumen, and advance to the maximum depth.
- E. Turn on suction unit and maintain continuous suction until there is no further return of stomach contents.
- F. After detaching suction unit, the catheter may be left in place to prevent any additional stomach contents from being expelled from the gastric access lumen.
- G. If active suctioning is not performed, a suction catheter may be placed in the gastric access lumen to act as a passive vent, and to prevent stomach contents from being expelled from the lumen.

### **NOTES & PRECAUTIONS:**

- A. It is important that the tip of the device be maintained in the patient's midline. Keeping the tip at midline assures that the distal tip is properly placed in the hypopharynx and upper esophagus.
- B. Depth of insertion is key to providing a patent airway. A shallow initial insertion will require deflation of the cuffs to advance the tube deeper.
- C. It is extremely important to open the airway and ensure that the tip of the King Airway advances past the base of the tongue.
- D. The King LTD device is not designed to ventilate the patient if placed in the trachea. If unable to ventilate the patient after placement deflate balloons and adjust depth of tube to optimize ventilation

### Background:

Left ventricular assist devices (LVADs) are designed to assist the pumping function of the patient's left ventricle. Both the Heartware HVAD<sup>®</sup> and Heartmate II<sup>®</sup> devices attach to the apex of the left ventricle (pump inflow) and propel blood to the ascending aorta (pump outflow). Both devices utilize an external wearable system that includes a small controller connected to the internal pump by an external driveline and is powered by two batteries. Both may also be "plugged in" to 110 or 12 V power, depending on the device. When managing an LVAD patient, follow these general assessment guidelines.

### Assessing patient with LVAD:

1. Establish airway and provide supplemental oxygen if any respiratory signs or symptoms are present.
2. **If a patient with an LVAD is having a medical emergency, it does not necessarily mean that it is a device issue. Consider the whole clinical picture and perform a thorough patient assessment, including device function. Infection, volume depletion, stroke, bleeding, and dysrhythmias may be the cause of patient's symptoms. Most LVAD patients are anticoagulated and are at risk for bleeding complications.**
3. Auscultate heart sounds to determine if the device is functioning. Both the Heartware HVAD<sup>®</sup> and Heartmate II<sup>®</sup> are continuous flow devices and you should hear a "whirring" sound". Because these devices diminish pulsatile flow in the circulation, peripheral pulses may not be palpable. Assess other signs of circulation—capillary refill, absence or presence of dizziness, temp/ moisture of skin, end-tidal CO<sub>2</sub>, and mental status to determine perfusion status.
4. Standard blood pressure devices may not work. If unable to obtain a blood pressure consider using the following, if available, to estimate perfusion pressure:
  - A. End-Tidal CO<sub>2</sub> - Expected values should be between 35 – 45 mmHg.
  - B. Doppler cuff pressure - Estimates the mean arterial pressure. The goal range for Doppler MAP is > 60 and less than 90.
  - C. Other clinical signs – Capillary refill, mental status.
5. Locate the device to identify which type is in place and follow the device specific troubleshooting guidelines. Intervene appropriately based on the type of alarm and device.
6. Start Large Bore IV and treat with fluids as needed.
7. Pulse oximetry may not be accurate due to the continuous flow nature of the device. You may not get an accurate reading in the field.
8. Your cardiac monitor **will** work, and a reliable EKG may be obtained. Because the LVAD creates continuous flow independent of left heart function, not all arrhythmias will be symptomatic, including ventricular arrhythmias. If a patient requires defibrillation, leave the pump running and all components in place. The LVAD does not interfere with electrical conduction. In general, LVAD patients also have an AICD/Pacemaker. Do not place defibrillation pads directly over the pump or AICD/Pacemaker (consider anterior/posterior placement).

## Left Ventricular Assist Devices LVAD – 30.107

9. All ACLS medications may be administered if necessary.
10. **DO NOT PERFORM CHEST COMPRESSIONS UNLESS INSTRUCTED BY THE VAD CENTER.**

### Transporting an LVAD patient:

1. Transport to closest LVAD center. **Call the number on the device to get advice from the LVAD Coordinator on call.**
2. Follow the advice of the LVAD Coordinator for troubleshooting the device. For all other concerns contact OLMC.
3. The patient must be supported by battery power. **Remember to also transport the backup controller and the spare batteries.**
4. The controller should be kept close to the patient, and care taken to not kink the leads.
5. If removing or cutting patients clothing is necessary, use caution as not to sever the driveline.
6. Do not put external pressure on any area of the LVAD system.
7. Place gurney straps underneath the leads, and keep the batteries easily accessible.
8. Allow the trained caregiver to ride in the transport vehicle if possible to act as an expert on the device in the absence of consciousness in the patient.
9. Bring all of the patient's equipment.

### Potential LVAD hazards with EMS response:

LVAD patients who are anticoagulated have a higher risk of bleeding and hemorrhage. They should remain on anticoagulant therapy. There are no valves on an LVAD, so there is the risk of retrograde flow and stagnation of blood if the device stops, or flow is impeded. These patients are very pre-load and afterload dependent, so hypovolemia can have a profound effect. If a patient is **hypertensive**, flow through the device may be reduced.

## Trouble Shooting HeartMate II® with Pocket Controllers When the Pump Has Stopped

- Be sure to bring ALL of the patient's equipment with them.
- Fix any loose connection(s) to restart the pump.
- If the pump does not restart and the patient is connected to batteries replace the current batteries with a new, fully-charged pair. (see *changing batteries* section on next page)
- If pump does not restart, change controllers. (see *changing controllers* section on next page)

### Alarms: Emergency Procedures



**Yellow or Red Battery Alarm:** Need to Change Batteries. See changing batteries section on next page.



**Red Heart Flashing Alarm:** This may indicate a Low Flow Hazard. Check patient--the flow may be too low. If patient is hypovolemic, give volume. If patient is in right heart failure-- treat per protocol. If the pump has stopped check connections, batteries and controllers as instructed in the section above.



### Changing Batteries

**WARNING:** At least one power lead must be connected to a power source AT ALL TIMES. Do not remove both batteries at the same time or the pump will stop.

- Obtain two charged batteries from patient's accessory bag or battery charger. The charge level of each gray battery can be assessed by pressing the battery button on the battery. (Figures 1 and 2)
- Remove only **ONE** battery from the clip by pressing the button on the grey clip to unlock the battery. (Figure 3)

- Controller will start beeping, flash yellow signals and will read **power disconnect** on the front screen.
- Replace with new battery by lining up **RED** arrows on battery and clip. (Figure 4)
- Slide a new, fully-charged battery (Figure 2) into the empty battery clip by aligning the **RED** arrows. The battery will click into the clip. Gently tug at battery to ensure connection. If battery is properly secured, the beeping and yellow flashing will stop.
- Repeat previous steps with the second battery and battery clip.



## Changing Controllers

- Place the replacement Controller within easy reach, along with the batteries/battery clips. The spare Controller is usually found in the patient's travel case.

- Make sure patient is sitting or lying down since the pump will momentarily stop during this procedure.

- Attach the battery clips to the spare controller by lining up the half moons and gently pushing together and attach the batteries to the spare controller by aligning the **RED** arrows.



- On the back of the replacement controller, rotate down the perc lock so the red tab is fully visible. Repeat this step on the original controller until the red tab is fully visible.
- Disconnect the drive line from the original controller by pressing down on the red tab and gently pulling on the metal end. The pump will stop and an alarm will sound. **Note:** The alarm will continue until the original controller is put to sleep. You can silence the alarm by holding down the silence button. **Getting the replacement controller connected and pump restarted is the first priority.**

- Connect the replacement Controller by aligning the **BLACK ARROWS** on the driveline and replacement Controller and gently pushing the driveline into the replacement Controller. The pump should restart, if not complete the following steps:



- Step 1.** Firmly press the Silence Alarm or Test Select Button to restart the pump.

- Step 2.** Check the powersource to assure that power is going to the controller.

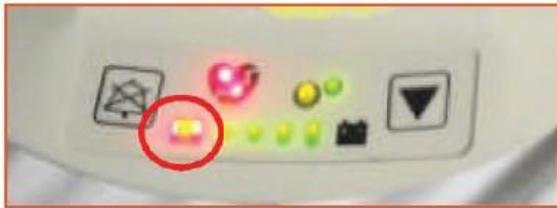
- Step 3.** Assure the perc lead is fully inserted into the socket by gently tugging on the metal end. **DO NOT** pull the lead.

- After the pump restarts, rotate up the perc lock on the new controller so the red tab is fully covered. If unable to engage perc lock to a fully locked position, gently push the driveline into the controller to assure proper connection. Retry to engage perc lock.
- Disconnect power from the original Controller. The original Controller will stop alarming once power is removed.
- Hold down battery symbol for 5 full seconds for complete shutdown of old controller.

## Trouble Shooting HeartMate II® When the Pump Has Stopped

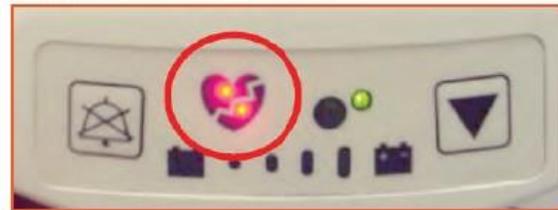
- Be sure to bring ALL of the patient's equipment with them.
- Fix any loose connection(s) to restart the pump.
- If the pump does not restart and the patient is connected to batteries replace the current batteries with a new, fully-charged pair. (see *changing batteries section on next page*)
- If pump does not restart, change controllers. (see *changing controllers section on next page*)

### Alarms: Emergency Procedures



**Yellow or Red Battery Alarm:** Need to Change Batteries. See changing batteries section on next page.

**Red Heart Flashing Alarm:** This may indicate a Low Flow Hazard. Check patient—the flow may be too low. If patient is hypovolemic, give volume. If patient is in right heart failure-- treat per protocol. If the pump has stopped check connections, batteries and controllers as instructed in the section above.



### Changing Batteries

**WARNING:** At least one power lead must be connected to a power source **AT ALL TIMES**. Do not remove both batteries at the same time or the pump will stop.

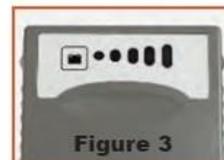
- Obtain two charged batteries from patient's accessory bag or battery charger. The charge level of each gray battery can be assessed by pressing the battery button on the battery. (Figures 3 and 4)
- Remove only **ONE** battery from the clip by pressing the button on the grey clip to unlock the battery. (Figure 1)
- Controller will start beeping and flashing green signals.
- Replace with new battery by lining up **RED** arrows on battery and clip. (Figure 2)
- Slide a new, fully-charged battery (Figure 4) into the empty battery clip by aligning the **RED** arrows. The battery will click into the clip. Gently tug at battery to ensure connection. If battery is properly secured, the beeping and green flashing will stop.
- Repeat previous steps with the second battery and battery clip.



**Figure 1**



**Figure 2**



**Figure 3**



**Figure 4**

## Changing Controllers

- Place the replacement Controller within easy reach, along with the batteries/battery clips. The spare Controller is usually found in the patient's travel case.
- Make sure patient is sitting or lying down since the pump will momentarily stop during this procedure.
- Attach the battery clips to the spare controller by lining up the half moons and gently pushing together and attach the batteries to the spare controller by aligning the **RED** arrows. **ALARMS WILL SOUND-THIS IS OK.**
- Depress the silence alarm button (upside-down bell with circle) until the alarm is silenced on the new, replacement Controller.
- Rotate the perc lock on the replacement controller in the direction of the "unlocked" icon until the perc lock clicks into the fully- unlocked position. Repeat this same step for the original Controller until the perc lock clicks into the unlocked position.
- Disconnect the perc lead/driveline from the original controller by pressing the metal release tab on the connector socket. The pump will stop and an alarm will sound.



**Note:** The alarm will continue until power is removed from the original Controller. **Getting the replacement Controller connected and the pump restarted is the first priority.**

- Connect the replacement Controller by aligning the **BLACK LINES** on the driveline and replacement Controller and gently pushing the driveline into the replacement Controller. The pump should restart, if not complete the following steps:

- Step 1.** Firmly press the Silence Alarm or Test Select Button to restart the pump.
- Step 2.** Check the powersource to assure that power is going to the controller.

- Step 3.** Assure the perc lead is fully inserted into the socket by gently tugging on the metal end. **DO NOT** pull the lead.



- After the pump restarts, rotate the perc lock on the new controller in the direction of the "locked" icon until the perc lock clicks into the fully-locked position. If unable to engage perc lock to the locked position, gently push the driveline into the controller to assure a proper connection. Retry to engage perc lock.
- Disconnect power from the original Controller. The original Controller will stop alarming once power is removed.

JANUARY 2015

## HeartWare® Ventricular Assist System Emergency Operation



### ALARM ADAPTER

- Used to silence the internal NO POWER ALARM.
- Should only be used on a controller that is NOT connected to a patient's pump.
- Must be inserted into the blue connector of the original controller after a controller exchange BUT before the power sources are disconnected or the NO Power alarm will sound for up to two hours.



### DRIVELINE CONNECTION

To Connect to Controller:

- Align the two red marks and push together. An audible click will be heard confirming proper connection. (Figure A)
- The Driveline Cover must completely cover the Controller's silver driveline connector to protect against static discharge. (Figure B)
- NOTE: an audible click should be heard when connecting the Driveline or Driveline extension to the controller. Failure to use the Driveline Cover may cause an Electrical Fault Alarm.



Figure A

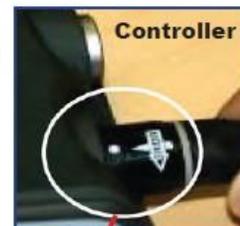


Figure B

### CONNECTING POWER TO CONTROLLER

To Connect a Charged Battery:

- Grasp the cable of the charged battery at the back end of the connector (leaving front end of connector free to rotate)
- Line up the solid white arrow on the connector with the white dot on the Controller.
- Gently push (but DO NOT twist) the battery cable into the Controller until it naturally locks into place; you should hear an audible click.
- Confirm that the battery cable is properly locked on the controller by gently pulling the cable near the controller power connector.
- DO NOT force the battery cable into the controller connector without correct alignment as it may result in damaged connectors.



Controller

### TO DISCONNECT A DEPLETED BATTERY

- Make sure there is a fully charged battery available to replace the depleted one.
- Disconnect the depleted battery by turning the connector sleeve counterclockwise until it stops.
- Pull the connector straight out from the controller.



## HeartWare® Ventricular Assist System Emergency Operation

### STEPS TO EXCHANGE THE CONTROLLER

**Step 1:** Have the patient sit or lie down.

**Step 2:** Place the new controller within easy reach.

**Step 3:** Connect back-up power sources (batteries or AC Power) to the new controller.

- Confirm that the power cables are properly locked on the controller by gently pulling on the cable near the connector.
- A "Power Disconnect" alarm will activate if a second power source is not connected to the new controller within 20 seconds of controller power up
- A "VAD Stopped" alarm will activate if the pump driveline is not connected to the new controller within 10 seconds - this alarm will resolve once the pump driveline is connected

**Step 4:** Pull back the white driveline cover from the original controller's silver connector.

**Step 5:** Disconnect the driveline from the original controller by pulling the silver connector away from the controller. Do not disconnect by pulling on the driveline cable. A "VAD Stopped" alarm may activate. Don't panic. You can silence the alarm after restarting the pump, which is the priority.

**Step 6:** Connect the driveline to the new controller (align the two red marks and push together). If the "VAD Stopped" alarm was active on the new controller, it will now resolve.

**Step 7:** The pump should restart. Verify the pump is working (RPM, L/min, Watts).

**Step 8: IF THE PUMP DOES NOT RESTART, CALL FOR MEDICAL ASSISTANCE IMMEDIATELY.**

**Step 9:** Insert the Alarm Adapter into the blue connector on the original controller.

- Disconnect both power sources from the original controller.
- The controller will be turned off and all alarms silenced.

**Step 10:** Slide the white driveline cover up to cover new controller's silver connector.

**Step 11:** Contact the VAD Center or Implanting hospital for a new backup controller.



**Step 3**



**Step 4**



**Step 6**



**Step 9**



**Step 10**

## Orogastric Tube Insertion and Maintenance – 30.115

### **Overview:**

While a patient is being ventilated with a BVM, trapped air can gather in the stomach increasing the risk of vomiting and aspiration. In addition, an enlarged stomach pushes against the diaphragm to increase intrathoracic pressure, decrease venous return and interferes with lung ventilation.

### **Indications:**

- To alleviate gastric distention, reduce aspiration and facilitate ventilation in intubated patients.

### **Contraindications:**

- Known alkali or acid ingestion
- Known esophageal varices
- Esophageal obstruction
- Suspected epiglottitis or croup

### **Procedure:**

1. Assemble equipment:
  - Proper size orogastric tube
  - Lubricant
  - 30 or 60 cc syringes
  - Suction unit

<b>Gastric Tube Size Guide</b>	
<b>Age</b>	<b>Size</b>
Less than 1 year	Refer to Pediatric Guide
1 yr to 16 yrs	10 – 14 French
Older than 16 yrs	Up to 18 French

2. With patient's head in a neutral position measure tube length from xiphoid process to angle of jaw to corner of the mouth. Place a mark on the tube to indicate how far to advance the tube.
3. Lubricate end of tube; about 3-4 inches
4. Gently insert tube and advance toward posterior oropharynx.
5. For non-traumatic patients, repositioning the head into a slightly flexed forward position may facilitate OG tube passage past the hypopharynx and into stomach.
6. Continue to insert tube to the measured mark). Secure tube with tape

## Orogastric Tube Insertion and Maintenance – 30.115

7. Attach syringe to the distal end of the OG tube.
8. Confirm tube placement by placing stethoscope over epigastrium and auscultate while inserting 30-66 cc of air in tube. You should hear gastric gurgling.
9. Secure tube in place with tape
10. Place the tube to low continuous suction as needed, gastric contents should be visible in tubing.
11. Document tube size and depth; color, consistency and amount of gastric contents

### **Notes and Precautions:**

- OG tube placement can cause bradycardia
- Do not delay transport for this procedure
- Monitor oxygen saturation and end tidal CO<sub>2</sub> continuously

## Patellar Dislocation Reduction – 30.118

### INDICATIONS:

Isolated non-traumatic lateral patellar dislocation.

### CONTRAINDICATIONS:

- A. Direct traumatic mechanism of injury (impact directly to the knee).
- B. Any sign of associated patella fracture (crepitus).
- C. Any associated injury to same extremity (femur fracture, tibia/fibula fracture, pelvic fracture).

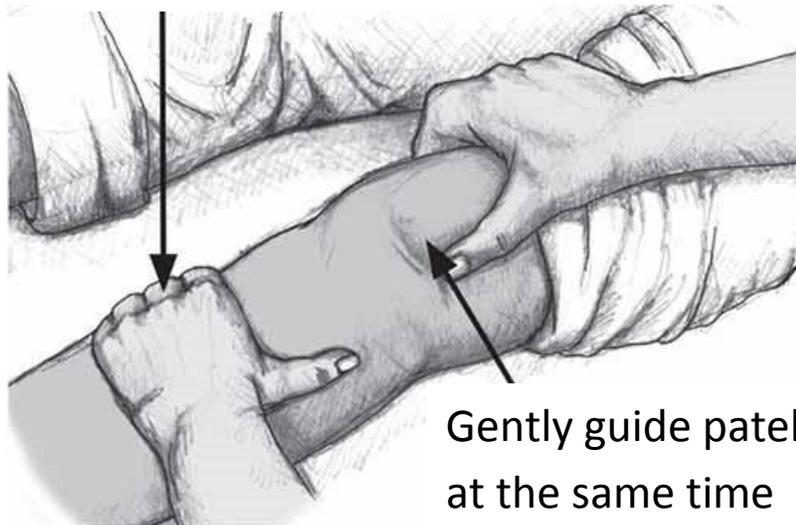
### PROCEDURE:

- A. Follow Pain Management protocol.
- B. Patient will usually present with the knee flexed and an obviously laterally displaced patella.
- C. Gently apply pressure to the lateral aspect of the patella (directing it medially) while extending the leg.

### NOTES & PRECAUTIONS:

- A. Reductions should not be attempted for medial dislocations, as these commonly have associated fractures.
- B. Patients should be splinted and transported regardless of success of reduction attempt. If a patient does not want transport after successful reduction, OLMC contact is mandatory as part of the refusal process.

Extend Leg



Gently guide patella in  
at the same time

### **PURPOSE:**

Physical and chemical restraint is used to protect the safety of patients and responders. Patient restraints should be utilized only when necessary and in those situations where the patient is exhibiting behavior that presents a danger to themselves and/or others.

### **PROCEDURE:**

#### **A. Physical Restraint Guidelines:**

1. Use the minimum level of physical restraints required to accomplish patient care and ensure safe transportation (Soft restraints may be sufficient). If law enforcement or additional manpower is needed, call for it prior to attempting restraint procedures. Do not endanger yourself or your crew.
2. Avoid placing restraints in such a way as to preclude evaluation of the patient's medical status.

#### **• Physical Restraint Procedure:**

1. Place patient face up on long backboard or gurney, NOT PRONE. Closely monitor the patient's respiratory status.
2. Secure ALL extremities to backboard or gurney. Try to restrain lower extremities first using restraints around both ankles. Next, restrain the patient's arms at his/her sides.
3. If necessary, utilize cervical spine precautions (tape, foam bags, etc.) to control violent head or body movements
4. If patient is backboarded, secure the backboard onto gurney for transport using additional straps if necessary. Remember to secure additional straps to the upper part of the gurney to avoid restricting the wheeled carriage.
5. Evaluate the patient's respiratory and cardiac status continually to ensure that no respiratory compromise exists. Monitor SpO<sub>2</sub> if possible.
6. DO NOT tighten chest straps to the point that they restrict breathing.

#### **B. Chemical Restraint Guidelines:**

Sedative agents may be needed to restrain the violently combative patient. These patients may include alcohol and/or drug-intoxicated patients and restless, combative, head-injury patients.

**Chemical Restraint Procedure:**

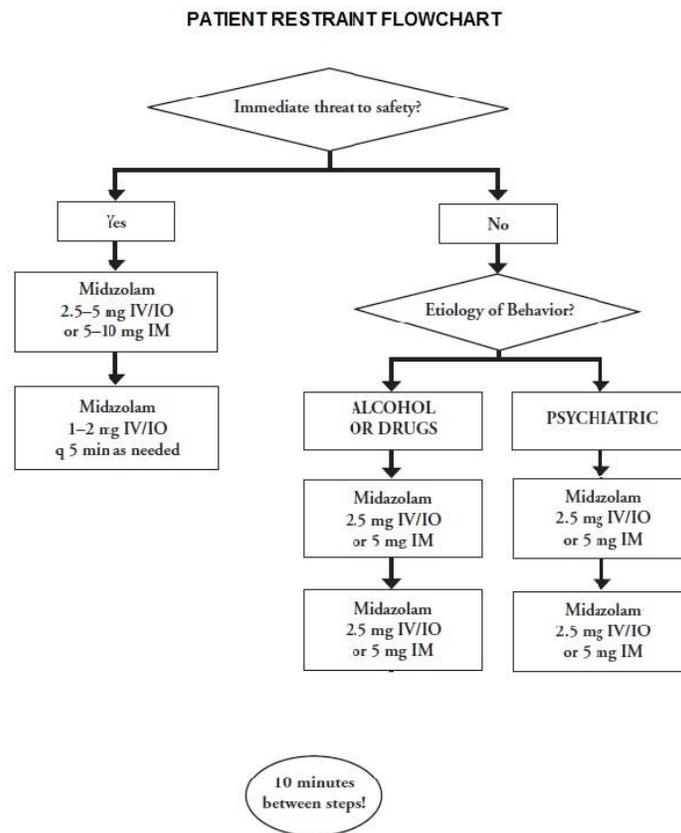
1. Evaluate the personnel needed to safely attempt restraining the patient.
2. If immediate threat to responders, bystanders or patient:
  - a. Administer midazolam (2.5 - 5 mg IV, IO or 5-10 mg IM)
  - b. Titrate midazolam 1-2 mg IV, IO as needed every 5 minutes to control agitation.
3. In all other situations, attempt to determine if the patient’s agitation is related to a drug/alcohol intoxication or withdrawal, medical or psychiatric problem.
4. If the cause of the patient’s agitation is likely due to a psychiatric disorder or unknown, administer medications in following sequence:

<i>Drug</i>	<i>Initial Dose</i>	<i>Repeat Dose in 10 min</i>	<i>Maximum Dose</i>
<b>Antipsychotic</b>			
Midazolam	2.5 mg IV or 5 mg IM	2.5 mg IV or 5 mg IM	5 mg IV or 10 mg IM
<b>Benzodiazepine* (see 7 below)</b>			
Midazolam	2.5 mg IV or 5 mg IM	2.5 mg IV or 5 mg IM	5 mg IV or 10 mg IM

5. If the cause of the patient’s agitation is likely drug ingestion (especially stimulants) or withdrawal or postictal state administer medications in following sequence:

<i>Drug</i>	<i>Initial Dose</i>	<i>Repeat Dose in 10 min</i>	<i>Maximum Dose</i>
<b>Benzodiazepine</b>			
Midazolam	2.5 mg IV or 5 mg IM	2.5 mg IV or 5 mg IM	5 mg IV or 10 mg IM
<b>Antipsychotic* (see 7 below)</b>			
Midazolam	2.5 mg IV or 5 mg IM	2.5 mg IV or 5 mg IM	5 mg IV or 10 mg IM

6. Consider and treat medical causes of combativeness (hypoxia, head injury, hypoglycemia)
7. If, 10 minutes after administration of the second dose (total of 20 minutes) the patient remains combative, contact OLMC for further advice.
8. Vital signs should be assessed within the first 5 minutes and thereafter as appropriate (at least every 10 minutes and before additional medication) if possible.
9. Monitor patients ECG, obtain 12-lead if possible.



## NOTES & PRECAUTIONS:

- A. Midazolam is preferred for patients who are known or suspected to be under the influence of stimulants or other intoxicants, who are in withdrawal, or who are postictal.
- B. OLMC is required for all pediatric patients**

### PURPOSE:

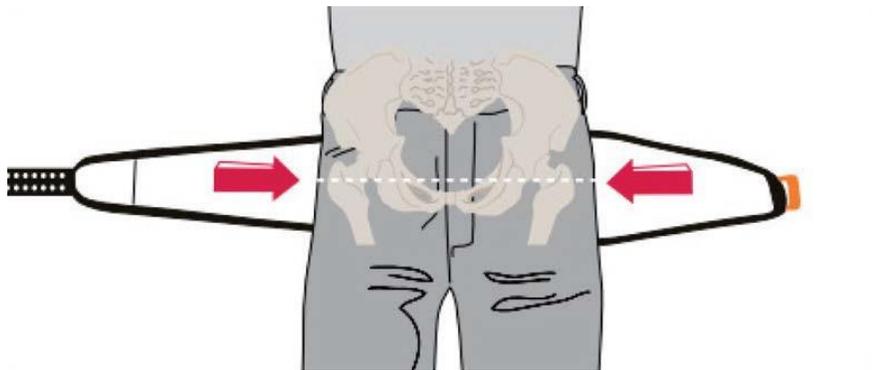
The initial reduction of an unstable pelvic fracture (to lessen ongoing internal bleeding and to ease the pain by splinting the fracture) using either a specifically applied sheet or another approved device.

### INDICATIONS:

- A. To be applied in all trauma patients who have appropriate mechanism(s) of injury and who present with pelvic instability.
- B. Consider pelvic wrap in trauma patients who have appropriate mechanism(s) of injury and who are in shock.

### PELVIC SLING PROCEDURE:

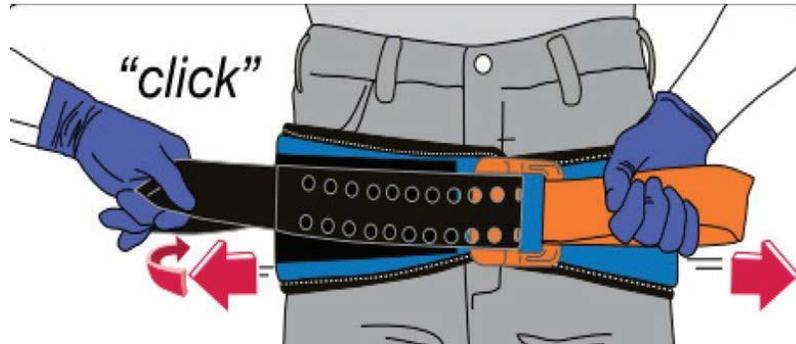
- A. Remove objects from patient's pocket or pelvic area. Place SAM Pelvic Sling gray side up beneath patient at level of trochanters (hips).



- B. Place BLACK STRAP through buckle and pull completely through.



- C. Hold ORANGE STRAP and pull BLACK STRAP in opposite direction until you hear and feel the buckle click. Maintain tension and immediately press BLACK STRAP onto surface of SAM Pelvic Sling to secure.



### PELVIC WRAP PROCEDURE:

- Fold the sheet smoothly lengthwise to about 9 inches wide (do not roll) and apply underneath the pelvis, centered on the greater trochanters. Assure the patient's pockets are empty (if applicable) to avoid placing pressure on the objects into the patient.
- Tighten the sheet around the pelvis and adjust the tension to try to return the pelvis to normal anatomical position.
- Secure using a knot or clamps if available.



### NOTES & PRECAUTIONS:

- Always re-check the position of the sheet (in terms of up and down). You should still be able to feel the anterior superior iliac spines after placement. If not, the sheet may be too high on the pelvis and must be repositioned.
- If the pelvis is unstable on initial exam, do not repeat the exam.
- Blood loss in a pelvic fracture can be significant. Monitor closely and treat per Shock Protocol.
- Consider placing prior to extrication from a vehicle if feasible.
- The pelvic sling/wrap is contraindicated for suspected isolated hip fractures, i.e., ground level falls.

A Peripherally Inserted Central Line (PICC) is a common method of maintaining long-term venous access in select patients. PICC lines are typically inserted into the antecubital fossa, and then threaded into central circulation. PICC lines are flushed with heparin to maintain patency and therefore it is imperative to aspirate 5 ml of blood from the line prior to use.

### INDICATIONS:

- A. PICC lines may be accessed when there is a need for drug or fluid administration and traditional means of venous access are unsuccessful.
- B. Patient or patient's caregiver requests use of PICC line.

### CONTRAINDICATIONS:

- A. Inability to aspirate or infuse through the catheter.
- B. Catheter located in any place other than the patient's upper arm.
- C. Need for rapid fluid resuscitation.

### PROCEDURE:

- A. Use clean gloves and maintain sterility as much as possible.
- B. If there is a needleless type port on the distal end of the catheter, perform the following: *(figure 1)*
  - 1. Scrub the port with an alcohol pad for at least 15 seconds and allow to dry for at least 5 seconds.
  - 2. Attach a 10 ml syringe (without saline) to the port.
  - 3. Unclamp if necessary (needleless port may not have a clamp)
  - 4. Attempt to aspirate at least 5 ml of blood. Blood should draw freely. If it does not, remove the syringe and DO NOT use the catheter for access.
  - 5. If blood aspirates freely, remove the 10 ml syringe with blood and discard.
  - 6. Attach a 10 ml syringe with NS and gently flush the line. Never use a smaller syringe. If line does not flush, remove the syringe and DO NOT use the catheter for access.
  - 7. If line flushes, remove the syringe and attach the catheter to the end of the IV tubing and begin infusion of NS. Adjust the rate to the needs of the patient within the limits of the catheter.
  - 8. Administer medications through IV tubing port if indicated.
- C. If there is a capped needle-type port on the distal end of the catheter, perform the following: *(figure 2)*
  - 1. Scrub the cap with an alcohol pad for at least 15 seconds and allow to dry for at least 5 seconds.
  - 2. Clamp the catheter tubing using ONLY the existing clamp on the catheter and then remove the cap. **Never allow a central line to be open to air.**
  - 3. Attach a 10 ml syringe on the catheter end.
  - 4. Unclamp the catheter.
  - 5. Attempt to aspirate at least 5 ml of blood. Blood should draw freely. If it does not, re-clamp the line and remove the syringe. DO NOT use the catheter for access.
  - 6. If blood aspirates freely, clamp the catheter again.
  - 7. Remove the 10 ml syringe with blood and discard.
  - 8. Attach a 10 ml syringe with NS.
  - 9. Unclamp and gently flush the line. Never use a smaller syringe. If line does not flush, re-clamp the line and remove the syringe. DO NOT use the catheter for access.
  - 10. If line flushes, re-clamp and remove the syringe.
  - 11. Attach the catheter to the end of the IV tubing.

12. Unclamp the catheter and begin infusion of NS. Adjust the rate according to the needs of the patient within the limits of the catheter.
13. Administer medications through IV tubing port if indicated.

## NOTES & PRECAUTIONS:

- A. **Do not administer medications, flush or aspirate with less than a 10 cc syringe. Smaller size syringes generate too much pressure and can damage the catheter.**
- B. **Do not attempt to reinject aspirated blood as it may contain clots.**
- C. The maximum flow rates for a PICC line is 125 ml/hr for less than size 2.0 French, and 250 ml/hr for catheters over 2.0 size French.
- D. Keep patient's arm straight to avoiding kinking the PICC line and obstructing flow.
- E. Ensure all line connections are secure.
- F. PICC lines access the patient's central circulation and the risk of infection is high. Avoid contamination to ports and connections while accessing.
- G. **Do not administer the following medications through a PICC line:**
  - a. **Adenosine** - The line may rupture during rapid infusion due to over pressurization.
  - b. **Dextrose 50%** – The catheter can be damaged by due to the viscosity of the fluid.

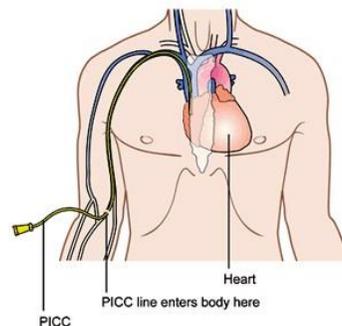


Figure 1- Needleless port



Figure 2 – Non-needleless type port with cap

### DEFINITION:

To provide direction on the safe removal of protective sports equipment that includes helmet and shoulder pads. This procedure page uses football gear as an example, but these guidelines can be used with other sports equipment as well.

### PROCEDURE:

#### A. Initial Evaluation

1. The initial evaluation should begin by assessing level of consciousness, breathing, and circulation. If the athlete is breathing and stable, but a neck injury is suspected-quick sensory and motor nerve exam should be initiated.
2. After the quick neurological exam on a stable athlete, the facemask should always be removed.

#### B. Face Mask Removal

1. Stabilize the head.
2. Cut side and top attachments at loop to remove face mask. Some helmets will need a cutting tool to “release” the top of the facemask from the helmet.
3. Quick release face masks are also in use and found on newer helmets. One popular device looks like a “rivet” instead of a screw. The release mechanism can be activated by pressing it down with a pen or tip of a screwdriver. Athletic trainers and coaching staff are familiar with this and can provide assistance.



### C. General equipment removal guidelines:

1. If the athlete has neck pain, numbness or tingling, extremity weakness or is unconscious, the helmet and shoulder pads should not be removed on the field of play.
2. If access to the airway is compromised, removal of the helmet and shoulders may be initiated.
3. **If removing equipment, always remove the helmet and the shoulder pads, never just one or the other.** Leaving the helmet on or just the shoulder pads on by itself creates head, neck or spinal cord flexion.

### D. Removal of helmet and shoulder pads as a unit:

1. Gear removal starts from the head and proceeds down the body.
2. Remove the helmet first and then remove the shoulder pads, and leg gear. **Do not start with the shoulder pads.**
3. Cut chin straps.
4. Release cheek pad snaps.
5. Use a **two-person technique** to remove the helmet.
  - i. Person at the top firmly holds manual c-spine at the top using two hands to stabilize the patient's helmet.
  - ii. The other responder, starting at the chin, slides his or her hands inside the patient's helmet "firmly" gripping the head and sliding their hands inside the helmet.
  - iii. Responders transition manual c-spine responsibility from the person at the top of the head/ helmet to the person supporting the patients head from underneath.
  - iv. Firm control of the head and neck is the goal. The person at the top proceeds to remove the helmet off the patients head in a coordinated and smooth manner. **DO NOT SPREAD APART SIDES OF HELMET**
  - v. Once helmet is removed, the person at the top of the head resumes manual c-spine until full c-spine precautions are in place.
6. Cut shoulder pad straps.
7. Cut both the jersey and shirt up sleeves towards midline of body.
8. Person at head stabilizes maxilla and occiput and gives commands.
9. Position three people on each side, with one stabilizing the head. Another person removes the equipment as a unit.

While backboard and straps are being prepared:

### E. Chest access:

1. Cut jersey and front laces of shoulder pads.
2. Flip out shoulder pads. Some newer systems allow the shoulder pads to come apart prior to removal. Athletic trainers and coaching staff are familiar with these systems and can provide assistance.
3. Place hands on shoulders with thumbs grasping the clavicle and fingers surrounding the upper trapezius muscles.
4. Secure the athlete's head between the responder's forearms.

### **F. Backboard utilization:**

1. Log rolling is the preferred method for movement as crews are most familiar with this technique and understand the importance of moving the patient as a unit and maintaining inline alignment of the head, neck and spine.
2. The lift technique is an alternative method that could be used for smaller patients but it is manpower intensive. If lifting remember to lift as a unit. Slide backboard into place from feet.
3. The person at head initiates commands and oversees proper placement and techniques
4. Position three responders on each side of body: one at shoulders, one at hips, and one at legs.
5. One other person is in charge of backboard and slides it into place.
6. If the helmet is not resting on board, padding can be added to fill space.
7. Fasten straps and tape helmet to board.
8. Chinstrap remains in place unless it interferes with airway.
9. Recheck sensory and motor nerve vitals for changes and document.

### **NOTES & PRECAUTIONS:**

Athletic Trainers and coaching staff are subject matter experts when it comes to the gear regardless of the sports. Collaborate with them early and often.

## INDICATIONS:

When patient is exhibiting respiratory difficulty secondary to secretions in airway or the potential for aspiration exists.

## PROCEDURE:

### A. Oral Suctioning

1. Pre-oxygenate patient with 100% oxygen.
2. Assemble equipment: Suction unit with tonsil tip or dental tip, personal protective equipment (gloves, goggles, gown).
3. Attach required monitoring equipment.
4. Turn suction unit on and confirm mechanical suction is present.
5. Insert tip without suction.
6. Cover thumbhole to begin suction if using a tip other than dental tip.
7. Apply suction for < 15 seconds.
8. Monitor patient's oxygen saturation.
9. Re-oxygenate patient for at least 2 – 3 minutes between suction attempts.

### B. Tracheal Suctioning

1. Pre-oxygenate patient with 100% oxygen.
2. Assemble equipment: Suction unit, correct size suction catheter, sterile rinse, personal protective equipment (gloves, goggles, gown).
3. Attach required monitoring equipment.
4. If patient is being ventilated with BVM prior to suctioning, have someone else remove the bag from end of ET tube prior to suction attempt.
5. Insert catheter into the ET tube without applying suction.
6. Advance catheter as far as possible.
7. Withdraw slowly using **intermittent** suction while rotating catheter.
8. Do not suction more than 15 seconds.
9. Monitor patient's oxygen saturation.
10. Rinse catheter in sterile saline.
11. Re-oxygenate patient for at least 2 – 3 minutes between suction attempts.

### C. Suctioning with Meconium Aspirator

**Tracheal suctioning is not indicated in the vigorous infant born with meconium stained fluid, whatever the consistency. Simply use a bulb syringe or large bore catheter to clear secretions from the mouth and nose as needed.**

1. Assemble equipment: Suction unit, appropriate size ET tube, personal protective equipment (gloves, goggles, gown.)
2. Attach required monitoring equipment.
3. Turn suction unit on and confirm mechanical suction is present.
4. After infant has been intubated, attach meconium aspirator to end of ET tube.
5. Cover thumbhole to begin suctioning while slowly withdrawing the ET tube. (Do not suction for more than 15 seconds.
6. Monitor patient's oxygen saturation and heart rate and stop if patient becomes bradycardic.
7. Re-oxygenate patient for at least 2 – 3 minutes between suctioning attempts.
8. If patient has not been intubated and meconium is thick, at the least, aggressive oropharyngeal suctioning should be carried out with the largest diameter suction device available.

### D. Suctioning with Nasal Aspirator Device

1. Assemble equipment: Bulb syringe, suction unit with nasal aspirator, personal protective equipment.
2. If nasal secretions are thick consider instilling 1-4 drops of NS into nares to loosen prior to suctioning.
3. If using electric suction be sure vacuum is set less than 100 mmHg.
4. Gently place device tip into nostril. Avoid placing against inside walls of nostril.
5. Apply suction (< 15 seconds if using electric suction)
6. Repeat as needed

### **NOTES & PRECAUTIONS:**

1. Oral and tracheal suctioning can cause trauma to the oropharynx and airway, bradycardia, or hypoxia. It should not delay other resuscitation.
2. Suction pressure should be set as low as possible and yet effectively clear secretions. Negative pressure of less than 80-100 mmHg in neonates and less than 150 mmHg in adults are recommended.
3. When suctioning the intubated patient the diameter of the suction catheter should not exceed one half of the internal diameter of the endotracheal tube.

**INDICATIONS:**

Taser® barbs should be removed at the request of law enforcement if:

- A. The patient has been adequately subdued so as not to pose a danger to Fire/EMS personnel. AND,
- B. The barbs are not embedded in the face, neck or groin areas.

**PROCEDURE:**

- A. Perform patient assessment.
- B. Monitor vitals and LOC. Ensure that vitals are in the normal limits for the situation.
- C. Expose the area where Taser barb has implanted under the skin.
- D. Cut wires from the barb if still attached.
- E. Place thumb and forefinger above and below the barb parallel to the portion of the shaft implanted in the patient's skin.
- F. Spread your thumb and forefinger apart to stretch the skin tightly over the barb.
- G. Holding tension, use needle-nose pliers (or similar tool) with gripping strength and grasp the end of the barb protruding out of the skin near the wire lead and firmly pull out the barb with one quick jerking motion.
- H. Assess the skin where the barb was removed. The skin should be cauterized from the electrical current. Dress the wound to prevent infection.
- I. Contact OLMC if unsure whether to transport.

**NOTES & PRECAUTIONS:**

- A. Patients should be in police custody and monitored by Police for the safety of medical personnel.
- B. Do not remove Taser® Barbs from the face, neck or groin area. Stabilize the barbs and transport to the Emergency Department.
- C. Tasers® emit two barbs. Make sure both are removed. Treat all barbs as a bio-hazard and dispose as you would any other sharps.
- D. Potential trauma may have occurred before (during a struggle) or after the patient was hit by the Taser® (patient falls and hits head).
- E. Consider whether the patient meets criteria for Altered Mental Status or Poisonings and Overdoses protocols.
- F. CAUTION: Where barbs have wires still connected to the Taser® Gun, shock can still be delivered.

## Tension Pneumothorax Decompression – 30.170

### DEFINITION:

The emergency decompression of a tension pneumothorax using an over-the-needle catheter.

### INDICATIONS:

To warrant chest decompression in the field, the patient must be **significantly symptomatic or in extremis (at risk of death)** with:

- A. High clinical suspicion and;
- B. Progressive respiratory distress and;
- C. Shock symptoms with low or rapidly decreasing blood pressure.

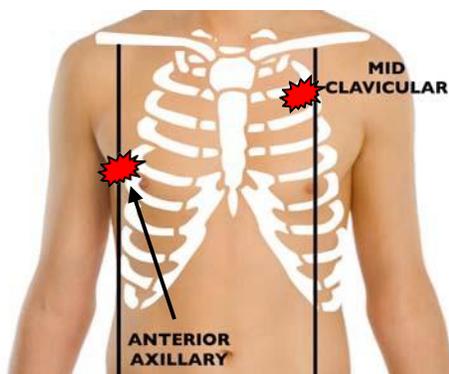
**and** at least one of the following:

- A. Decreased or absent breath sounds
- B. Consistent history (i.e., chest trauma, COPD, asthma).
- C. Distended neck veins.
- D. Tracheal shift away from affected side (late sign).
- E. Asymmetrical movement on inspiration.
- F. Hyper-expanded chest on affected side.
- G. Drum-like percussion on affected side.
- H. Increased resistance to positive pressure ventilation, especially if intubated.

**EMS witnessed traumatic arrest patients with abdominal or chest trauma for whom resuscitation is indicated should have bilateral chest decompression performed even in the absence of the above signs.**

### PROCEDURE:

- A. Expose the entire chest.
- B. Establish landmarks:
  - 1. Anterior – 2<sup>nd</sup> intercostal mid clavicular **or if unavailable,**
  - 2. Lateral – 4<sup>th</sup> intercostal space anterior axillary (above nipple).
- C. Clean chest vigorously with appropriate antiseptic.
- D. On affected side, locate the landmark and insert a large gauge over-the-needle catheter with syringe attached along **the superior margin** of the rib below (e.g. top of third rib to enter second intercostal space).
- E. If the air is under tension, the barrel will pull easily and "pop" out of the syringe.
- F. Remove syringe, advance catheter, and remove needle.
- G. Secure from movement.



## Tension Pneumothorax Decompression – 30.170

### NOTES & PRECAUTIONS:

- A. Patient's chest should be auscultated often for return of tension or other respiratory complications.
- B. Tension Pneumothorax is a rare condition, but can occur with trauma, spontaneously, or as a complication of intubation. Tension takes time to develop, but forceful positive ventilation may increase the rate of development.
- C. Simple or non-tension Pneumothorax is not life threatening and should not be decompressed in the field.
- D. The ideal decompression catheter length is three inches.
- E. Possible complications:
  - a. Creation of Pneumothorax if none existed previously.
  - b. Laceration of lung or pericardium. Stop needle advancement once it has popped through the pleura and advance the catheter only.
  - c. Laceration of blood vessels. (Always slide the needle above the rib).
  - d. Infection. Clean rapidly but vigorously; use sterile gloves if possible.
- F. Tension Pneumothorax can be precipitated by the occlusion of an open chest wound. If the patient deteriorates after dressing an open chest wound, remove the dressing.

**DEFINITION:**

Placement of a circumferential band around a limb in order to occlude arterial blood flow distal to the band.

**INDICATIONS:**

Extremity hemorrhage that is uncontrollable by less aggressive means (direct pressure, bandaging, or pressure dressing) OR a wound that could cause life threatening extremity hemorrhage during an ongoing tactical problem (e.g. potential building collapse, mass casualty event, amputation).

**PROCEDURE:**

- A. Fully expose and evaluate the wound.
- B. Apply tourniquet directly to the skin, 2 to 3 inches proximal to the most proximal limb wound, not over a joint.
- C. Tighten until all bleeding stops and no distal pulse is palpable.
- D. Secure the windlass per manufacturer instructions.
- E. If one properly placed tourniquet does not control bleeding, a second should be placed proximal to the first and tightened appropriately.
- F. Endeavor to keep all tourniquets exposed.
- G. Mark with time of application and communicate this to receiving providers.
- H. Re-evaluate tourniquets frequently to ensure they have not loosened.

**NOTES & PRECAUTIONS:**

- A. Properly applied tourniquets will rarely damage tissue if removed within two hours.
- B. If unable to fully expose a limb and identify all wounds on that limb place the tourniquet as high on the limb as possible. Once all wounds on that limb can be identified, every effort should be made to move the tourniquet to 2 to 3 inches proximal to the most proximal wounds, and not on a joint.
- C. Intermittently loosening and tightening a tourniquet to “reperfuse” a limb is of no benefit and dangerous as it encourages additional bleeding.
- D. A single commercially available tourniquet completely occludes femoral artery blood flow about 70% of the time. Two tourniquets, placed side by side completely occlude about 80% of the time.
- E. The ability of the tourniquet to completely occlude arterial flow is dependent on limb circumference. Larger limbs are more difficult to occlude.
- F. A persistent pulse, continued venous congestion / distention, re-bleeding after initial hemorrhage control, and expanding hematoma are all indications of an ineffective tourniquet.
- G. Clothing, padding under the tourniquet, and limb movement all cause tourniquets to loosen over time and should be avoided.
- H. Tourniquets can cause significant pain and may require narcotics for pain control.
- I. Proper placement of a CAT tourniquet on a lower extremity requires threading the circumferential band through both slits of the buckle.
- J. Proper placement of the SOFTT tourniquet requires tightening the knurled screw on the buckle before tightening the windlass.

**DEFINITION:**

Transcutaneous pacing is the technique of electronic cardiac pacing accomplished by using skin electrodes to pass repetitive electrical impulses through the thorax.

**INDICATIONS:**

Transcutaneous pacing should be considered in bradycardia with evidence of inadequate perfusion, (e.g. altered mental status, chest pain, hypotension, other signs of shock).

**PROCEDURE:**

- A. Ensure ECG pads are attached and monitor displays a rhythm.
- B. Attach pacing electrodes to anterior and posterior chest just to the left of the sternum and spinal column, respectively. Alternatively, pads may be placed in the standard anterior and lateral position as with defibrillation. If there is difficulty in obtaining capture, try alternative position.
- C. Begin pacing at a heart rate of 80 beats per minute and 30mA current output.
- D. Increase current by increments of 10mAs while observing monitor for evidence of electrical capture. Confirm mechanical capture by checking pulses and BP.
- E. If patient is comfortable at this point, continue pacing. If patient is *uncomfortable*, administer Versed<sup>®</sup> 2.5 mg slow IV push or if no IV, 5.0 mg IM.
- F. If patient still complains of pain, repeat dose of Versed<sup>®</sup> and contact OLMC.
- G. If the patient remains unconscious during pacing, assess capture by observing the monitor and evaluating pulse and blood pressure changes. In the event of electrical capture and no pulses, follow PEA protocol.
- H. If there is no response to pacing and drugs, consult with OLMC. If a change in pacing rate is desired, contact OLMC.

**PEDIATRIC PATIENTS:**

Use above guidelines except:

- A. Give Versed 0.1 mg/kg IV to a MAX of 2.5mg. (May repeat once after 5 minutes.) If more needed, call OLMC.
- B. Use anterior/posterior pad placement first for patients less than 1 year.
- C. Begin pacing at smallest mA output.
- D. Increase current in increments of 10 mAs while observing monitor for evidence of electrical capture.
- E. Confirm mechanical capture by checking pulses and BP.
- F. Contact OLMC for adjustments to rate based on age and response to pacing.

**NOTES & PRECAUTIONS:**

Transcutaneous pacing should not be used in the following settings:

- A. Asystole.
- B. Patients meeting Death In The Field criteria.
- C. Patients in traumatic cardiac arrest.

# Operations

### **PURPOSE:**

Law enforcement agencies stress that their first priority on any crime scene is the preservation of life with reconstruction of the crime scene second. EMS personnel can be of assistance by adhering to the following guidelines regarding crime scene response.

### **PROCEDURE:**

#### **A. Response and Arrival**

1. Be conscious of physical and weather conditions around the site. Tire tracks of suspect vehicles are often located in or adjacent to a driveway.
2. Limit the number of personnel allowed onto the scene. Consult with police on the scene to direct placement of vehicles and route of personnel onto the scene.

#### **B. Access and Treatment**

1. Select a single route to the victim. Maintaining a single route decreases the chance of altering or destroying evidence or tracking blood over a suspect's footprints.
2. Note the location of furniture, weapons, and other articles, and avoid disturbing them. If they need to be moved, someone should note the location the article was moved from, by whom it was moved, and where it was placed.
3. Remove from the scene all EMS generated debris that is contaminated with blood or body fluid and dispose of through established channels.
4. Be conscious of any statements made by the victim or other persons at the crime scene. Write down what these statements were and report to the investigating officers.
5. Note the specific garments worn by the patient at the time of treatment. It is also important not to tear the clothing off or cut through any holes, whether made by a knife, bullet, or other object.
6. The victim should be placed on a clean sheet when ready for transport. At the hospital, please try to obtain the sheet once the victim is moved off of it, fold it carefully in on itself, and give it to the investigating officers. This is especially important in close contact crimes such as rape, serious assault and death cases.

#### **C. Documentation**

1. A detailed report is important in case you are later called to testify in court. An incident report should be completed and should cover your observations, conversations with family or witnesses, location of response vehicles and equipment, furniture, weapons, clothing that has been moved, items that were handled and your route to the victim.
2. An Unusual Event Report may be helpful for you to complete. This is a protected document and if you are called to court may be used by you to refresh your memory of aspects of the call that are not included in the Patient Care Report.
3. Do not offer your opinions or evaluations about the crime scene.

### **REMINDER:**

Any location can be, or become, a crime scene. When responding, and upon arrival, if something does not appear to be right, notify police. If you suspect a crime scene and law enforcement is not present, secure area and document what you see.

### PROCEDURE:

- A. A patient care report shall be generated for each identified patient and shall be completed on an approved State EMS patient care form.
- B. Documentation shall include, at least:
  - 1. The patient's presenting problem.
  - 2. Vital signs with times.
  - 3. History and physical findings as directed in by individual protocols.
  - 4. Treatment(s) provided, and time(s).
  - 5. If monitored, ECG strip and interpretation.
  - 6. Any change in the condition of patient.
  - 7. OLMC contact:
    - a. Include physician name
    - b. Time of contact
    - c. Orders received from physician
- C. A copy of the Prehospital Care Report must be left or faxed within 12 hours at the receiving hospital whenever a patient is transported per ORS 333-250-0044.
- D. If a patient refuses treatment and/or transport, refer to Refusal and Informed consent procedure.

## Hazardous Materials Response – 50.060

### **PURPOSE:**

Paramedics may be first on the scene of a hazardous materials situation because of shorter response times or no knowledge of dispatch that hazardous materials are involved. This protocol is intended to guide paramedics who do not normally function in hazardous materials scenes. If the scene you are responding to is a known or suspected (based on information from dispatch) hazardous materials situation, stage and wait for the hazardous materials personnel. When you have arrived at the scene and find out during scene assessment that hazardous materials are involved, stage and wait for the hazardous materials personnel. All scenes (MVA, Industrial, etc.) should be considered as being a potential hazardous materials situation. The following approach procedure should be used:

### **PROCEDURE:**

#### A. Approach

1. All scenes:
  - a. Be cautious all times.
  - b. The reported location may be inaccurate, response into a contaminated area might occur.
  - c. Approach upwind and upgrade if possible.
  - d. Position vehicle well away from the incident.
  - e. Communicate your actions to the 9-1-1 Center.
  - f. Remember: contaminated and/or exposed response personnel may add to the overall problem and reduce their effectiveness to help.
2. If at any time you suspect a hazardous materials situation:
  - a. Confirm that fire and police have been notified. The agency responsible for hazardous materials response may respond with different levels of personnel and equipment based upon the information received. Do not always expect a hazardous materials team to respond.
  - b. If you are a first-in responder, the first priority is scene isolation.
  - c. If you believe that you or your vehicle is contaminated, stage in an isolated area. **KEEP OTHERS AWAY! KEEP UNNECESSARY EQUIPMENT FROM BECOMING CONTAMINATED.**

#### B. Person in Charge

1. If the paramedic is the first medical person on the scene, he/she should assume the role of PIC (medically) until a "hazardous materials trained paramedic" (HMTP) arrives. If at all possible the Incident Command Structure should be implemented.
2. The HMTP will direct all care.
3. The HMTP will determine the method of transport of the exposed patient (air vs. ground).
4. The HMTP will determine who will provide care during transport (HMTP may remain in that position during transport).

### C. Patient Care for the Contaminated Patient

- i. Types of incidents which may require decontamination of the patient:
  - a. Radiation
  - b. Biological hazards
  - c. Chemical
  - d. Toxic substances
- ii. Contamination can occur through:
  - a. Smoke
  - b. Vapor
  - c. Direct contact
  - d. Run-off
- iii. Determine the hazardous substance involved and provide treatment as directed by the Haz-Mat Paramedic (HMTP). In the absence of an HMTP, consult Poison Control through OLMC.
- iv. The hazardous materials team must be contacted about removal of contaminated clothing and packaging of the patient with regard to your protection and the patient's.

### CI. Ambulance Preparation

1. The HMTP shall determine the process needed for ambulance preparation.
2. Remove any supplies and equipment that will be needed for patient care.
3. Seal cabinets and drape interior, including floor and squad bench, with plastic (available from hazardous materials team).

### CII. Transport and Arrival at the Hospital (if requested by "HMTP")

1. If an ambulance has transported a patient from an incident that is subsequently determined to involve hazardous materials exposure, scene personnel must immediately relay all relevant information to the transporting unit(s) and/or receiving facility(s) involved (via EMS dispatch or OLMC).
2. OLMC and the receiving hospital should be contacted as soon as possible. The paramedic should communicate the material involved, degree of exposure, decontamination procedures used and patient condition.
3. The ambulance should park in an area away from the emergency room or go directly to a decontamination center or area.
4. Patient(s) should not be brought into the emergency department before paramedics receive permission from the hospital staff.
5. Once the patient(s) has been released to the hospital, follow the HMTP's direction and if necessary double bag the plastic sheeting used to cover the gurney and the floor. Double bag any equipment, which is believed to have become contaminated.
6. After unloading the patient from the ambulance, check with the "HMTP" to see where the ambulance can be safely decontaminated and whether or not there is equipment available for this purpose. Do not begin decontamination without direction from the "HMTP". After consultation with the Hazardous Materials Team leader the HMTP may recommend that the ambulance be decontaminated.
7. Following decontamination recommendations from the "HMTP", decontaminate the ambulance and personnel before returning to the incident scene. When returning to the incident scene, bring bags containing contaminated materials, equipment, clothing, etc., and turn them over to the "HMTP".

## Hazardous Materials Response – 50.060

### Paramedic/EMT Exposure

1. If a paramedic/EMT is exposed or is concerned with the possibility of exposure, medical help should be sought immediately.
2. Report all exposures to the HMTP, Poison Center, and supervisor, and the on-call OHDP nurse.
3. Follow your agencies guidelines for Communicable Disease: Bloodborne/Airborne Pathogens), including appropriate Personnel Exposure Report.
4. Do not return to service until cleared to do so by the HMTP or Poison Center.

**FOR ADDITIONAL INFORMATION SEE THE HAZMAT PROTOCOL**

## Multiple Toxic Exposure – 50.070

### **PURPOSE:**

To provide guidelines for emergency response personnel on scenes that involve multiple victims who have been exposed to a hazardous material or hazardous environment. This procedure would be used when MSDS and DOT information indicate that victims **may** suffer untoward effects from their exposure and need **short-term, continuing medical assessment**. It would also apply when victims are symptomatic and have been exposed to a hazardous environment that poses little risk of long-term effects, such as discharge of tear gas. *This protocol is NOT intended for use when there are symptomatic patients and the substance they were exposed to is unknown or when there is a potential for serious or long-term medical consequences.*

### **PROCEDURE:**

- A. Triage determines that there are multiple victims who have been exposed to a hazardous material or environment, and that these victims are presently asymptomatic or have been exposed to an agent that has transient effects (e.g., tear gas).
- B. Triage will assist the Hazardous Materials Team - (trained) Paramedic/EMT (HMTP) in coordinating removal of the victims from the potentially hazardous environment, then isolate the victims as best as possible in a safe, well lit, and climate controlled environment (Consider using a bus or a room in a nearby building). If clothing is contaminated, removal of contaminants and proper procedures will be employed prior to isolating victims.
- C. Access to and egress from the Triage and Treatment Area must be strictly controlled at all times. It is necessary to keep track of patients who are under the care of EMTs, especially when the patient is a minor and his/her parent(s) are present. Patients should not be allowed to leave the treatment or triage area without Triage or Treatments knowledge. It is recommended that a guard be posted at the entrance and exit to control patient movement.
- D. The HMTP will attempt to determine the type and level of exposure. The HMTP will then contact receiving hospital with information on the type of chemical and level of exposure. Receiving hospital will consult with Poison Control to determine any symptoms that are to be expected, the approximate time line for onset of symptoms, and recommended treatment modalities. When possible, a three-way phone link among the scene, receiving, and Poison Center should be arranged. The HMTP will report this information to Triage and to Medical.
- E. All potential patients entering the area will be triage tagged and baseline vitals will be obtained and recorded. It is recommended that the Triage consult with the Medical and assign one EMT for every 8 to 10 patients. If any exposure victim starts exhibiting symptoms, they will be immediately removed to the designated Treatment Area.

## Multiple Toxic Exposure – 50.070

- F. In consultation with receiving hospital, Triage and HMTP will make a determination regarding how long the victims will be observed and the frequency of evaluating and taking vital signs of each patient. A log will be maintained of all patients treated and released. This log will include the patient's name, DOB, the date, symptoms (if any), and disposition.
  - 1. If the patients are asymptomatic after the designated observation time, they may be released. The HMTP or Triage will individually brief the patients regarding the symptoms they should watch for and should recommend further medical evaluation by their own physician. Minor patients should only be released to their parent or guardian.
  - 2. Triage or the HMTP will inform Medical of the number of patients being released.
- G. It is recommended that Medical proceed with initiating procedures normally undertaken during an MCI. Regional shall be notified that the all-call is precautionary.

### **PURPOSE:**

The purpose of this protocol is to describe who is in charge of patient care on the scene of medical emergencies and how to resolve disputes with other medical professionals in attendance. **This protocol does not apply to MCI/MPS events where ICS is established.**

### **PROCEDURE:**

- A. EMTs/Paramedics/Prehospital Providers On-Scene: The first arriving, highest certified EMT will be the Person-In-Charge (PIC) and will assume responsibility for directing overall patient care. The team approach to patient care assessment and treatment should be utilized by the PIC.
- B. When a higher level EMT arrives, in an EMS role, that individual shall assume the role of PIC, after receiving verbal report from the initial PIC.
- C. The responsibilities of the PIC directing overall patient care include:
  1. Assuring that treatment, operations, and communications follow protocols.
  2. Coordinating patient care activities. This PIC must watch over the entire patient care scene activities and be sure that the patient care activities are being accomplished in a rapid, efficient, and appropriate manner.
  3. Directing other EMTs to establish airway management, start IVs, etc.
  4. Establishing the appropriate time to be spent at the scene for doing patient care.
  5. Determining when transportation of the patient is to occur.
  6. Performing medical coordination with all agencies and personnel.
- D. The PIC directing overall patient care will be held responsible and accountable for patient care activities performed at the scene and be identified on all patient care reports.
- E. If a patient requires transport and the first arriving PIC is from a non-transporting agency, provision of patient care will be turned over to the transporting EMT-P or flight personnel when:
  1. The patient is placed on the transport unit's gurney, **OR**
  2. At a time agreed upon by both EMTs, continued patient care will then become the responsibility of the transporting unit. There will be a verbal agreement anytime transfer of care from one EMT (EMT-P) to another takes place.

### **Paramedic Direction on Scene:**

EMTs and Paramedics take medical direction from:

1. Physician Supervisors.
2. Regional Protocols.
3. On-Line Medical Control (OLMC) as directed in protocols.

### **Physician On Scene Policy, (within office):**

- A. When EMS is called to a physician's office, the EMTs and paramedics should receive information from the physician and attempt to provide the service requested by the physician.
- B. While in the physician's office, the physician shall remain in charge of the patient. The EMTs and paramedics may follow the direction of the physician as long as it is within the Scope of Practice and protocols of the PIC. Anytime there is a conflict between a physician's orders and the protocols, OLMC shall be contacted.

- C. Once the patient is in the ambulance, unless the physician accompanies the patient, paramedics shall follow the protocols.

### **Physician On-Scene Policy, (outside office):**

- A. Any physician (MD or DO) at the scene of an emergency may be qualified to provide assistance to EMTs and paramedics and shall be treated with professional courtesy.
- B. A licensed physician requesting control of patient care at the scene shall be:
  - 1. Thanked for the offer by the PIC.
  - 2. Advised that the EMTs and Paramedics work under regional protocols and On-Line Medical Control.
  - 3. Advised that we are not permitted to relinquish medical control to a physician on the scene without agreement from On-Line Medical Control.
- C. If the physician requesting control is not the patient's "physician of record," EMTs and paramedics shall be authorized to proceed under the direction of the physician **ONLY IF ALL THREE OF THE FOLLOWING PROVISIONS ARE MET:**
  - 1. OLMC is contacted and authorizes transfer of patient care.
  - 2. The physician agrees to accompany the patient to the hospital in the ambulance.
  - 3. The physician agrees to complete and sign the appropriate patient care report.
- D. If communication with OLMC cannot be established, care may be provided only according to approved ALS protocols. No direction from an on scene physician may be accepted.

### **Disputes On-Scene Between EMTs or Other Medical Professionals:**

- A. Disagreements about care should be handled in a professional manner and shall not detract from patient care.
- B. To the extent possible, the ALS and BLS protocols shall be followed and provide the basis for resolving disputes.
- C. If an unresolved dispute continues between EMTs or other medical professionals concerning the care of a patient, **OLMC shall be contacted.**
- D. If a dispute arises which results in transfer of patient care from one PIC to another, the approximate time of the transfer shall be included on the patient care report.
- E. **DISPUTES SHALL NOT APPEAR ON PATIENT CARE REPORTS.** Written "Unusual Event Forms" should be completed pursuant to any dispute arising at the scene.

### **PURPOSE:**

This protocol describes the steps an EMT should follow in contacting a hospital for On-Line Medical Control (OLMC) and describes the contents of the various reports.

### **PROCEDURE:**

- A. Calls to OLMC or the Receiving Hospital: EMTs shall contact OLMC or the Receiving Hospital by radio or telephone in the following situations:
  - 1. As required by the protocols
  - 2. As required in approved studies
  - 3. As required for trauma services
  - 4. When On-Line Medical Control (OLMC) is needed
- B. All scenes involving OLMC contact:
  - 1. One person at the scene must be designated as the contact person in charge of communications. The EMT designated as “in charge” of communications shall contact the Receiving Hospital (OLMC) if OLMC is needed or required.
  - 2. The receiving hospital should be contacted to provide patient status updates during transport for all patients.
  - 3. If BLS responders have initiated OLMC communications, ALS responders shall continue to use that medical direction source.
- C. When requesting OLMC, the following information must be relayed
  - 1. Unit number, identity and certification level of person making contact
  - 2. Location of the call, street address if appropriate
  - 3. Purpose of call (Identify the protocol being followed)
  - 4. Age and sex of patient
  - 5. Patient’s chief complaint
  - 6. Brief history, prior medical history, medications, and allergies
  - 7. Vital signs
  - 8. Pertinent physical findings
  - 9. Treatment at scene
  - 10. Destination hospital and ETA, including loading time

- D. When contacting the TC for trauma system patients, the following information must be relayed:
1. Unit number, identity and certification level of person making contact
  2. Location of the incident, street address if appropriate
  3. Number of patients. Follow **Multi-Casualty Incident** protocol, if applicable.
  4. Age and sex of the patients
  5. Trauma System entry criteria (be as specific as possible)
  6. Trauma Band number(s)
  7. Patient's vital signs. Specify if not taken or not present.
  8. Approximate ETA of patient(s) to Trauma Center; include loading time if appropriate
  9. Unit number and mode of transport
  10. Patient destination based on incident location or request

## Refusal and Informed Consent – 50.117

### PURPOSE:

- To establish the process of obtaining informed consent.
- To define which persons may be left at the scene because they are not considered in need of EMS.
- To describe the process of obtaining and documenting patient refusal.

### PROCEDURE: (Refer to Refusal Flow sheet)

#### A. Determine if there is an “Identified Patient”:

Determine “No Patient Identified” if the person meets **ALL** of the following criteria:

- No significant mechanism of injury.
- No signs of traumatic injury.
- No acute medical condition.
- No behavior problems that place the patient or others at risk.
- Person is NOT less than 18 years of age.
- Person is NOT the 911 caller.

#### B. **Identified Patient** who is refusing medical care or transport:

Determine if the patient appears to have impaired decision making capacity.

Consider conditions that may be complicating the patient’s ability to make a decision:

- Head injury.
- Drug or alcohol intoxication.
- Toxic exposure.
- Psychiatric problems.
- Language barriers (consider translator or ATT language line through dispatch).
- Serious medical conditions.

#### C. Identified Patient **WITH** decision making capacity who refuses **needed** treatment and/or transport:

1. Explain the risks and possible consequences of refusing care and/or transport.
2. If a serious medical need exists, contact OLMC for physician assistance.
3. Enlist family, friends, or law enforcement to help convince patient.
4. If patient continues to refuse, complete the Patient Refusal Information Form and have them sign it. Give the top copy to the patient with self-care instructions.

#### D. Identified Patient **WITH IMPAIRED** decision making capacity:

1. Treat and transport any person who is incapacitated and has a medical need.
2. Patients with impaired decision making capacity should **NOT** sign a release form.
3. With any medical need, make all reasonable efforts to assure that the patient receives medical care. Attempt to contact family, friends, or law enforcement to help.
4. If deemed necessary, consult with OLMC and consider chemical or physical restraint per Restraining of Patients Protocol.

### **DOCUMENTATION:**

All instances of an identified patient, with or without impaired decision making capacity, must be fully documented on a Patient Care Form with an attached signed refusal form. The following is considered minimum documentation criteria:

- General appearance and level of consciousness (mental status).
- History, vital signs, and physical exam.
- Presence of any intoxicants.
- Assessment of the person's decision making capacity.
- Risks explained to patient.
- Communication with family, friends, police, and/or OLMC.

### **GUIDELINES & DEFINITIONS:**

- A. **Decision Making Capacity:** The ability to make an informed decision about the need for medical care based on:
  - Accurate information given the patient regarding potential risks associated with refusing treatment and/or transport.
  - The persons perceived ability to understand and verbalize these risks.
  - The person's ability to make a decision that is consistent with his/her beliefs and life goals.
- B. **Impaired Decision Making Capacity:** The inability to understand the nature of the illness or injuries, or the risks and consequences of refusing care.
- C. **Emergency Rule:** EMTs may treat and/or transport under the doctrine of implied consent a person who requires immediate care to save a life or prevent further injury. Minors may be treated and transported without parental consent if a good faith effort has been made to contact the parents or guardians regarding care and transport to a hospital, and the patient, in the opinion of EMTs, needs transport to a hospital. When in doubt, contact OLMC.
- D. **Required OLMC Contact:** EMTs are required to contact OLMC for the following refusal situations:
  - Suspected impaired decision making capacity.
  - Suspected serious medical condition such as:
    - Respiratory distress.
    - Sustained abnormal vital signs.
    - Compromised airway.
    - Uncontrolled bleeding.
    - Suspected cervical spine injury.
    - Infants under 3 months of age.
    - Chest pain that you suspect to be cardiac related.
    - Cardiac dysrhythmia.
    - Poisons and overdoses.
    - First time seizures.
  - Suspected abuse situation involving a minor or the elderly.
  - Any unconscious or altered mental status (individual or parent/guardian for a minor).
  - Conflict on scene regarding refusal of care.
  - Minor without a parent or guardian who is refusing care.

# Refusal and Informed Consent – 50.117

## ASSESS PATIENT'S MEDICAL NEED

### NO IDENTIFIED PATIENT

- No significant mechanism.
- No visible signs of traumatic injury
- No known acute medical condition
- No identifiable behavior problems.
- **NOT** less than 18 years old.
- **DID NOT** request medical assistance.

### ACTION

- No Information Form required.

### IDENTIFIED PATIENT

### ASSESS ABILITY TO MAKE DECISIONS

#### Consider:

- Head injury.
- Drug or alcohol intoxication.
- Medical conditions (e.g., hypoglycemia).
- Toxic exposure.
- Psychiatric problems.
- Language barriers.

### ABLE TO MAKE DECISIONS

Ambulance transport advised, but refused.

#### -ACTION-

- **Explain risks of refusal.**
- If serious medical need exists, contact OLMC.
- Enlist family, friends, police, etc. to help convince patient.
- Complete Information Form, obtain patient signature, & give them the top copy.
- Follow *Documentation* protocol.

### ABLE TO MAKE DECISIONS

With no apparent need for ambulance transport.

#### -ACTION-

- **PIC must agree with patient's course of action.**
- Fully document physical findings.
- Fully document advice given to patient.
- Follow *Documentation* protocol.

### UNABLE TO MAKE DECISIONS

(Impaired Capacity)

#### -ACTION-

- Treat & transport if medical emergency exists. Use *Restraining of Patients* protocol if needed.
- Make all reasonable efforts to assure patient gets medical care.
- **Consult OLMC.**
- **DO NOT have patient sign an Information Form**

### MINIMUM DOCUMENTATION

#### For ALL Identified Patients

- General appearance & level of consciousness.
- History, vital signs, & physical exam.
- Presence of any intoxicants.
- Assessment of patient's decision-making capacity.
- Any risks that were explained to the patient.
- Communications with family, police, and/or OLMC.

### OLMC CONTACT REQUIRED

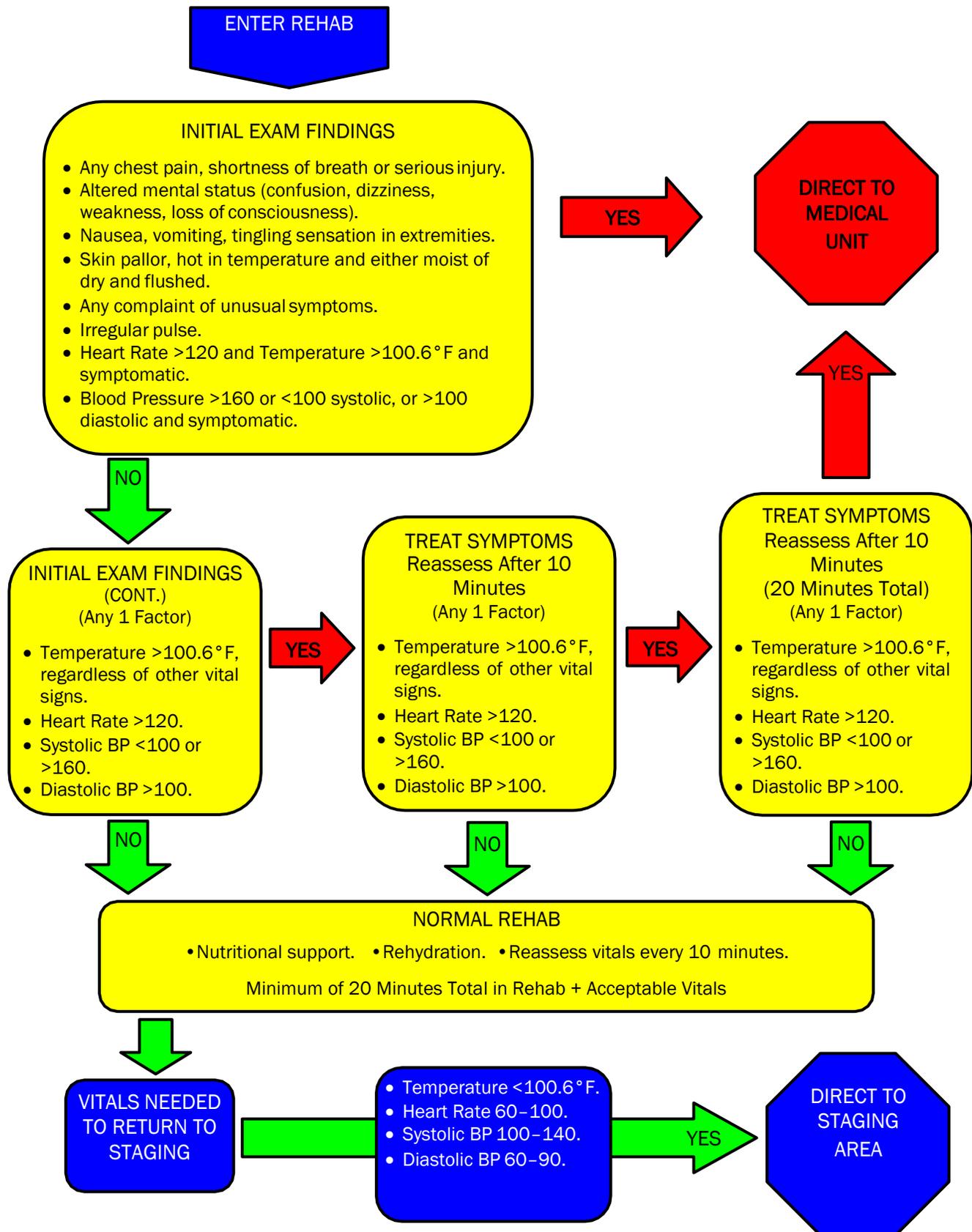
- Impaired decision-making capacity.
- Suspected serious medical condition.
- Suspected abuse – child or elderly.
- First-time seizures (all).
- Scene conflict regarding medical care.
- Minor without guardian refusing care.

**PURPOSE:**

To establish guidelines for the evaluation and treatment of personnel in the Rehabilitation Group (Rehab).

**PROCEDURE:**

- A. Personnel in Rehab will undergo an initial medical evaluation that will consist of a physical assessment including mental status and vital signs (blood pressure, pulse and temperature, pulse ox and CO monitoring [if available]). All medical evaluations will be recorded on the Medical Evaluation Form.
- B. Medical treatment or a resting period will be determined according to the following triage criteria based on entry findings:
  1. Findings mandating that the individual be transferred to the Medical Unit:
    - a. Any chest pain, shortness of breath or serious injury.
    - b. Altered mental status (confusion, dizziness, weakness, loss of consciousness).
    - c. Nausea, vomiting, tingling sensation in extremities.
    - d. Skin pallor, hot in temperature and either moist or dry and flushed.
    - e. Any complaint of unusual symptoms.
    - f. Irregular pulse.
    - g. Heart Rate >120 and Temperature >100.6°F and symptomatic.
    - h. Blood Pressure >160 or <100 systolic, or >100 diastolic and symptomatic.
  2. If initial exam findings include any of the following the individual will require reassessment within 10 minutes:
    - a. Temperature >100.6°F, regardless of other vital signs.
    - b. Heart Rate >120.
    - c. Systolic BP <100 or >160.
    - d. Diastolic BP >100.
  3. If reassessment exam findings include any of the following, the individual will require an additional reassessment in 10 minutes:
    - a. Temperature >100.6°F, regardless of other vitals.
    - b. Heart Rate >120
    - c. Systolic BP <100 or >160.
    - d. Diastolic BP >100.
  4. If, after an additional 10 minutes (20 minutes total in Rehab), reassessment exam findings include any of the following, the individual will be sent to the Medical Unit for further evaluation and/or treatment:
    - a. Temperature >100.6°F, regardless of other vitals.
    - b. Heart Rate >120.
    - c. Systolic BP <100 or >160.
    - d. Diastolic BP >100.
  5. Exam findings allowing an individual to enter Staging for reassignment include:
    - a. Temperature <100.6°F.
    - b. Heart Rate 60–100.
    - c. Systolic BP 100–140.
    - d. Diastolic BP 60–90.



**Emergency Incident Medical Evaluation Form (CONFIDENTIAL)**

Incident #: \_\_\_\_\_ Location: \_\_\_\_\_ Forward to: \_\_\_\_\_ Date: \_\_\_\_\_

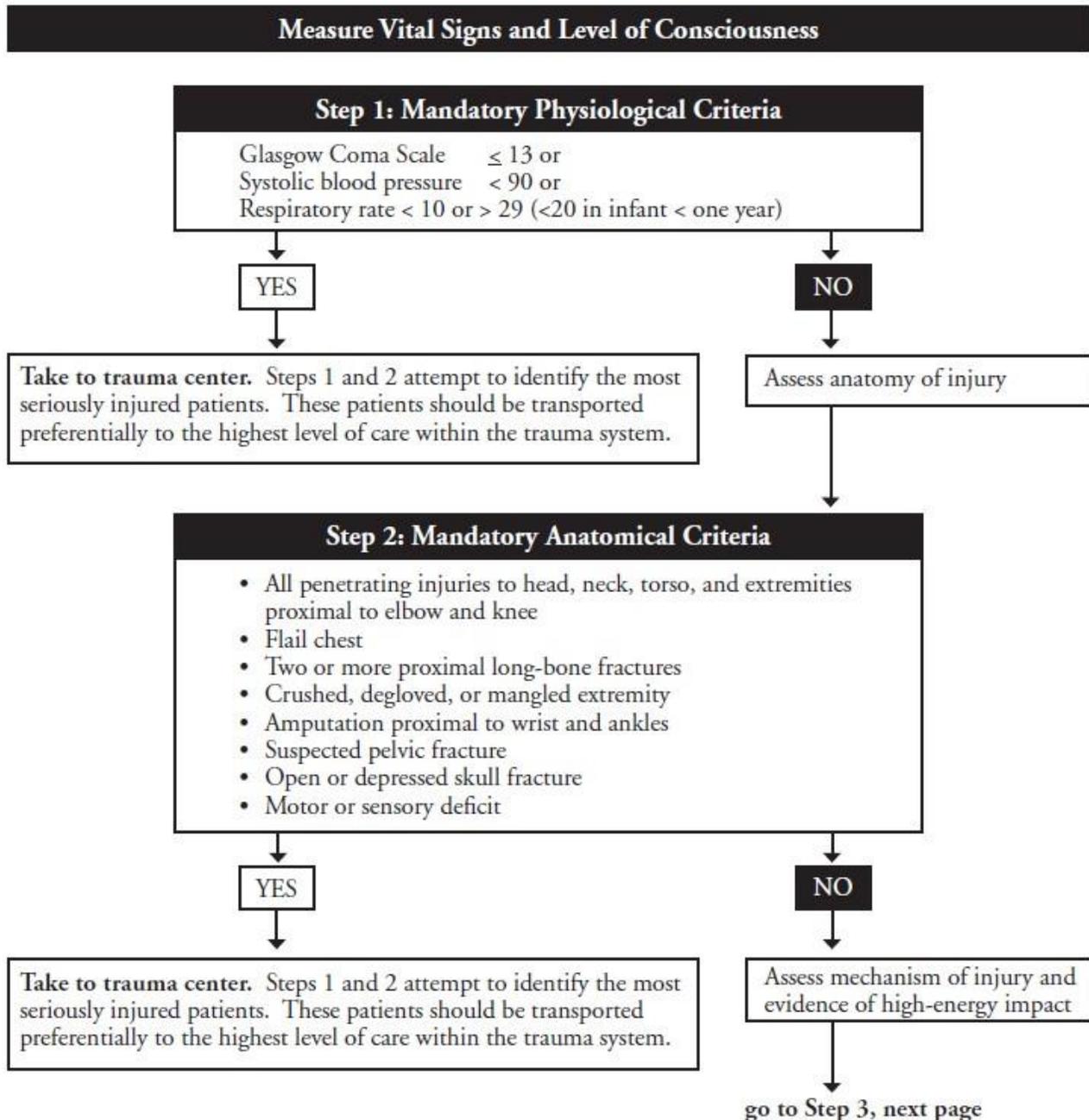
Name	Unit	Time In/Out	# SCBA Cylinders	Exam Period	BP Sys	BP Dia	Pulse	Temp	Pulse Ox	Co	Notes
				INITIAL	# sys > 160 or < 100	# Dia > 100 (1)	# > 120 (2)	# > 100.6 (2)	< 95 (3)	> 0 (3)	
				10 M In							
				20 M In							
				INITIAL							
				10 M In							
				20 M In							
				INITIAL							
				10 M In							
				20 M In							
				INITIAL							
				10 M In							
				20 M In							
				INITIAL							
				10 M In							
				20 M In							
				INITIAL							
				10 M In							
				20 M In							
				INITIAL							
				10 M In							
				20 M In							
				INITIAL							
				10 M In							
				20 M In							
				INITIAL							
				10 M In							
				20 M In							

- (1) Reassess in 10 minutes
- (2) Hold 20 minutes; if unresolved after 20 min, send to Medical Unit
- (3) Refer to Carbon Monoxide Exposure Protocol

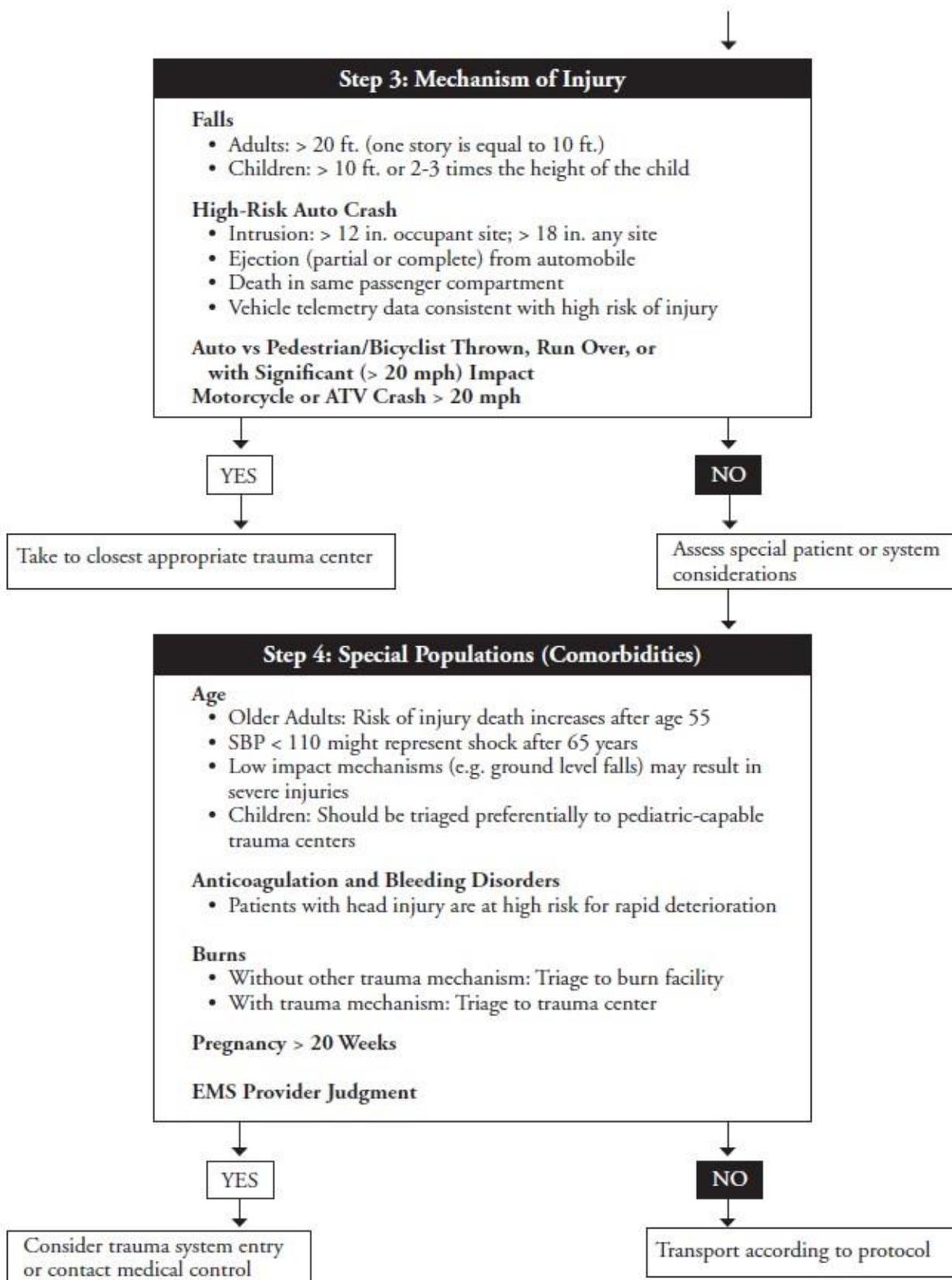
Individuals with any of the following symptoms should have aggressive treatment and may be sent to the Medical Unit:  
 Chest pain, weakness, dizziness, altered mental status, disorientation, headache, nausea, vomiting, muscle cramps, exhaustion, fainting, moist, pale or cool skin, abdominal cramps.

# Trauma System

## I. PATIENT ENTRY:



# Trauma System Guidelines – 60.100



### II. **MEDICAL DIRECTION:**

- A. Off-line medical direction for trauma patients is controlled by the Treatment Protocols.
- B. OLMC may override off-line medical direction. Any instances where this occurs will be reported to the EMS Office.

### III. **COMMUNICATIONS:**

- A. Communications with Receiving Trauma Center (TC):  
The following information will be provided:
  - 1. Unit number and the location of the incident.
  - 2. Number of patients.
  - 3. Age and sex of the patients.
  - 4. Trauma system entry criteria and vital signs.
  - 5. Glasgow Coma Scale.
  - 6. ETA to Receiving TC.
  - 7. Patient destination based on incident location or request.
- B. Communications from TC or OLMC to the paramedics in the field will be as follows:
  - 1. The TC will inform the paramedic if more information is needed by the trauma center.
  - 2. The TC will inform the paramedic if the chosen trauma center is unable to receive the patient and will assist in designating an alternate destination.
  - 3. In the event that there are multiple Trauma System entries, the TC will assist the paramedic at the scene in determining the destinations of all patients.

### IV. **TRAUMA CENTER DESTINATION:**

- A. You need to transport the patient to the closest approved Trauma Center (TC)

- C. **Patients or Guardians Request:** If the alert, competent patient or his/her competent guardian demands transport to a specific hospital, the EMT must honor that request and notify the TC immediately.
- D. **Multiple Patients:** From the same scene, all patient destinations are to be assigned to the closest TC unless the designated TC advises that the facility cannot accept additional patients. In this instance, the designated TC will assist the paramedic in determining patient destinations.

### V. **MODE OF TRANSPORT:**

An air ambulance should be used when it would reduce total pre-hospital time by 10 minutes or greater. This is usually achieved whenever the ground transport time will exceed 25 minute.

### VI. **PATIENT EVALUATION PROTOCOL:**

- A. Treatment Priority Should Be Approached In This Order:
  1. Airway Maintenance (Including control of the cervical spine).
  2. Breathing.
  3. Control of circulation and hemorrhage.
  4. Treatment of shock.
  5. Neurological examinations.
  6. Complete secondary survey.
  7. Splinting of fractures.

### VII. **SCENE TIME:**

After gaining access to the patient, scene time should not exceed ten minutes for any patient who is entering the Trauma System. Plan to start IV/IOs and initiate other care once en-route to the hospital if necessary.

# **Multi-Casualty Incidents**

### **The National Incident Management System (NIMS) will be used to manage all incidents.**

1. Incident Command (IC) is the responsibility of the agency having jurisdiction (AHJ).
2. Each assisting agency shall retain full authority to operate within the scope of its agency operational and administrative protocols and procedures.
3. Agencies that are assisting in the support of a single jurisdiction will function under the direction of that jurisdiction's designated Unified Incident Command.
4. Incident Command of a multi-discipline event should be predicated on the "Primary Hazard" of the event.
5. In a Unified Command, the "Lead Agency" may change as priorities change.

The **Mass Casualty Incident Protocol** is a tool that may be used in part or whole as determined by the on-scene Incident Commander in situations where the number of patients exceeds the resources of the on-scene responders. There is no set number of patients that will automatically initiate this protocol. If the Incident commander determines that additional resources or incident structure is needed to better manage due to the complexity of the incident, he/she shall announce to dispatch that an MCI is being declared. This may be done upon arrival or at any time during the incident.

- If the incident involves multiple asymptomatic patients (HazMat exposure) set up secure evaluation area. See **Multiple Toxic Exposure** protocol.
- During a declared MCI, the Trauma System is not in effect.
- "Licensed ambulances" are not needed for transport.
- If transport resources are limited, more than one critical patient may be placed in an ambulance.

## MCI Task Card - Medical

Reports to Incident Commander (or Operations in larger incidents)

### **OBJECTIVES:**

- 1. Coordinate all On-Scene EMS activity.**
- 2. Coordinate Medical activities with Incident Commander (IC), and other ICS branches as needed.**
- 3. Provide accountability for supervised personnel.**

### **ACTIONS:**

- Establish Medical with Command.
- Obtain a separate working radio channel for use by Medical.
- Establish the following roles/functions and hand out vest, triage tags and task cards.

**Triage**

**Treatment**

**Transportation**

**Destination** (reports to Transportation)

**Staging Area** (confirm area, and proper talk group)

**An assistant to help you with radio and face-to-face communications.**

**Landing Zone (LZ)**

- Order additional resources and ambulances through Incident Command.
- Establish accountability system for personnel working within Medical.
- Refer to Medical checklists (over).
- Monitor performance of subordinates. Provide support and changes as needed.

## MCI Task Card - Medical

### SCENE CHECKLIST

Functional Assignments:	Ops:	Order Resources:	Ops:	HazMat:
Triage		Ambulances (specify #)		Mass Decon
Treatment		Police (Secure Area)		Safety
Transportation		Buses		Rescue
Destination		Vans		
Staging Area		Medical Examiner		
Landing Zone		Red Cross		
		Specialty Teams		

### OTHER ASSIGNMENTS

Incident Commander	Triage	Treatment	Transportation	Destination
				<b>Staging Area</b>

## MCI Task Card – Treatment

Reports to Medical (Use assigned radio channel) Coordinates with Triage and Transportation

### **OBJECTIVES:**

- 1. To rapidly treat and transport all patients.**
- 2. Identify and establish large treatment area(s) to stabilize and care for patients until transported.**
- 3. Coordinate all activities within the treatment area.**
- 4. Coordinate movement of patients from treatment area(s) with Transportation.**
- 5. Provide accountability for personnel working in Treatment.**

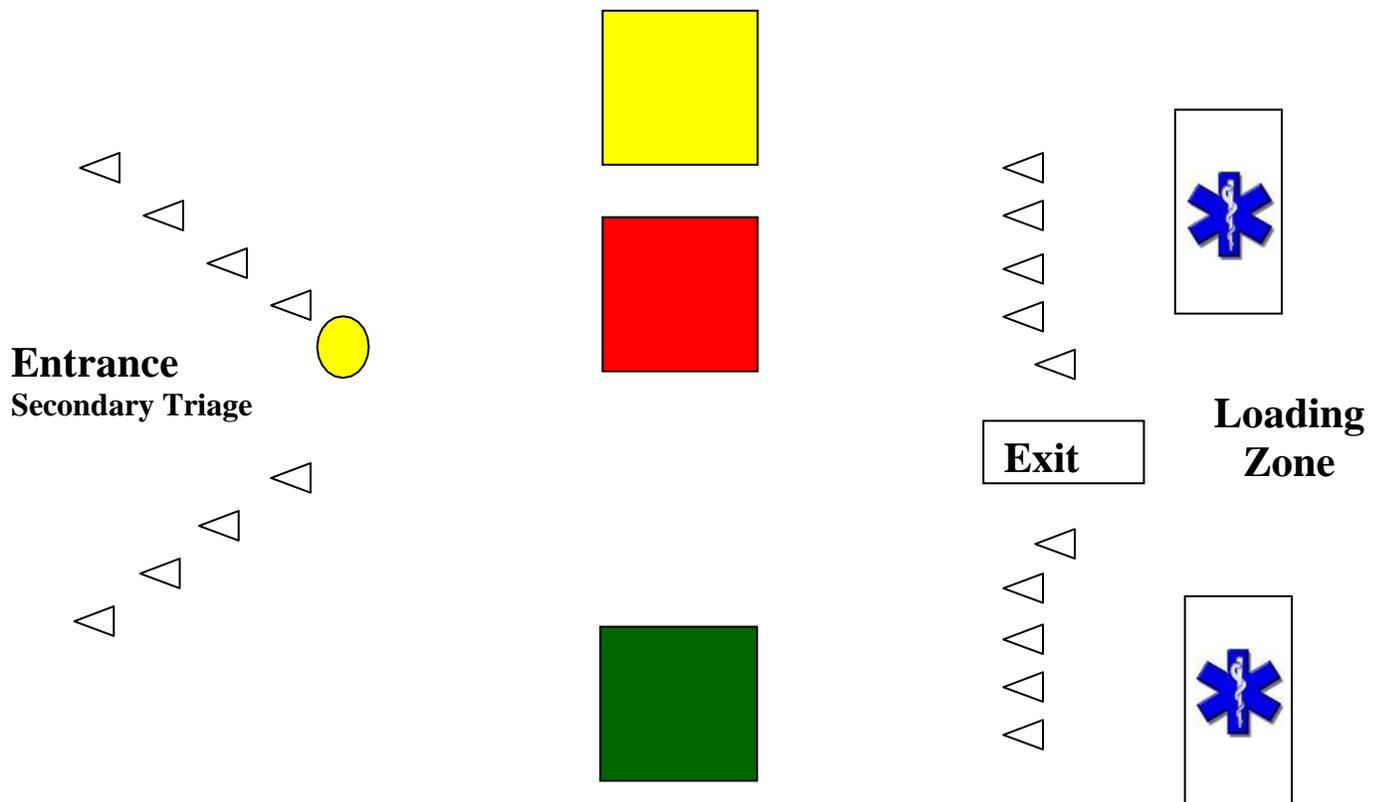
### **ACTIONS:**

- Establish treatment area(s) large enough to receive estimated number of patients. Set up area with room to expand if necessary. Provide for environmental protection of victims and allow easy ambulance access and egress. If multiple treatment areas are needed, identify each geographically. (e.g. - North/South, street name, division name, etc.). See Diagram.
- Order additional resources through Medical.
- Clearly identify treatment area entry point. Assign a person at the entrance to conduct primary or secondary triage, attach triage tags and direct patients to correct treatment area.
- Consider appointing “Red,” “Yellow,” and “Green” Treatment Team Leaders and assign support personnel.
- Establish a medical supply drop area for incoming ambulances and fire units.
- Provide BLS care in the treatment area until resources allow a higher level.
- Ensure all patients in treatment area have been tagged with a triage tag.
- Identify the order in which patients are to be transported. Coordinate patient movement to the loading zone with Transportation.
- Provide accountability for personnel working within treatment area.

# MCI Task Card – Treatment

## Treatment Area Guidelines

- Set up treatment area WELL AWAY from Hazardous. Consider ambulance access/egress, wind direction and slope.
- Make it BIG. Set up in an area that will allow you to expand.
- Clearly identify entry point and exit point for patient transportation.
- Utilize colored tarps and flags to identify each treatment area.
- Separate the green area from yellow/red area. Consider separating with CBRNE unit or other natural barrier.
- Assign treatment team leaders to each area and identify them with the appropriate colored vests.



# MCI Task Card – Treatment

## SCENE CHECKLIST

OPS Channels	Medical:	Treatment:	Transport:
<b>Assign Treatment Team Leaders</b>		<b>Current Patients in Treatment Area</b>	
<b>RED Team Leader:</b>		<b>Red</b>	
<b>YELLOW Team Leader:</b>		<b>Yellow</b>	
<b>GREEN Team Leader:</b>		<b>Green</b>	
<b>Supply:</b>		<b>Black</b>	
<b>Additional Company Assignments</b>		<b><u>Notes:</u></b>	
Company	Assignment		

**Other Assignments:**

Command	Operations	Triage	Staging	Destination
OPS: _____ _____				

## MCI Task Card - Triage

- Manage the triage function at the incident (should not perform task level triage)
- Coordinate personnel/crews performing primary and secondary triage
- Maintain accountability of all triage personnel/crews
- Ensure rapid primary triage is performed – no more than 30 seconds per patient
- Ensure secondary triage point is established when necessary or that secondary triage is accomplished in place
- Coordinates movement of triaged patients to treatment/collection/transport area. (order personnel and equipment as appropriate to accomplish this)
- Ensures appropriate patient triage log is initiated and maintained. (multiple logs may need to be managed and information integrated depending on the scope of the incident)
- Relay triage information up the chain-of-command and updates status as needed
- After triage is completed, assists treatment and transport supervisors/teams to locate their patients.
  - *In a hazardous incident, patients may not be able to be triaged until they are removed from the hazard zone.*
  - *Consider having crews utilize triage tags during secondary triage so that primary triage may be performed at appropriate speed.*

### **Triage & identify patients by category utilizing “ABC” method:**

- Red\*** Immediate life threat. (Must have rapid transport to survive.)
- Yellow\*** Delayed (Injuries can wait 1-3 hours before transport.)
- Green\*** Ambulatory (Injuries can wait 3+ hours before transport)
- Black\*** Dead (No transport) Move only if needed to reach other live patients.

## MCI Task Card - Transportation

Reports to Medical (Use assigned radio channel)

### **OBJECTIVES:**

1. **Coordinate movement of patients from treatment area with Treatment.**
2. **Coordinate all activities within the loading zone.**
3. **Coordinate flow of transport vehicles with staging.**
4. **Provide accountability for personnel working in Transportation.**

### **ACTIONS:**

- Establish patient loading zone.
- Establish one-way vehicle access/egress with Staging.
- Request additional resources as needed from Medical.
- Assign Medical Communications.
- Supervise patient movement to loading zone with Treatment.
- Monitor medical radio channel to estimate number of incoming patients.

**MCI Task Card - Transportation**

**Loading Zone Location:**

---

---

**Access/Egress Location:**

---

---

**Resources Requested:**

Time	Resource	Unit/Agency
------	----------	-------------

---

---

---

---

---

---

---

---

**Medical Communications:**

Name: \_\_\_\_\_

Unit/Agency: \_\_\_\_\_

## MCI Task Card –Destination

### Reports to Transportation

#### **OBJECTIVES:**

- 1. Coordinate hospital destination for patients leaving the loading zone.**
- 2. Maintain the patient transport log using web based or protocol approved alternative.**

#### **ACTIONS:**

- Establish communications with “Regional Hospital.” (Via HEAR Report Radio Channel VHF Channel 16 or by phone to the ER PT Coordinator at (503) 814-1300.
- Confirm MCI has been declared with Regional Hospital and Dispatch.
- Provide total number of estimated patients.
- Establish communication with loading zone to receive information on patients ready for transport (e.g., face-to-face, runner, radio etc.).
- When a unit is ready to transport, contact Regional Hospital. Provide & record the following information.
  1. Triage Tag #'s/ UPI if available
  2. Triage color/category
  3. Age/gender
  4. Unit number of transporting vehicle
- Confirm hospital destination with Regional and record.
- Inform the transporting unit of its destination.



	PATIENT LOCATION	TRANSPORT NUMBER
<b>1</b>		
TRIAGE	<div style="display: inline-block; width: 15px; height: 15px; background-color: red; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: yellow; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: green; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: black; border: 1px solid black;"></div>	
GCS & MAJOR INJURIES		
AGE & SEX		
TRAUMA BAND ID		
TRANSPORT UNIT		
HOSPITAL		

	PATIENT LOCATION	TRANSPORT NUMBER
<b>2</b>		
TRIAGE	<div style="display: inline-block; width: 15px; height: 15px; background-color: red; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: yellow; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: green; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: black; border: 1px solid black;"></div>	
GCS & MAJOR INJURIES		
AGE & SEX		
TRAUMA BAND ID		
TRANSPORT UNIT		
HOSPITAL		

	PATIENT LOCATION	TRANSPORT NUMBER
<b>3</b>		
TRIAGE	<div style="display: inline-block; width: 15px; height: 15px; background-color: red; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: yellow; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: green; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: black; border: 1px solid black;"></div>	
GCS & MAJOR INJURIES		
AGE & SEX		
TRAUMA BAND ID		
TRANSPORT UNIT		
HOSPITAL		

	PATIENT LOCATION	TRANSPORT NUMBER
<b>4</b>		
TRIAGE	<div style="display: inline-block; width: 15px; height: 15px; background-color: red; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: yellow; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: green; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: black; border: 1px solid black;"></div>	
GCS & MAJOR INJURIES		
AGE & SEX		
TRAUMA BAND ID		
TRANSPORT UNIT		
HOSPITAL		

	PATIENT LOCATION	TRANSPORT NUMBER
<b>5</b>		
TRIAGE	<div style="display: inline-block; width: 15px; height: 15px; background-color: red; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: yellow; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: green; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: black; border: 1px solid black;"></div>	
GCS & MAJOR INJURIES		
AGE & SEX		
TRAUMA BAND ID		
TRANSPORT UNIT		
HOSPITAL		

	PATIENT LOCATION	TRANSPORT NUMBER
<b>6</b>		
TRIAGE	<div style="display: inline-block; width: 15px; height: 15px; background-color: red; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: yellow; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: green; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: black; border: 1px solid black;"></div>	
GCS & MAJOR INJURIES		
AGE & SEX		
TRAUMA BAND ID		
TRANSPORT UNIT		
HOSPITAL		

	PATIENT LOCATION	TRANSPORT NUMBER
<b>7</b>		
TRIAGE	<div style="display: inline-block; width: 15px; height: 15px; background-color: red; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: yellow; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: green; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: black; border: 1px solid black;"></div>	
GCS & MAJOR INJURIES		
AGE & SEX		
TRAUMA BAND ID		
TRANSPORT UNIT		
HOSPITAL		

	PATIENT LOCATION	TRANSPORT NUMBER
<b>8</b>		
TRIAGE	<div style="display: inline-block; width: 15px; height: 15px; background-color: red; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: yellow; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: green; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: black; border: 1px solid black;"></div>	
GCS & MAJOR INJURIES		
AGE & SEX		
TRAUMA BAND ID		
TRANSPORT UNIT		
HOSPITAL		

	PATIENT LOCATION	TRANSPORT NUMBER
<b>9</b>		
TRIAGE	<div style="display: inline-block; width: 15px; height: 15px; background-color: red; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: yellow; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: green; border: 1px solid black;"></div> <div style="display: inline-block; width: 15px; height: 15px; background-color: black; border: 1px solid black;"></div>	
GCS & MAJOR INJURIES		
AGE & SEX		
TRAUMA BAND ID		
TRANSPORT UNIT		
HOSPITAL		

# **Hazardous Materials**

### DECONTAMINATION ZONE

Note: All victims suspected of ingestion or significant exposure to **hydrogen cyanide** solution **require decontamination**. Others may be transferred immediately to the Support Zone.

#### A. Decontamination

1. Victims who are able and cooperative may assist with their own decontamination.
  - a. **Rapidly remove contaminated clothing** while flushing exposed skin and hair with plain water for 2 to 3 minutes
  - b. Then wash twice with mild soap
  - c. Rinse thoroughly with water
  - d. Double bag contaminated clothing and personal belongings
2. Irrigate exposed or irritated eyes with plain water or saline for 5 minutes.
  - a. Continue eye irrigation during other basic care or transport.
  - b. Remove contact lenses if present and easily removable without additional trauma to the eye

#### B. Transfer to Support Zone as soon as decontamination is complete.

## IDENTIFICATION

CAS 74-90-8

UN 1051

Synonyms include formic anammonide and formonitrile. Aqueous solutions are referred to as hydrocyanic acid and prussic acid.

Hydrogen cyanide is very volatile, producing potentially lethal concentrations at room temperature. At temperature below 78°F, hydrogen cyanide is colorless or pale blue liquid (hydrocyanic acid); at higher temperatures, it is a colorless gas. It has a faint bitter almond odor and a bitter burning taste. It is soluble in water. **Hydrogen cyanide is lighter than air.**

## PRECAUTIONS

- A. Persons whose clothing or skin is contaminated with cyanide containing solutions can secondarily contaminate personnel by direct contact or through off-gassing vapor.
  1. Avoid dermal contact with cyanide-contaminated victims and their bodily fluids.
  2. **Take special care with victims who may have ingested cyanide, as cyanide salts dissolve in the stomach and react with hydrochloric acid to produce hydrogen cyanide gas. Transport patients in vehicles with windows opened and/or good ventilation. These patients who meet *Death in the Field* criteria should be considered a Hot Zone.**
  3. Victims exposed only to hydrogen cyanide gas do not pose contamination risks to rescuers.
- B. Hydrogen cyanide is a volatile flammable liquid at room temperature; as a gas, it is flammable and potentially explosive.
- C. Hydrogen cyanide is absorbed well by inhalation and can produce death within minutes.
  1. Substantial absorption can occur through intact skin if vapor concentration is high.
  2. Exposure by any route may cause systemic effects.

## HEALTH EFFECTS

HCN is classified a systemic (chemical) asphyxiant. Cyanides interfere with the intracellular utilization of oxygen resulting in cellular dysfunction and cell death. Effects are most profound and first evidenced in the CNS and cardiovascular system. Initial symptoms may include CNS excitation and cardiovascular compensation followed by depression/collapse of both systems.

## ROUTES OF EXPOSURE

- A. Inhalation
  1. Hydrogen cyanide is readily absorbed from the lungs; symptoms of poisoning begin within seconds to minutes
  2. *The odor of cyanide does not provide adequate warning of hazardous concentrations. Perception of the odor is a genetic trait (20% to 40% of the general population cannot detect hydrogen cyanide); also rapid olfactory fatigue can occur.*
- B. Skin/Eye Contact: Exposure to hydrogen cyanide can cause skin and eye irritation and can contribute to systemic poisoning with delayed symptoms.
- C. Ingestion of hydrogen cyanide solutions or cyanide salts can be rapidly fatal

### **SIGNS AND SYMPTOMS**

- A. Signs and symptoms usually develop rapidly. Initial symptoms are nonspecific and include excitement, dizziness, n/v, HA and weakness.
- B. Progressive signs and symptoms may include: Drowsiness, tetanic spasm, convulsions, hallucinations and loss of consciousness.
- C. Cardiovascular – Can cause various life threatening dysrhythmias.
- D. Respiratory
  - 1. Victims may complain of shortness of breath and chest tightness
  - 2. Pulmonary findings may include rapid breathing and increased depth of respiration
  - 3. As poisoning progresses, respirations become slow and gasping; cyanosis may be present, and pulmonary edema may develop

### **RESCUER PROTECTION**

- A. Respiratory protection: Pressure demand self-contained breathing apparatus (SCBA) is recommended in response situations that involve exposure to potentially unsafe levels of hydrogen cyanide
- B. Skin protection: Chemical protective clothing is recommended because both hydrogen cyanide vapor and liquid can be absorbed through the skin to produce systemic toxicity.

### **DECONTAMINATION ZONE**

- A. Refer to Decontamination page.
- B. Transfer to Support Zone as soon as decontamination is complete.

### **SUPPORT ZONE**

- A. Be certain that victims have been decontaminated properly. Additional decontamination may be required for exposed skin and eyes.
- B. Decontaminated victims or those exposed only to vapor, pose no serious risks of secondary contamination to rescuers. In these cases, Support Zone personnel require no specialized protective gear.

### **TREATMENT**

Patients who rapidly regain consciousness and who have no other signs or symptoms may not require antidote treatment. Patients who remain comatose or develop shock should be treated promptly with the antidotes per OLMC direction. In cases of ingestion—**emesis and activated charcoal are *contraindicated***.

- A. High flow oxygen, establish IV access, apply cardiac monitor and secure protected airway following Airway Management protocol.
- B. If Cyanide Toxicity is suspected based on findings (soot in mouth, nose or oropharynx, known exposure) and patient is comatose, in cardiac or respiratory arrest, or has persistent hypotension despite fluid resuscitation:
  1. Administer Hydroxocobalamin (Cyanokit®) 5 g IV as an infusion and monitor for clinical response. Contact OLMC for advice regarding a second 5 g dose.
  2. Treat other presenting symptoms per appropriate protocol.
  3. Initiate emergent transport to appropriate facility.
  4. Patients in shock or having seizures should be treated according to existing protocols. These patients may be seriously acidotic; consider giving sodium bicarbonate 50 mEq, with OLMC direction.
- C. **MULTI-CASUALTY TRIAGE** - Patients who have only brief inhalation exposure and mild or transient symptoms may be discharged.

## **IDENTIFICATION**

**CAS 7664-39-3**

**UN 1052 (Anhydrous)**

**UN 1790 (Solution)**

Synonyms include fluoric acid, hydrofluoride, hydrofluoric acid, and fluorine monohydride.

Hydrogen fluoride is a colorless, corrosive fuming liquid or gas (boiling temperature 67°F) with a strong irritating odor. It is usually shipped in cylinders as a compressed gas. Hydrogen fluoride readily dissolves in water to form colorless hydrofluoric acid solutions. Dilute solutions are indistinguishable from water. It is present in a variety of over-the-counter products at concentrations of 6% to 12%.

## **PRECAUTIONS**

- A. Victims whose clothing or skin is contaminated with HF liquid, solution or condensed vapor, can secondarily contaminate response personnel by direct contact or through off-gassing vapor.
- B. Inhalation hazards result not only from HF gas but also from fumes arising from concentrated hydrogen fluoride liquid **or from the patient's bodily fluids.**
- C. Rapid flushing of exposed areas with water is critical. HF is water-soluble.

## **HEALTH EFFECTS**

The toxic effects of hydrogen fluoride are due primarily to the fluoride ion. The fluoride ion combines with endogenous calcium and magnesium to form insoluble calcium fluoride and magnesium fluoride.

- A. This results in cell destruction and local bone demineralization
- B. Life threatening hypocalcemia, hypomagnesemia, and hyperkalemia can occur.
- C. The adverse action of the fluoride ion may progress for several days

## **ACUTE EXPOSURE**

- A. **Respiratory** Due to HF's water solubility, effects of exposure generally occur in the upper airway including the glottis. However, people incapacitated in large clouds of HF can have severe deep lung injury.
  - 1. **Mild effects**— mucous membrane irritation, cough and narrowing of the bronchi.
  - 2. **Severe effects.**
    - a. Almost immediate narrowing and swelling of the throat, causing upper airway obstruction.
    - b. Lung injury may evolve rapidly or may be delayed in onset for 12 to 36 hours.
    - c. Pulmonary edema and constriction of the bronchi. Partial or complete lung collapse can occur
    - d. Pulmonary effects can result even from splashes on the skin.
- B. **Dermal**—Depending on the concentration and duration of exposure, skin contact may produce pain, redness of the skin, and deep, slow healing burns with symptoms delayed up to 24 hours. HF can penetrate tissues deeply, causing both local cellular destruction and systemic toxicity.

### C. Ocular

1. **Mild effects**— rapid onset of eye irritation
2. **More severe effects**— may result from even minor hydrofluoric acid splash include, sloughing of the surface of the eye, swelling of the structures of the eye, and cell death due to lack of blood supply. Potentially permanent clouding of the eye surface may develop immediately or after several days

### D. Gastrointestinal

1. A small amount of ingested HF is likely to produce systemic effects including acid-base imbalance and may be fatal.
2. Ingestion of hydrofluoric acid may cause corrosive injury to the mouth, throat and esophagus as well as inflammation and bleeding of the stomach.
3. Nausea, vomiting, diarrhea and abdominal pain may occur

- E. **Electrolyte disturbances**—exposure by any route may result in systemic effects: hypocalcemia and/or hypomagnesemia and/or hyperkalemia.

## PREHOSPITAL MANAGEMENT

### HOT ZONE

#### Rescuer Protection

- A. SCBA is recommended in response situations that involve exposure to potentially unsafe levels of hydrogen fluoride
- B. Skin protection: Chemical protective clothing, i.e. level A or level B, is recommended because skin exposure to either vapor or liquid may cause severe consequences.

### DECONTAMINATION ZONE

- A. Victims exposed only to hydrogen fluoride gas or vapor who have no skin or eye irritation do not need decontamination, they may be transferred immediately to the Treatment Area.
- B. Rescuer Protection: If exposure levels are determined to be safe, personnel wearing a lower level of protection than that worn in the Hot Zone may conduct decontamination.
- C. ABC Reminders
  1. Quickly ensure a patent airway— anticipate airway edema.
  2. Stabilize the cervical spine with a c-collar and a backboard if trauma is suspected
  3. Administer supplemental O<sub>2</sub>
  4. Assist ventilation with a bag-valve-mask device if necessary
- D. Basic decontamination
  1. Victims who are able and cooperative may assist with their own decontamination
    - a. **RAPIDLY REMOVE CONTAMINATED CLOTHING** while flushing exposed skin and hair with plain water for 15 minutes.
    - b. If either of the treatments recommended below is available, water flushing may be reduced to 5 minutes and the treatment should be started immediately.
      - I. 2.5 G calcium gluconate in 100 ml of water soluble lubricant such as KY<sup>®</sup> Jelly, **OR**,
      - II. 2 ml of 10% calcium gluconate per ounce of KY<sup>®</sup> Jelly
    - c. Double bag contaminated clothing and personal belongings

2. Irrigate exposed or irritated eyes with plain water or saline or 5 minutes
  - a. Continue eye irrigation during other basic care or transport
  - b. Remove contact lenses if present and easily removable without additional trauma to the eye.
3. In case of ingestion, **do not induce emesis or administer activated charcoal**
  - a. Victims who are conscious and able to swallow should be given 4 to 8 ounces of water or milk.
  - b. If available, also give 2 to 4 ounces of an antacid containing magnesium (e.g., Maalox, Milk of Magnesia) or calcium (e.g., TUMS)
4. As soon as basic decontamination is complete, move the victim to the Treatment Area.

### **TREATMENT**

Be certain that victims have been decontaminated properly. Treatment Area personnel require no specialized protective gear if victims have undergone decontamination.

- A. ABCs, C-spine (p.r.n.), Pulse Oximetry, ECG obtain baseline QT interval a (may be of benefit for this).
- B. Treat patients who are or have per existing protocols.
- C. Observe for signs of hypocalcemia and contact OLMC regarding treatment with Calcium Gluconate.
  1. ECG—prolonged Q-T interval or QRS or ventricular dysrhythmias.
  2. Other—Muscular tetany. This is probable after ingestion of even small amounts of HF.
- D. **For inhalation victims.**
  1. Administer 2.5% calcium gluconate by nebulizer. Mix 1cc of 10% Calcium Gluconate with 3ccs of Normal Saline into the nebulizer.
  2. If wheezes are present consider use of Albuterol per Respiratory Distress protocol.
- E. **Minor Burns.**
  1. Initially, the health care provider should wear rubber or latex gloves to prevent secondary contamination
  2. Vigorously massage the burned areas with calcium gluconate gel—2 ml of 10% calcium gluconate per ounce of KY<sup>®</sup> Jelly
  3. Continue this procedure until pain is relieved or more definitive care is rendered
- F. **Hand Exposure**
  1. Subungual (under the nail) burns often do not respond to immersion treatment. The treatment for hand burns requires expert assistance; consult with OLMC
  2. Treatment of hand exposures can be accomplished by placing calcium gluconate gel into an exam glove and placing the glove on the affected hand.
- G. **Optical Exposure**—Irrigate exposed eyes with a 1% aqueous solution of calcium gluconate (10 ml of 10% solution in 90 ml of sterile saline in Buretrol) using a nasal cannula.
  1. Up to 500 ml over 1 to 2 hours may be used
  2. If calcium gluconate is not available, use normal saline for irrigation.

### **MULTI-CASUALTY TRIAGE**

Consult with the OLMC for advice regarding triage of multiple victims. Persons who have had only minor or brief exposure to hydrogen fluoride gas or vapor and are initially asymptomatic are not likely to develop complications. See Multiple Toxic Exposure Protocol.

## **IDENTIFICATION**

**CAS 56-38-2**

**UN 2783**

Synonyms include Alkron, Alleron, Danthion, DNTP, DPP, Ethyl Parathion, Etilon, E-605, Stathion, Sulphos, and Thiophos.

The term organophosphate (OP) is generally understood to mean an organic derivative of phosphoric or similar acids. There are many different OPs and they differ to some extent in their properties. Many OPs inhibit an enzyme known as acetylcholinesterase. This is a class effect of OPs, but not all OPs (e.g. glyphosate) demonstrate this effect. Inhibitors of acetylcholinesterase affect certain nerve junctions in animals, as well as parasympathetic effector sites (the heart, lungs, stomach, intestines, urinary bladder, prostate, eyes and salivary glands). By inhibiting the enzyme acetylcholinesterase, OPs prevent the nerve junction from functioning properly.

## **PRECAUTIONS**

- A. Organophosphates are highly contaminating.
- B. Victims whose skin or clothing is contaminated with liquid or powdered organophosphate can secondarily contaminate response personnel by direct contact or off gassing of solvent vapor.
- C. Clothing and leather goods (e.g., belts or shoes) cannot be reliably decontaminated; they should be incinerated.
- A. Special care should be taken to avoid contact with the vomitus of a patient who has ingested organophosphate.

## **PHYSICAL PROPERTIES**

- A. At room temperature, organophosphate powders or combustible liquids.
- B. Organophosphates are almost insoluble in water, slightly soluble in petroleum oils, and miscible with many organic solvents. Accordingly, most commercial products contain hydrocarbon solvents.
- C. Organophosphates have low vapor pressures, thus significant inhalation is unlikely at normal temperatures (Exception: Dichlorvos (a.k.a. DDVP and Vapona) when in a poorly ventilated confined space). However, the hydrocarbon solvents remain volatile and flammable, as well as possessing toxic properties.

## **ROUTES OF EXPOSURE**

- A. Inhalation
  - 1. Toxic inhalation of organophosphate vapor is unlikely at ordinary temperatures because of its low volatility, but toxic effects can occur after inhalation of organophosphate sprays or dusts
  - 2. The hydrocarbon solvents (most commonly toluene and xylene) used to dissolve organophosphate are more volatile than organophosphate itself, and toxicity can result from inhalation of solvent vapor as well
- B. Skin/Eye Contact—Organophosphates are rapidly absorbed through intact skin or eyes, contributing to systemic toxicity.
- C. Ingestion—Acute toxic effects. May be rapidly fatal.

## HEALTH EFFECTS

### A. Introduction:

1. Organophosphates are known as cholinesterase inhibitors. Normally, the neurotransmitter acetylcholine (ACh) is broken down by acetylcholinesterase (AChE). Organophosphates inhibit the activity of AChE and thus ACh is not broken down. The resulting accumulation of ACh overstimulates ACh receptors (aka cholinergic receptors) within the central and peripheral nervous systems. The toxic effects of organophosphates result from this overstimulation of ACh receptors. There are two types of ACh receptors, muscarinic and nicotinic.
2. Signs and symptoms of poisoning vary according to age, dose, and concentration
  - a. **CNS effects**—Irritability, nervousness, giddiness, fatigue, lethargy, impairment of memory, confusion, slurred speech, visual disturbance, depression, impaired gait, convulsions, loss of consciousness, coma, and respiratory depression. CNS effects can be some of the earliest symptoms.
  - b. **PNS Effects**—nicotinic and muscarinic stimulation can provide opposing effects. In general, nicotinic signs and symptoms predominate early in organophosphate poisoning, while muscarinic signs and symptoms predominate later.
    1. **Muscarinic effects**— **SLUDGE** (Salivation, Lacrimation, Urination, Defecation, Gastroenteritis, Emesis), or **DUMBELS** (Diarrhea, Urination, Miosis, Bradycardia, Bronchorrhea, Bronchospasm, Emesis, Lacrimation, Salivation, Secretion, Sweating)
    2. **Nicotinic effects**— **MTWHF** (Mydriasis, Tachycardia, Weakness, Hypertension, Hyperglycemia, Fasciculations, Flaccidity)

## PREHOSPITAL MANAGEMENT

### **HOT ZONE**

- A. Respiratory Protection: SCBA is recommended in response situations that involve exposure to potentially unsafe levels of organophosphates.
- B. Skin Protection: Chemical-protective clothing is recommended because organophosphates are rapidly absorbed through the skin and may cause systemic poisoning.

### **DECONTAMINATION ZONE**

All victims suspected of organophosphate ingestion, or substantial exposure to aerosolized organophosphates, or who have skin or eye exposure to liquid or powdered organophosphates require thorough decontamination.

## BASIC DECONTAMINATION

Follow Decontamination General Guidelines. Then, move the victim to the Treatment Area upon completion.

## **SIGNS AND SYMPTOMS**

- A. Mild poisoning HA, n/v, abdominal cramps, diarrhea.
- B. Moderate poisoning: Generalized muscle weakness and twitching, slurred speech, pinpoint pupils, excessive secretions, and shortness of breath.
- C. Severe poisoning: Seizures, skeletal-muscle paralysis, respiratory failure, and coma.

### TREATMENT

- A. Secure protected airway in cases of respiratory compromise per Airway Management protocol.
- B. There is no contra-indication to the use of paralytic agents in this setting, however both **succinylcholine and vecuronium will have a significantly sustained duration of paralysis in the presence of organophosphates.**
- C. The initial intravenous dose of atropine in adults should be determined by the severity of symptoms. In seriously poisoned patients, very large doses may be required. Alterations of pulse rate and pupillary size are unreliable indicators of treatment adequacy. **Atropine works only to correct muscarinic effects.**
  - 1. Mild poisoning—1 mg.
  - 2. Moderate poisoning—1 to 2 mg.
  - 3. Severe poisoning—2 to 5 mg.

*Doses should be repeated every 5 minutes until excessive secretions and sweating have been controlled*
- D. Administer pralidoxime (2-PAM), if profound weakness or paralysis present.
  - 1. Moderate symptoms—1,200 mg (two Mark 1 injectors or one Duodote)
  - 2. Severe symptoms—1,800 mg (three Mark 1 injectors or three Duodote injectors)

**CAUTION:** When administering 2-PAM intravenously, administer at rate of less than 200 mg/minute, (4 mg/minute for children).

**Note: The Mark 1 auto-injector atropine is 2 mg. The 2-Pam auto-injector is 600 mg pralidoxime. The Duodote Auto-Injector is atropine 2.1 mg/0.7 mL and pralidoxime chloride 600 mg/2 mL.**
- E. Patients who are comatose, hypotensive, have seizures or cardiac dysrhythmias should be treated according to ALS protocols.

### TRANSPORT TO MEDICAL FACILITY

- A. Report to OLMC, and the receiving medical facility, the condition of the patient, treatment given, and estimated time of arrival at the medical facility.
- B. If organophosphate has been ingested:
  - 1. Prepare the ambulance in case the victim vomits toxic material.
  - 2. Prepare several towels (or other absorbent material) and open plastic bags to quickly clean up and isolate vomitus

### MULTI-CASUALTY TRIAGE

Patients who have histories or evidence suggesting substantial exposure and all persons who have ingested organophosphate should be transported to a medical facility for evaluation.

- A. Others may be discharged from the scene after their names, addresses, and telephone numbers are recorded.
- B. They should be advised to seek medical care promptly if symptoms develop or recur.

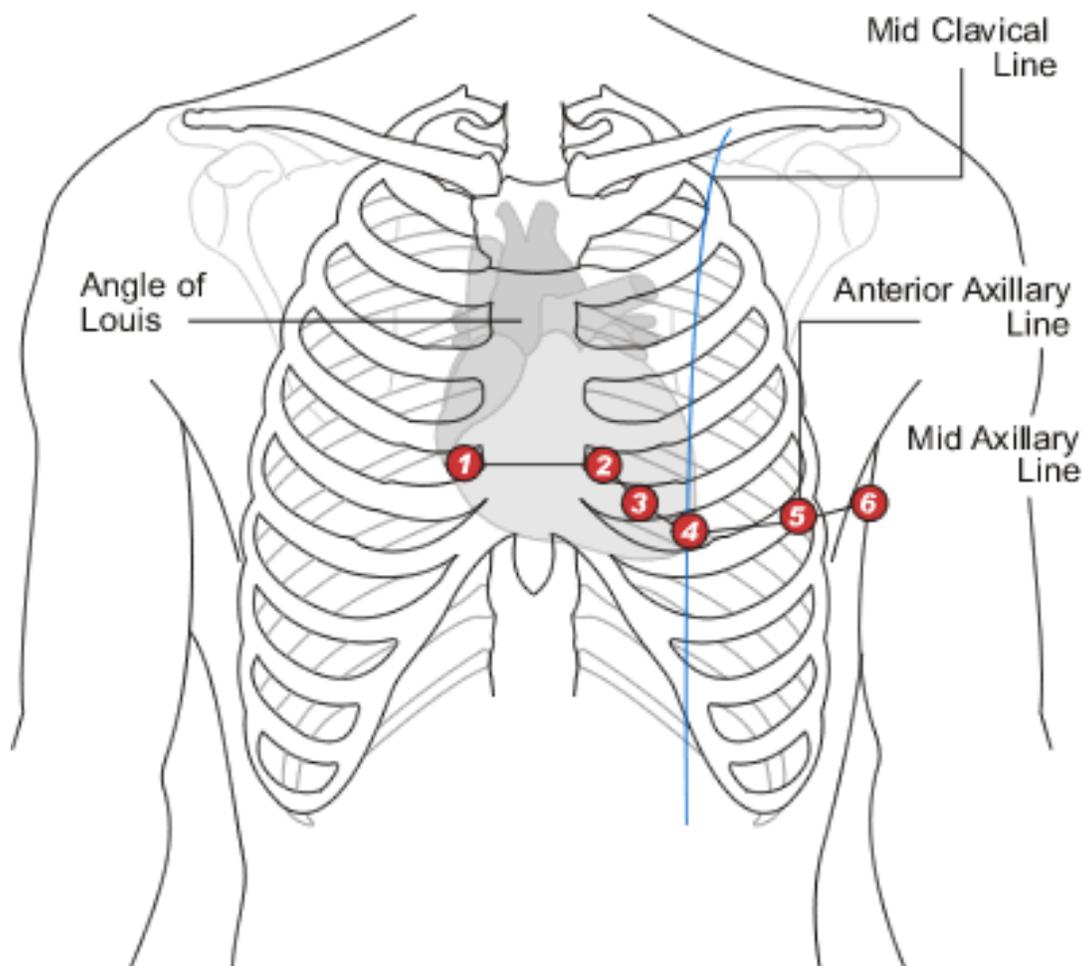
## Organophosphates – 70.040

### **PEDIATRIC PATIENTS:**

Atropine: In children, dosages range from 0.02 to 0.05 mg/kg.

Pralidoxime: Pediatric dose: 25 to 50 mg/kg and must be given slowly via IV (4 mg/min.)

# **2017 Patient Treatment Protocol Aids**



V1: Fourth intercostal space to the right of the sternum.

V2: Fourth intercostal space to the Left of the sternum.

V3: Directly between leads V2 and V4.

V4: Fifth intercostal space at midclavicular line.

V5: Level with V4 at left anterior axillary line.

V6: Level with V5 at left midaxillary line.

AMI Recognition – Lead Groupings

Limb Leads

Chest Leads

<b>I</b> Lateral	<b>aVR</b>	<b>V1</b> Septal	<b>V4</b> Anterior
<b>II</b> Inferior	<b>aVL</b> Lateral	<b>V2</b> Septal	<b>V5</b> Lateral
<b>III</b> Inferior	<b>aVF</b> Inferior	<b>V3</b> Anterior	<b>V6</b> Lateral

# 1

## MODIFIED LOS ANGELES PREHOSPITAL STROKE SCREEN

1. Age over 45 years	Yes	No	Unknown
2. No prior history of seizure disorder	Yes	No	Unknown
3. New onset of neurologic symptoms in last 24 hours	Yes	No	Unknown
4. Patient was ambulatory at baseline (prior to event)	Yes	No	Unknown
5. CBG between 60 & 400	Yes	No	
<b>Neurological examination</b>	<b>Normal</b>	<b>Abnormal</b>	
Facial smile/grimace (ask patient to smile/show teeth) Normal: both sides of face move equally well Abnormal: one side of face does not move as well as the other	Yes	Right	Left
Arm drift (patient closes eyes and hold both arms out palms up) Normal: both arms move the same or do not move at all Abnormal: One arm does not move or drifts down compared to other	Yes	Right	Left
Hand grip (have patient squeeze both hands simultaneously) Normal: equal grip strength Abnormal: unequal grip strength	Yes	Right	Left

**If questions 1 – 5 are all answered “Yes” or “Unknown” and at least 1 of the 3 neurological examination findings are abnormal and unilateral, patient is considered to have a POSITIVE screen. Continue to C-STAT evaluation.**

# 2

## C-STAT – CINCINNATI STROKE TRIAGE ASSESSMENT TOOL

	Points	
<b>Gaze Preference</b> – Deviation of eyes <b>away</b> from side of weakness, toward side of stroke.		
Absent	0	
Present	2	
<b>Arm Weakness</b> - Cannot hold up arm(s) for 10 seconds		
Absent	0	
Present	1	
<b>Level of Consciousness</b> - Incorrectly answers at least one of two LOC questions <b>AND</b> does not follow at least one of two commands.		
Absent	0	
Present	1	

**\*\*\*\*\* POSITIVE C-STAT SCORE IS  $\geq 2$  \*\*\*\*\***

## Thrombo-embolic Lesion of The Right Middle Cerebral Artery

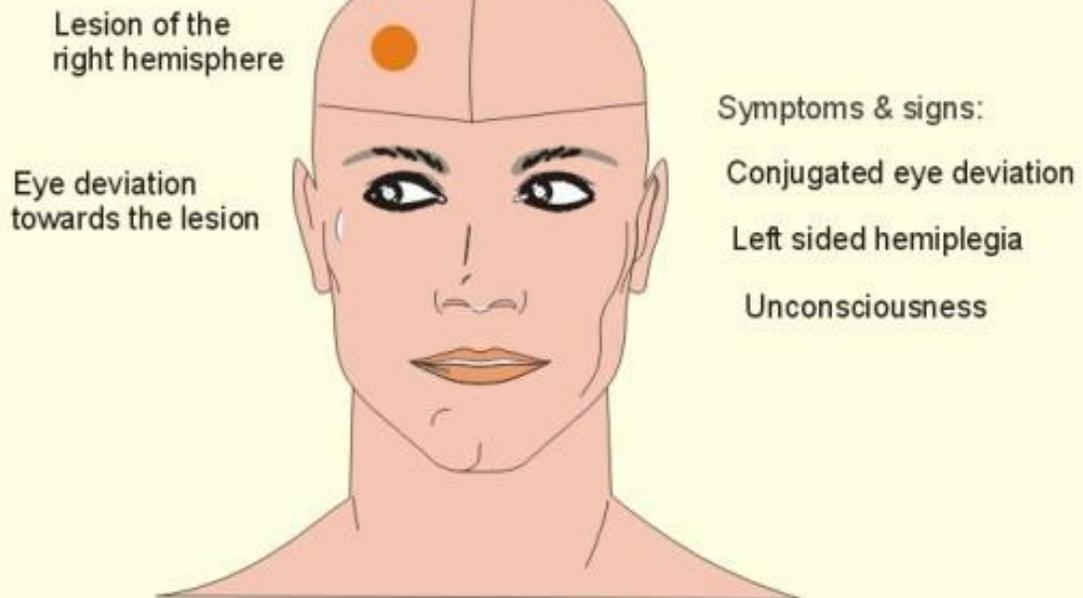


Fig 7-6