TREATMENT
Abdominal Pain

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain: nature, duration, location, radiation, intensity</td>
<td>Distension</td>
<td>Diffuse: Perforation, intraabdominal bleeding (trauma, ectopic, AAA), gastroenteritis</td>
</tr>
<tr>
<td>Associated symptoms: fever, nausea and vomiting, diarrhea, melena, painful urination</td>
<td>Tenderness</td>
<td>RUQ: cholecystitis, hepatitis, pancreatitis</td>
</tr>
<tr>
<td>Last menstrual period</td>
<td>Guarding</td>
<td>Epi gastric: peptic ulcer, pancreatitis, gastritis</td>
</tr>
<tr>
<td>Prior abdominal surgery</td>
<td>Rigidity</td>
<td>LUQ: spleen, pancreatitis, stomach (PUD)</td>
</tr>
<tr>
<td></td>
<td>Rebound</td>
<td>Flank: kidney stone, pyelonephritis</td>
</tr>
<tr>
<td></td>
<td>Masses</td>
<td>RLQ: Appendicitis, kidney stone, PID, ovarian cyst, cystitis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LLQ: diverticulitis, kidney stone, PID, ovarian cyst, cystitis</td>
</tr>
</tbody>
</table>

**Treatment:**

A. Start O₂, follow *Airway Management* procedure.

B. If shock syndrome is present and MAP > 65 mmHg (SBP > 90 mmHg), follow *Shock* protocol, and consider IV/IO, NS, large bore, TKO or as needed. If traumatic event, enter into trauma system. Rapid transport is of primary importance.

C. Place patient in comfortable position.

D. Do not allow patient to eat or drink.

E. Obtain vital signs frequently.

**Specific Precautions:**

A. Abdominal pain may be the first warning of catastrophic internal bleeding (ruptured aneurysm, liver, spleen, ectopic pregnancy, perforated viscus, etc.).

B. Since the bleeding is not apparent, you must think of **volume depletion** and monitor patient closely to recognize shock.

C. For transgender or non-binary patients, ask if any prior surgery.
# Altered Mental Status and Coma

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset / changes LOC</td>
<td>LOC</td>
<td>Hypoglycemia (diabetes)</td>
</tr>
<tr>
<td>Recent history: headache, nausea and vomiting, trauma</td>
<td>Evidence of traumatic injury</td>
<td>Hypoxia/hypercarbia/CO</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Vital signs</td>
<td>Shock (MI, hypovolemia)</td>
</tr>
<tr>
<td>CVA</td>
<td>Pupils</td>
<td>Drug/toxin</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Breath odor</td>
<td>Trauma</td>
</tr>
<tr>
<td>Seizure</td>
<td>Nuchal rigidity</td>
<td>Cerebrovascular (CVA, intracranial hemorrhage, infection, tumor)</td>
</tr>
<tr>
<td>Medications</td>
<td>Neuro deficits (weakness)</td>
<td>Metabolic (e.g., electrolyte imbalance, hypothermia, hyperthermia)</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>Confusion</td>
<td>Seizure (postictal)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Infection (meningitis/encephalitis)</td>
</tr>
</tbody>
</table>

## Treatment:

A. Determine level of consciousness.

B. Start $O_2$, follow *Airway Management* procedure. Unless intubated, transport on left side, if possible, to protect airway.

C. Monitor vital signs and respiratory status during transport.

D. Start IV/IO as needed.

E. Monitor cardiac rhythm and follow *Cardiac Dysrhythmia* protocol.

**Consider underlying causes:** Altered mental status has many causes, and may require the use of multiple protocols.
Hypoglycemia:
Determine capillary blood glucose level using blood glucose meter. If the blood glucose reading is less than 60 mg% or glucose less than 80 mg% in a known diabetic:
A. Administer glucose:
   1. Do not administer oral glucose to patients without a gag reflex or with a rapidly diminishing level of consciousness.
   2. If patient is unable to take sugar orally, administer dextrose 50%, 25-50 mL (in large vein) or dextrose 10%, 125-250 mL.
B. Repeat capillary blood glucose level after 10 minutes and treat if it remains low.
C. If unable to administer oral glucose or establish IV/IO, give glucagon 1 mg IM.

Overdose:
A. Follow Poisoning and Overdose protocol, if indicated.
B. If opioid intoxication is suspected:
   1. If no IV/IO has been established, administer naloxone 2 mg IM/IN.
   2. If IV/IO already established, administer naloxone 0.5 mg IV/IO and observe for improved respiration, IV/IO dose may be repeated every 2 minutes up to 2 mg.
   3. In most instances, a total dose of 2 mg IM/IN or IV/IO will be sufficient to reverse opioid intoxication. In some cases (methadone or designer drugs), larger doses of naloxone may be necessary. In these cases, additional doses of naloxone (2 mg IM/IN or IV/IO every 3-5 minutes) up to a MAX of 8 mg of naloxone may be administered to reverse opioid intoxication.

Psychiatric Disorders:
A. Almost never cause disorientation or alteration in level of consciousness. If the patient is disoriented, assume a medical cause.
B. Follow Psychiatric and Behavioral Disorders protocol.
C. If a non-organic cause of coma in adults (over age 16) is suspected, ammonia inhalants or other noxious stimuli may be considered.
   1. Response to noxious stimuli does not rule out medical or traumatic causes of initial coma.
   2. Never place inhalants in nostrils or inside O₂ mask.

Seizure:
Follow Seizure protocol.

Stroke:
Follow Stroke/CVA protocol.

Toxemia:
Follow OB/GYN Emergencies protocol, if indicated.
**Trauma:**

A. Maintain spinal precautions.
B. If GCS score is $\leq 13$, enter patient into the Trauma System.
C. Perform all treatment possible en route.
D. Maintain ventilation as per End-tidal $CO_2$ protocol.
   1. Secure protected airway if GCS score is $< 8$.

---

**Pediatric Considerations:**

1. Consider etiology and appropriate protocols: shock, toxic exposure, head trauma (consider intentional injury), seizure.
2. Vascular access.
3. Rapid blood glucose determination. If glucose determination is less than 60 mg% (less than 40 mg% for neonates), administer oral glucose to conscious patient, OR,
   a. If no IV/IO established and airway protective reflexes are intact, administer $D_{50}$, or other glucose containing substance, orally.
   b. If IV/IO established, administer Dextrose 10% (5 mL/kg) for neonates, infants, and children, may repeat once.
   c. If no IV/IO established and airway protective reflexes are not intact, administer glucagon 0.02 mg/kg IM to a MAX of 1 mg.
   d. Repeat blood glucose determination and treat if it remains low.
4. If mental status and respiratory effort are depressed, administer naloxone 0.1 mg/kg, MAX 2 mg IV/IO/IM.
   a. **Do Not Administer naloxone to neonates.**
   b. May repeat every 5 minutes with strong suspicion of opiate overdose, or if partial response is noted.
### Anaphylaxis and Allergic Reactions

**HX**
- Difficulty breathing / speaking (hoarseness)
- Chest tightness
- Subjective airway impairment or swelling
- Itching
- Exposure: Meds, insects or stings, food / toxic substance
- Known allergies
- Prior allergic reactions

**PE**
- LOC
- Edema (face, tongue, extremities)
- Respiratory (wheezing, hoarseness, stridor etc.)
- Rash, flushing, hives
- Hypotension/shock

**DDX**
- Anaphylaxis
- Upper airway infections
- Angioedema (medication)
- Asthma (bronchospasm)
- Urticaria
- Foreign body

### Treatment:

**A.** Protect airway; suction as needed.
1. Follow *Airway Management* procedure.
2. Cricothyrotomy may be required if unable to secure protected airway or ventilate by BVM after epinephrine has been administered.

**B.** Start IV/IO as needed. If shock syndrome is present and MAP < 65 mmHg (SBP < 90 mmHg), follow *Shock* protocol.

**C.** Monitor cardiac rhythm and if dysrhythmia is present, follow *Cardiac Dysrhythmia* protocol.

**D.** Assess severity of allergic reaction.
1. Mild (Skin signs only)
   a. Diphenhydramine 1 mg/kg IV/IO/IM to a MAX of 50 mg.
   b. Consider dexamethasone 10 mg IV/IO/IM/PO.
2. Moderate (Advancing hives, respiratory distress, etc.)
   a. Epinephrine 1:1,000 0.3 - 0.5 mg IM. May repeat once in 5-15 minutes if needed.
   b. Albuterol 2.5 mg via nebulizer.
   c. Consider:
      i. Diphenhydramine 1 mg/kg IV/IO/IM to a MAX of 50 mg.
      ii. Dexamethasone 10 mg IV/IO/IM/PO.
   a. Epinephrine 1:1,000 0.3 - 0.5 mg IM. Repeat once in 5-15 minutes if patient is still in shock Or, if IV/IO established,
   b. Epinephrine 1:10,000 0.1 mg boluses IV/IO every 3-5 min titrated to effect. MAX dose 0.5 mg.
   c. If hypotensive, fluid challenge 500–1,000 mL. Repeat once if needed.
   d. If time permits consider:
      i. Albuterol 2.5 mg via nebulizer.
      ii. Diphenhydramine 1 mg/kg IV/IO/IM to a MAX of 50 mg.
      iii. Dexamethasone 10 mg IV/IO/IM/PO.

E. SPECIAL NOTE:
   1. If 1:10,000 not available, you may dilute 1 mL of 1:1,000 epinephrine with 9 mL of NS (1 mg/10 mL) and administer 1 mL IV or IO.
Pediatric Considerations:

1. Mild Reaction (Skin Signs Only)
   a. Diphenhydramine 1 mg/kg IV/IO/IM to a MAX of 50 mg.
   b. Consider dexamethasone 0.6 mg/kg IV/IO/IM/PO to a MAX of 10 mg.

2. Moderate Reaction (Respiratory Signs)
   a. Epinephrine 1:1,000. Administer 0.01 mg/kg IM to a MAX of 0.5 mg.
      May repeat once in 5-15 minutes if needed.
   b. Albuterol 2.5 mg via nebulizer.
   c. Consider:
      i. Diphenhydramine 1 mg/kg IV/IO/IM to a MAX of 50 mg.
      ii. Dexamethasone 0.6 mg/kg IV/IO/IM/PO to a MAX of 10 mg.

3. Severe Reaction Shock (BP < for Age)
   a. Epinephrine 1:1,000. Administer 0.01 mg/kg IM to a MAX of 0.5 mg.
      Repeat once in 5-15 minutes if patient is still in severe shock.
   Or, if IV/IO established:
   b. Epinephrine 1:10,000. Administer 0.01 mg/kg (MAX 0.1 mg) IV boluses every 3-5 min
      titrated to effect. MAX total dose 0.5 mg.
   c. Treat with fluid challenge 20 mL/kg. Repeat once if needed.
   d. If time permits consider:
      i. Albuterol 2.5 mg via nebulizer.
      ii. Diphenhydramine 1 mg/kg IV/IO/IM to a MAX of 50 mg.
      iii. Dexamethasone 0.6 mg/kg IV/IO/IM/PO to a MAX of 10 mg.

4. Lowest normal pediatric systolic BP by age:
   a. Less than one month: > 60 mmHg.
   b. One month to 1 year: > 70 mmHg.
   c. Greater than 1 year: 70 + 2 x age in years.
Anaphylaxis and Allergic Reactions

**Allergic Reaction and Anaphylaxis (Adult)**

- **MILD**  
  (e.g. skin signs only)
  - Diphenhydramine 1 mg/kg IV/IO/IM to a MAX of 50 mg.
  - Consider dexamethasone 10 mg IV/IO/IM/PO.

- **MODERATE**  
  (e.g. advancing hives, respiratory distress)
  - Epinephrine 1:1,000 0.3 - 0.5 mg IM. May repeat once in 5 - 15 min if needed.
  - Albuterol 2.5 mg via nebulizer.
  - Consider:
    - Diphenhydramine 1 mg/kg IV/IO/IM to a MAX of 50 mg.
    - Dexamethasone 10 mg IV/IO/IM/PO.

- **SEVERE**  
  (e.g. cardiovascular collapse, profound shock)
  - Epinephrine 1:1,000 0.3 - 0.5 mg IM. Repeat once in 5 - 15 min if patient is still in extremis.
  - OR, if IV/IO established:
    - Epinephrine 1:10,000 0.1 mg boluses IV/IO every 3-5 min titrated to effect. MAX dose 0.5 mg.
    - Treat with fluid challenge 500–1,000 mL. Repeat once if needed.

  - If time permits consider:
    - Albuterol 2.5 mg via nebulizer.
    - Diphenhydramine 1 mg/kg IV/IO/IM to a MAX of 50 mg.
    - Dexamethasone 10 mg IV/IO/IM/PO.

- If patient's symptoms worsen, treat per appropriate algorithm branch.

- Consider OLMC contact
Anaphylaxis and Allergic Reactions (Pediatrics)

Remove exposure to trigger if known (stinger, medication, etc.)

**MILD**
(e.g. skin signs only)

- Diphenhydramine 1 mg/kg IV/IO/IM to a MAX of 50 mg.
- Consider dexamethasone 0.6 mg/kg IV/IO/IM/PO to a MAX of 10 mg.

If patient’s symptoms worsen, treat per appropriate algorithm branch.

Consider OLMC contact

**MODERATE**
(e.g. advancing hives, respiratory distress)

- Epinephrine 1:1,000 0.01 mg/kg IM to a MAX of 0.5 mg. May repeat once in 5-15 minutes if needed.
- Albuterol 2.5 mg via nebulizer.
- Consider:
  - Diphenhydramine 1 mg/kg IV/IO/IM to a MAX of 50 mg.
  - Dexamethasone 0.6 mg/kg IV/IO/IM/PO to a MAX of 10 mg.

If time permits consider:
- Diphenhydramine 1 mg/kg IV/IO/IM to a MAX of 50 mg.
- Dexamethasone 0.6 mg/kg IV/IO/IM/PO to a MAX of 10 mg.

**SEVERE**
(e.g. cardiovascular collapse, profound shock)

- Epinephrine 1:1,000 0.01 mg/kg IM to a MAX of 0.5 mg. Repeat once in 5-15 min if patient is still in extremis.
- OR, if IV/IO established:
  - Epinephrine 1:10,000 0.01 mg/kg (MAX 0.1 mg) IV/IO boluses every 3-5 min titrated to effect. MAX dose 0.5 mg.
  - Treat with fluid challenge 20 mL/kg. Repeat once if needed.

If patient’s symptoms worsen, treat per appropriate algorithm branch.

Consider OLMC contact

Lowest normal pediatric systolic BP 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
Specific Precautions:

A. Epinephrine should not be given unless signs of cardiovascular or respiratory distress are present.
B. Preferred location for IM administration, if feasible, is the mid-anterolateral aspect of thigh.
C. Common side effects include anxiety, tremor, palpations, tachycardia, and headache.
D. Acute coronary syndromes (angina, myocardial infarction, arrhythmias) may occur in both treated and untreated patients of all age groups.
E. Patients presenting with anaphylaxis who are on beta-blockers and ACE inhibitors may have a more severe anaphylaxis presentation and more adverse effects with epinephrine treatment.
   1. Epinephrine administered to a patient taking beta-blockers may produce unopposed alpha-adrenergic and reflex vagotonic effects, possibly leading to severe hypertension and the risk of cerebral hemorrhage.
   2. Anaphylaxis in a patient on beta-blockers may present with severe bronchospasm, profound hypotension and bradycardia.
   3. If epinephrine is ineffective in treating anaphylaxis in patients taking beta-blockers, both glucagon administration (1-5 mg in adults, 20-30 microgram/kg (MAX 1 mg) in children (OLMC required) and isotonic volume expansion (in some circumstances, up to several liters of crystalloid) may be necessary.
Burns

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed space (how long)</td>
<td>Respiratory distress</td>
<td>Airway</td>
</tr>
<tr>
<td>Loss of consciousness</td>
<td>Airway burns</td>
<td>Carbon monoxide/toxins</td>
</tr>
<tr>
<td>Trauma</td>
<td>(singed hair, soot, erythema, edema)</td>
<td>Cyanide</td>
</tr>
<tr>
<td>Accompanying explosion</td>
<td>Lung sounds</td>
<td>Trauma</td>
</tr>
<tr>
<td>Toxic exposure, fumes</td>
<td>Burns (% BSA Rule of 9s)</td>
<td></td>
</tr>
<tr>
<td>Respiratory complaints</td>
<td>Trauma</td>
<td></td>
</tr>
</tbody>
</table>

**Treatment:**

A. **Airway**

1. Indications for early intubation include:
   a. Signs of respiratory distress, stridor, accessory muscle use.
   b. New onset of hoarseness.
   c. Blisters or edema of oropharynx.
   d. Deep burns to lower face or neck.

B. If MAP < 65 mmHg (systolic BP < 90 mmHg) follow *Shock* protocol, otherwise follow initial fluid administration rate as below (if unresponsive to fluid bolus, consider Hydroxocobalamin (Cyanokit®) administration - See item N below).

C. Fluid Administration not in shock (Lactated Ringers, if available).

<table>
<thead>
<tr>
<th>Total Body Surface Area (TBSA)</th>
<th>Initial Fluid Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 5 %</td>
<td>125 mL/hr</td>
</tr>
<tr>
<td>6 - 13 %</td>
<td>250 mL/hr</td>
</tr>
<tr>
<td>≥ 14 %</td>
<td>500 mL/hr</td>
</tr>
</tbody>
</table>

NOTE: Burns greater than 20% TBSA should have two (2) large bore IV/IO

D. Remove jewelry and clothing that is smoldering or non-adherent to the patient.

E. Determine Total Body Surface Area (TBSA) involved utilizing either the rule of nines or palm method. (Do not include superficial thickness burns in TBSA)

F. If the patient has the following, transport to the Burn Center:
   1. Partial thickness burns greater than 10% total body surface area (TBSA).
   2. Full thickness burns in any age group.
   3. Electrical burns, including lightning injury.
   4. Chemical burns.
   5. Inhalation injuries.
6. Burns to face, hands, feet, genitalia, perineum, major joints, or circumferential burns.
7. Burns in high-risk patients (pediatrics, elderly, significant underlying cardiac or respiratory problems).
8. Trauma system patients with burns meeting the above criteria should be transported to Emanuel Trauma Center, if possible.

G. Cool burned areas (no more than 5 minutes) then cover with clean, warm, and dry sheet or blanket or clean saran wrap (if available). Discontinue cooling if patient begins to shiver. Attempt to leave unbroken blisters intact.

H. Wound care
   1. Transport using clean, dry sheets or blankets, or saran wrap.

I. Prevent hypothermia

J. Treat pain per Pain Management protocol.

K. Apply carbon monoxide (e.g. Rad-57) monitor if available and measure carbon monoxide level. If symptoms are present (e.g. headache, dizziness, weakness, nausea) and carbon monoxide level (COHb) is greater than 15%, administer 100% oxygen.

L. If chemical burn:
   1. Consider HazMat response.
   2. Protect yourself from contamination. (See Hazardous Materials - 50.060 protocol)
   3. Flush contaminated areas with copious amounts of water.
   4. If chemical is dry, carefully brush off prior to flushing.
   5. Do not use a neutralizer.

M. If electrical burn:
   1. Apply sterile dressings to entry and exit wounds. As with other injuries, keep clean, warm, and dry.
   2. Treat any dysrhythmias per appropriate Cardiac Dysrhythmia protocol.
   3. Specify arc flash or contact and voltage if known.

N. 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 dose.
   2. If Hydroxocobalamin (Cyanokit®) is not available, then administer Sodium Thiosulfate 50 ml of 25% solution over 10-20 minutes.
   3. Hydroxocobalamin (Cyanokit®) and Sodium Thiosulfate may be administered to the same patient but NOT at the same time.
   4. Treat other presenting symptoms per appropriate protocol.
   5. Initiate emergent transport to appropriate facility.
   6. Notify receiving facility if either Hydroxocobalamin or Sodium Thiosulfate are administered.
**Pediatric Patients:**
1. Treat pain per *Pain Management* protocol.
2. Consider possibility of non-accidental cause in children.
3. *Hydroxocobalamin* dose for pediatric patients is 70 mg/kg IV/IO over 15 minutes. Do not exceed adult dosing. Follow MCEMS Pediatric Guide Page 22.
4. If MAP or systolic BP is inappropriate for age, treat per *Shock* protocol. Follow Pediatric Guide.

**Notes and Precautions:**
A. Remove rings or other constricting items immediately.
B. Airway
   1. Mild inhalation injuries in patients with normal oxygen saturations and no signs of respiratory distress can be safely observed.
   2. Signs such as singed nasal hairs and facial burns alone are not indications for intubation.
   3. Be prepared to use RSI early to control airway if necessary.
C. Consider the potential for other traumatic injury or MI.
D. Maintaining the patient’s core body temperature is a priority. EMS transport vehicles should be warmed and the patient should be covered to prevent hypothermia.

**Burn Classifications**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Depth</th>
<th>Anatomical Layer</th>
<th>Appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Degree</td>
<td>Superficial</td>
<td>Epidermis only</td>
<td>Dry, red, painful, blanches</td>
</tr>
<tr>
<td>Second Degree</td>
<td>Partial superficial</td>
<td>Epidermis /papillary dermis</td>
<td>Blistered, moist, erythematous, weeping, blanches, severe pain to touch</td>
</tr>
<tr>
<td>Second Degree</td>
<td>Partial Deep</td>
<td>Epidermis /reticular dermis</td>
<td>Blisters, wet or waxy, decreased pain present to deep pressure</td>
</tr>
<tr>
<td>Third Degree</td>
<td>Full</td>
<td>Epidermis, all dermal layers</td>
<td>Waxy, white to leathery, absent pain sensation, does not blanch</td>
</tr>
<tr>
<td>Fourth Degree</td>
<td>Involves fascia/muscle and bone</td>
<td>Hypodermis/fascia</td>
<td>Waxy, white to leathery, absent pain sensation, does not blanch</td>
</tr>
</tbody>
</table>
Rule of Nines:

Palm Method:

The size of the patient's hand, including the fingers, represents approximately 1% of his/her total body surface area.
# Cardiac Arrest

Do not delay management to obtain history

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preceding symptoms</td>
<td>Determine pulselessness and/or apnea</td>
<td>Rhythm</td>
</tr>
<tr>
<td>Witnessed arrest (yes or no)</td>
<td>Pupil size and reaction</td>
<td>Asystole</td>
</tr>
<tr>
<td>Down time</td>
<td>Lung sounds (document each time the patient is moved)</td>
<td>VF</td>
</tr>
<tr>
<td>Presence or absence of bystander CPR</td>
<td>If present, document:</td>
<td>PEA</td>
</tr>
<tr>
<td>Medications/allergies</td>
<td>o Dependent lividity</td>
<td>Etiologies</td>
</tr>
<tr>
<td>History of cardiac disease or hypertension</td>
<td>o Decomposition</td>
<td>Primary Cardiac</td>
</tr>
<tr>
<td>Evidence of drug ingestion</td>
<td>o Rigor mortis</td>
<td>Hypovolemia</td>
</tr>
<tr>
<td>Presence of Advance Directive or DNAR orders</td>
<td></td>
<td>Hypoxia</td>
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<td></td>
<td></td>
<td>Acidosis</td>
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<td></td>
<td></td>
<td>Hypoglycemia</td>
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<td></td>
<td></td>
<td>Hypothermia</td>
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<td></td>
<td></td>
<td>Toxins</td>
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<td></td>
<td></td>
<td>Tamponade</td>
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<td></td>
<td></td>
<td>Tension pneumothorax</td>
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<tr>
<td></td>
<td></td>
<td>Thrombosis</td>
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<tr>
<td></td>
<td></td>
<td>Trauma</td>
</tr>
</tbody>
</table>

See *Death in the Field, Advance Directives* and *Do Not Attempt Resuscitation Orders* protocols and follow if appropriate.

**Treatment:**

- A. Initiate CPR (rate 100-120 compressions per minute). Interruptions in CPR should be avoided. When necessary, interruptions should be < 10 seconds.
- B. Check cardiac rhythm and follow appropriate Arrest Algorithm.
- C. Airway should be addressed with NO INTERRUPTION TO CPR. Ventilation rate should be 8-10 breaths/minute.
- D. Early defibrillation when appropriate.
- E. Start IV/IO; administer medication(s) as soon as feasible.
- F. Initiate Induced Hypothermia protocol.
- G. Regardless of cardiac arrest etiology or if ROSC is achieved, if patient is transported, transport to closest hospital with interventional cath lab capability.
- H. OLMC must be contacted prior to discontinuing resuscitation efforts if patient has an organized rhythm and if EtCO₂ is > 10 with wave form without CPR.
- I. Sodium bicarbonate is not recommended for routine cardiac arrest sequence but may be considered in a dose of 1 mEq/kg after prolonged arrest. Half of the original dose may be repeated every 10 minutes, if it is used.
- J. Sodium bicarbonate should be used early in cardiac arrest of known cyclic antidepressant overdose or patients with possible hyperkalemia (high potassium).
- K. If patient is intubated, consider insertion of OG tube to alleviate gastric distention.
Cardiac Arrest Algorithm

Emergency Medical Responder/EMT:
Flow of the algorithm presumes that the initial rhythm is continuing. If the rhythm changes, begin the appropriate care.

ALS backup must be requested, if not responding, for all cardiac arrests. If for any reason this protocol cannot be followed OLMC should be contacted.

ABCs
If down time estimated at greater than 5 min, CPR for 2 minutes.
If down time less than 5 min, then CPR until AED/SAD is attached.

1. Press “analyze” and defibrillate, if recommended
2. CPR for 2 minutes
3. Check pulse
4. If no pulse, repeat sequence

NOTES: Follow manufacturer recommendations for appropriate age and/or weight restrictions for AED/SAD.
Cardiac Arrest Algorithm

Paramedic/EMT-Intermediate:
Flow of algorithm presumes that the initial rhythm is continuing. If the rhythm changes, begin the appropriate algorithm.
Interruptions in CPR should be avoided. When necessary, interruptions should be < 10 seconds.

Ventricular Fibrillation and Pulseless Ventricular Tachycardia

Initiate CPR
If down time estimated at greater than 5 min, CPR for 2 minutes.
If down time less than 5 min, then CPR until defibrillator is attached.

Check monitor for rhythm - if VF or VT (pulseless)
**Defibrillate x 1 at 360 joules**
**Single defibrillator**
(CPR until ready to defibrillate)
CPR IMMEDIATELY following defibrillation
Establish IV/IO access (do not stop CPR)
**Infuse 1 L chilled saline**
Check rhythm after 2 minutes of CPR

If VF/VT persists continue CPR
Vasopressin 40 units IV/IO
**Defibrillate x 1 at 360 joules**
**Single defibrillator**
(CPR until ready to defibrillate)
CPR IMMEDIATELY following defibrillation
Recheck rhythm after 2 minutes of CPR
If VF/VT persists continue CPR
Amiodarone 300 mg IV/IO
Defibrillate x 1 at 360 joules
Single defibrillator
(CPR until ready to defibrillate)
CPR IMMEDIATELY following defibrillation
Recheck rhythm after 2 minutes of CPR

If VF/VT persists continue CPR
1:10,000 Epinephrine 1 mg IV/IO
Defibrillate x 1 at 360 joules
Single defibrillator
(CPR until ready to defibrillate)
CPR IMMEDIATELY following defibrillation
Recheck rhythm after 2 minutes of CPR

If VF/VT persists continue CPR
Amiodarone 150 mg IV/IO
Defibrillate x 1 at 360 joules
Single defibrillator
(CPR until ready to defibrillate)
CPR IMMEDIATELY following defibrillation
Recheck rhythm after 2 minutes of CPR

If VF/VT persists continue CPR
1:10,000 Epinephrine 1 mg IV/IO
Double sequential defibrillation at 720 joules
(2 Lifepaks @ 360 joules each)
(CPR until ready to defibrillate)
CPR IMMEDIATELY following defibrillation
Recheck rhythm after 2 minutes of CPR
If VF/VT persists continue CPR
Lidocaine $1.5 \text{ mg/kg}$ IV/IO
**Double sequential defibrillation at 720 joules**
(2 Lifepaks @ 360 joules each)
(CPR until ready to defibrillate)
CPR IMMEDIATELY following defibrillation
Recheck rhythm after 2 minutes of CPR

If VF/VT persists continue CPR
1:10,000 Epinephrine 1 mg IV/IO
**Double sequential defibrillation at 720 joules**
(2 Lifepaks @ 360 joules each)
(CPR until ready to defibrillate)
CPR IMMEDIATELY following defibrillation
Recheck rhythm after 2 minutes of CPR

If VF/VT persists continue CPR
Lidocaine $1.5 \text{ mg/kg}$ IV/IO
**Double sequential defibrillation at 720 joules**
(2 Lifepaks @ 360 joules each)
(CPR until ready to defibrillate)
CPR IMMEDIATELY following defibrillation
Recheck rhythm after 2 minutes of CPR

If VF/VT persists continue CPR
1:10,000 Epinephrine 1 mg IV/IO
**Double sequential defibrillation at 720 joules**
(2 Lifepaks @ 360 joules each)
(CPR until ready to defibrillate)
CPR IMMEDIATELY following defibrillation
Recheck rhythm after 2 minutes of CPR
Cardiac Arrest

If VF/VT persists continue CPR
Magnesium sulfate 2 grams IV/IO
**Double sequential defibrillation at 720 joules**
(2 Lifepaks @ 360 joules each)
(CPR until ready to defibrillate)
CPR IMMEDIATELY following defibrillation
Recheck rhythm after 2 minutes of CPR

---

**NOTES:**

A. The order of administration of Vasopressin and Epinephrine may be reversed.
B. If the rhythm is Torsades de Pointes, give magnesium sulfate 2 grams IV/IO.
C. After successful resuscitation:
   1. If patient was not defibrillated or cardioverted, do not administer an antidysrhythmic.
   2. If patient was defibrillated or cardioverted with no antidysrhythmic: Give a lidocaine bolus (1.5 mg/kg) and re-bolus with 0.75 mg/kg every 10 minutes.
   3. If amiodarone was the last antidysrhythmic given: Re-dose 30 minutes after ROSC with amiodarone 150 mg over 10 minutes.
   4. If lidocaine or magnesium was the last antidysrhythmic given: Give lidocaine 0.75 mg/kg every 10 minutes.
D. Be cautious with the administration of lidocaine or amiodarone if:
   1. Systolic BP is less than 90, OR
   2. Heart rate is less than 50 beats per minute, OR
   3. Periods of sinus arrest, OR
   4. Any A-V block is present.
E. Second defibrillator should be attached to the patient as early as practical in anticipation of using double sequential after fifth single defibrillation.
F. Double sequential defibrillation is to be used only for patients 12 years old and above.
Cardiac Arrest Algorithm

Paramedic/EMT-Intermediate:

**Asystole**
(Confirm in two leads, increase gain to rule out fine VF; if rhythm is unclear and possibly Ventricular Fibrillation, defibrillate as for VF)

**ABCs**

- Initiate CPR
- If down time estimated at greater than 5 min, CPR for 2 minutes.
- If down time less than 5 min, then CPR until defibrillator is attached.
- Establish IV/IO access
- **Infuse 1 L chilled saline**

<table>
<thead>
<tr>
<th>Vasopressin 40 units IV/IO x 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous CPR for 2 minutes</td>
</tr>
</tbody>
</table>

| 1:10,000 Epinephrine 1 mg IV/IO every 3 to 5 minutes |

**NOTES:**

The order of administration of Vasopressin and Epinephrine may be reversed.

**Consider and treat other possible causes:**

- Acidosis — consider sodium bicarbonate 1 mEq/kg IV/IO
- Cardiac Tamponade - immediate transport
- Cyclic antidepressants - consider sodium bicarbonate 1 mEq/kg IV/IO
- Hyperkalemia- consider calcium gluconate or sodium bicarbonate 1 mEq/kg IV/IO
- Hypothermia- see Hypothermia protocol
- Hypovolemia- fluid challenge
- Hypoxia- oxygenate and ventilate
- Pulmonary Embolism - immediate transport
- Tension Pneumothorax - needle decompression.

If unresponsive to at least epinephrine 3 mg consider termination of efforts if asystole is confirmed in all six limb leads (with full gain).
Administration of lidocaine or amiodarone is not indicated unless VF/PVT was present during resuscitation.
Pulseless Electrical Activity (PEA)

1. Electromechanical dissociation
2. Idioventricular rhythm
3. Ventricular escape rhythm
4. Pulseless bradycardic rhythm
5. Post defibrillation idioventricular rhythm

**ABCs**

Initiate CPR
If down time estimated at greater than 5 min, CPR for 2 minutes.
If down time less than 5 min, then CPR until defibrillator is attached.
Establish IV/IO access
**Infuse 1 L chilled saline**

Vasopressin 40 units IV/IO x 1
Continuous CPR for 2 minutes

1:10,000 Epinephrine 1 mg IV/IO every 3 to 5 minutes

**NOTES:**

The order of administration of Vasopressin and Epinephrine may be reversed.

If \( \text{EtCO}_2 > 20 \), with organized rhythm, initiate fluids per *Shock* protocol and consider norepinephrine (4-12 micrograms/min). Continue CPR until palpable pulse.

**Consider and treat other possible causes:**

Acidosis — consider sodium bicarbonate 1 mEq/kg IV/IO
Cardiac Tamponade - immediate transport
Cyclic antidepressants - consider sodium bicarbonate 1 mEq/kg IV/IO
Hyperkalemia - consider calcium gluconate or sodium bicarbonate 1 mEq/kg IV
Hypothermia - see *Hypothermia* protocol
Hypovolemia - fluid challenge
Hypoxia - oxygenate and ventilate
Pulmonary Embolism - immediate transport
Tension Pneumothorax - needle decompression

Administration of lidocaine or amiodarone is not indicated unless VF/PVT was present during resuscitation.
Cardiac Arrest with Pregnancy (> 22 weeks)

**Treatment:**

- Manage rhythm per appropriate cardiac arrest algorithm (V-Fib/Pulseless V-Tach, PEA, Asystole)
- CPR with continuous manual left lateral uterine displacement using the two-handed method shown below. (see Note G)
- Ensure BVM ventilations are with high flow oxygen utilizing a two-handed technique to prevent gastric inflation. Suction should be readily available.
- Early transport is preferable regardless of ROSC status. The gravid uterus must remain displaced during transport. Continue the two-handed technique for uterine displacement (except in the presence of mechanical CPR when the patient can be attached to a board and the board is lifted 30 degrees in left lateral decubitus position). If patient is in cardiac arrest notify and transport to the closest facility.
- IV/IO access should be above the diaphragm (humeral IO or external jugular access is preferred).
- Intubation should be with an endotracheal tube if possible and be performed by the most experienced provider using VL if available. Consider using an endotracheal tube 1-2 sizes smaller than you would normally use.
Notes and Precautions (Pregnancy):
A. Early transport prior to achieving ROSC, especially if a mechanical CPR device is available.
B. Alert the receiving facility early in order to have an OB team present upon arrival in the emergency department. If you have not achieved ROSC go to the closest facility regardless of OB capabilities.
C. If ROSC has been achieved prior to, or during transport, bypass to an OB and NICU capable facility
D. Lidocaine is preferable (Class B in Pregnancy) to amiodarone (Class C in Pregnancy) in the setting of ventricular fibrillation or pulseless ventricular tachycardia.
E. In the setting of ventricular fibrillation or pulseless ventricular tachycardia, no adjustments need to be made to defibrillation energy settings. Immediately following defibrillation, resume the left lateral uterine displacement.
F. If mechanical CPR is in place, continue the left lateral uterine displacement by tilting the backboard 30° to the left or by continuing manual displacement.
G. If ROSC is achieved continue left lateral uterine displacement by placing the patient in the left lateral decubitus position or by manually displacing the gravid uterus.
H. High flow oxygen needs to be maintained in all peri-arrest patients.
I. Consider OG placement when possible.
Cardiac Arrest Algorithm

Paramedic/EMT-Intermediate:

Pediatric Considerations
Cardiac arrest in children is often secondary to respiratory failure. Ventilation may cause spontaneous return of cardiac function!

NO VASOPRESSIN IN PEDIATRICS

Ventricular Fibrillation and Pulseless Ventricular Tachycardia
Follow adult cardiac arrest algorithm except as noted.

Defibrillate at 4 joules/kg.
Substitute the following drug dosages.
1. Epinephrine 0.01 mg/kg IV/IO; MAX 1 mg (10 mL 1:10,000 IV/IO)
2. Amiodarone 5 mg/kg IV/IO repeat once with 2.5 mg/kg
3. Lidocaine 1.5 mg/kg IV/IO up to 3 mg/kg
4. Sodium bicarbonate 1 mEq/kg IV/IO then 0.5 mEq/kg for subsequent doses.
5. Magnesium sulfate 25 mg/kg IV/IO

Asystole
1. Epinephrine every 3-5 minutes

Pulseless Electrical Activity
1. Epinephrine every 3-5 minutes

Consider and treat other possible causes:
Acidosis — consider sodium bicarbonate 1 mEq/kg IV/IO
Cardiac Tamponade - immediate transport
Cyclic antidepressants - consider sodium bicarbonate 1 mEq/kg IV/IO
Hyperkalemia- consider sodium bicarbonate 1 mEq/kg IV/IO or calcium gluconate 0.5 mL/kg IV/IO
Hypothermia - see Hypothermia protocol
Hypovolemia - fluid challenge
Hypoxia - oxygenate and ventilate
Pulmonary Embolism - immediate transport
Tension Pneumothorax - needle decompression
**Table 1: Neonates - Immediate Postnatal Resuscitation**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Indication</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dextrose, 10%</td>
<td></td>
<td>5 mL/kg (0.5 gram/kg) MAX 250 mL</td>
</tr>
<tr>
<td>Dilution ratio:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 part D50 to 4 parts NS.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epinephrine</td>
<td>Bradycardia, Cardiac Arrest</td>
<td>0.01 mg/kg Repeat every 3-5 minutes</td>
</tr>
<tr>
<td>Sodium Bicarbonate (Dilute by 1/2 with NS)</td>
<td>Metabolic Acidosis</td>
<td>1 mEq/kg</td>
</tr>
</tbody>
</table>

**Table 2: Infants And Children**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Indication</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenosine</td>
<td>PSVT</td>
<td>0.1 mg/kg; 0.2 mg/kg</td>
</tr>
<tr>
<td>Amiodarone</td>
<td>V-fib/Pulseless V-tach V-tach with pulse</td>
<td>5 mg/kg IV/IO Repeat once with 2.5 mg/kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.5 mg/kg IV/IO Mix with 2 mL/kg of NS in Buretrol and infuse over 10 minutes</td>
</tr>
<tr>
<td>Atropine</td>
<td>Bradycardia</td>
<td>0.02 mg/kg - May repeat dose once. Minimum dose: 0.1 (Do not exceed adult dose)</td>
</tr>
<tr>
<td>Calcium Gluconate</td>
<td>Antidote for calcium channel blocker OD, HF, iatrogenic magnesium intoxication</td>
<td>0.5 mL/kg IV/IO</td>
</tr>
<tr>
<td>Dextrose, 10%</td>
<td>Hypoglycemia</td>
<td>5 mL/kg (0.5 gram/kg)</td>
</tr>
<tr>
<td>Epinephrine</td>
<td>V-fib, low cardiac output, Cardiac arrest, asystole, PEA</td>
<td>0.01 mg/kg Repeat every 3-5 minutes.</td>
</tr>
<tr>
<td>Lidocaine</td>
<td>Recurrent Ventricular Fibrillation, Stable VT</td>
<td>Bolus: 1.5 mg/kg (3 mg/kg MAX) Maintenance: 0.75 mg/kg q 10 min.</td>
</tr>
<tr>
<td>Midazolam</td>
<td>Pacing, Cardioversion, Seizures</td>
<td>IV or IO: 0.1 mg/kg IM or IN: 0.3 mg/kg</td>
</tr>
<tr>
<td>Magnesium Sulfate</td>
<td>V-fib/Pulseless V-tach</td>
<td>25 mg/kg IV/IO</td>
</tr>
<tr>
<td>Naloxone</td>
<td>Respiratory depression secondary to narcotics</td>
<td>0.1 mg/kg - MAX of 2 mg.</td>
</tr>
<tr>
<td>Norepinephrine</td>
<td>Low cardiac output</td>
<td>0.1 to 2 micrograms/kg/min</td>
</tr>
<tr>
<td>Sodium Bicarbonate (Dilute by 1/2 with NS)</td>
<td>Metabolic acidosis, Cyclic antidepressant OD, Hyperkalemia</td>
<td>1 mEq/kg/dose</td>
</tr>
</tbody>
</table>

**Note:** Pediatric doses should not exceed adult doses.
Cardiac Dysrhythmias

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past medical history</td>
<td>AMS</td>
<td>Sinus bradycardia</td>
</tr>
<tr>
<td>Medications</td>
<td>Respiratory distress</td>
<td>AV blocks</td>
</tr>
<tr>
<td>• Beta blockers</td>
<td>Hypotension / shock</td>
<td>Acute MI</td>
</tr>
<tr>
<td>• Calcium Channel blockers</td>
<td>Chest pain</td>
<td>Hypoxia</td>
</tr>
<tr>
<td>• Clonidine</td>
<td>CHF</td>
<td>Hypothermia</td>
</tr>
<tr>
<td>• Digitalis</td>
<td>Syncope</td>
<td>Head injury (increased ICP)</td>
</tr>
<tr>
<td>Pacemaker</td>
<td>Seizures</td>
<td>Spinal cord lesion</td>
</tr>
</tbody>
</table>

**Treatment:**

A. Start O₂, follow *Airway Management* procedure, and apply pulse oximeter.
B. Start IV/IO, NS and follow *Shock* protocol if indicated.
C. Monitor cardiac rhythm, see the following cardiac dysrhythmias on the next pages:

**NOTES:**
If the patient is asymptomatic, dysrhythmias may not require treatment in the field.
Cardiac Dysrhythmias - Adult Tachycardia **(Stable)**

Start oxygen per *Airway Management* procedure. 
Monitor vital signs, ECG and oxygen saturation. Establish IV/IO access.

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

- Obtain 12-lead ECG

**Narrow QRS (≤ 0.12 sec)**

- Regular
  - Attempt vagal maneuvers
    - Adenosine 6 mg rapid IV/IO
    - Adenosine 12 mg rapid IV/IO
    - Adenosine 12 mg rapid IV/IO

- Irregular
  - Consider:
    - Atrial fibrillation
    - Atrial flutter
    - Multifocal atrial tachycardia
  - Monitor Patient
  - Obtain post treatment 12-lead ECG
  - Contact OLMC for advice
  - Consider contributing factors and other treatments

**Wide QRS (> 0.12 sec)**

- Irregular
  - Consider wide complex irregular rhythms including WPW, AFib with aberrancy
  - If possible
    - Torsades Magnesium Sulfate 2 grams IV/IO over 1-2 minutes
  - If no conversion, repeat amiodarone 150 mg IV/IO over 10 min
  - Amiodarone 150 mg IV/IO over 10 min

- Regular
  - Consider Adenosine 6 mg rapid IV/IO if possible aberrancy
Cardiac Dysrhythmias - Adult Tachycardia (Unstable)

Start oxygen per Airway Management procedure. Monitor vital signs, ECG and oxygen saturation. Establish IV/IO access.

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

- Immediate synchronized cardioversion at 360 joules*.
- May repeat synchronized cardioversion at 360 joules* once if no change in rhythm.
- If patient is conscious, administer midazolam 2.5 - 5.0 IV/IO/IN or Etomidate (0.15 mg/kg) IV/IO for sedation. May repeat midazolam to MAX of 5.0 mg. Do not delay cardioversion for sedation.

*If patient is in a wide complex irregular tachycardia use defibrillation (unsynchronized)

Did the patient convert?

No

Amiodarone 150 mg IV/IO Slow push

Cardioversion at 360 joules*

* If patient is in a wide complex irregular tachycardia use defibrillation (unsynchronized)

If still no conversion

Initiate rapid transport

Contact OLMC

If patient converts

- Obtain post treatment 12-lead ECG
- Contact OLMC for advice regarding post-conversion antidysrhythmics
- Consider contributing factors and other treatments
**Notes and Precautions: (Tachycardia):**

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 (Porta Cath, Broviac, Hickman, etc).

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 - Pediatric Tachycardia (Stable)

Start oxygen per *Airway Management* procedure. Monitor vital signs, ECG and oxygen saturation. Establish IV/IO access.

Are signs or symptoms of poor perfusion caused by the dysrhythmia present?

- No - Pt stable. Obtain 12-lead ECG

Narrow complex QRS (≤ 0.09 sec)

- Probable Sinus Tachycardia
  - P waves present
  - Variable RR; Consistant PR
  - HR < 220 infants
  - HR < 180 children

  Monitor patient

Wide complex QRS (> 0.09 sec)

- Probable SVT
  - Compatible history
  - P waves absent/abnormal
  - HR not variable
  - HR ≥ 220 infants
  - HR ≥ 180 children

  Attempt vagal maneuvers

  Adenosine 0.1 mg/kg rapid IV/IO

  If no conversion may repeat adenosine x2 at 0.2 mg/kg rapid IV/IO

Possible Ventricular Tachycardia

- If rhythm is regular and QRS is monomorphic, consider adenosine 0.1 mg/kg rapid IV/IO

Obtain post treatment 12-lead ECG

Contact OLMC for advice

Consider contributing factors and other treatments
Cardiac Dysrhythmias - Pediatric Tachycardia (Unstable)

Start oxygen per Airway Management procedure. Monitor vital signs, ECG and oxygen saturation. Establish IV/IO access.

Are signs or symptoms of poor perfusion caused by the dysrhythmia present?

Yes - Pt unstable

- Immediate synchronized cardioversion 4 joules/kg. If no response, repeat synchronized cardioversion at 4 joules/kg.
- If patient is conscious, administer midazolam (consult Pediatric Guide for dose) IV/IO/IN or Etomidate (0.15 mg/kg) IV/IO for sedation. May repeat midazolam to MAX of 5.0 mg. Do not delay cardioversion for sedation.

If patient is in a wide complex irregular tachycardia use defibrillation (unsynchronized)

Did the patient convert?

No

Amiodarone
2.5 mg/kg IV/IO
Slow push

Cardioversion 4 joules/kg x2 if needed

If patient is in a wide complex irregular tachycardia use defibrillation (unsynchronized)

If still no conversion

Initiate rapid transport

Contact OLMC

Yes

Obtain post treatment 12-lead ECG
- Contact OLMC for advice regarding post-conversion antidysrhythmics
- Consider contributing factors and other treatments
NOTES:
A. Use pediatric pads for cardioversion for children less than 15 kg.
B. Place on anterior chest in sternal-apical location.
C. If pediatric pads are not available, use adult pads placed anterior-posterior on the chest wall with firm contact.
D. If available defibrillator will not “dial down” to appropriate energy level, use lowest possible energy level available.
Cardiac Dysrhythmias - Adult Bradycardia

**HEART RATE < 50**

Start oxygen per *Airway Management* procedure. Monitor vital signs, ECG and oxygen saturation. Establish IV/IO access.

Are signs or symptoms of poor perfusion caused by the bradycardia present? (Altered mental status, chest pain, hypotension or other signs of shock)

- **No - Pt stable**
  - Observe and monitor patient. Consider 12-lead ECG if patient is stable.

- **Yes - Pt unstable**
  - 2nd degree Type II, or 3rd degree heart block, or Cardiac transplant?
    - **No**
      - Atropine 0.5 mg IV/IO. May repeat every 3-5 minutes to a MAX of 3 mg.
      - If no response to atropine, *Transcutaneous Pacing* per protocol
        - **Capture?**
          - **Yes**
            - Monitor patient
          - **No**
            - Monitor patient

    - **Yes**
      - Atropine 0.5 mg IV/IO. May repeat every 3-5 minutes to a MAX of 3 mg.
      - *Transcutaneous Pacing* per protocol
        - **Capture?**
          - **Yes**
            - Monitor patient
          - **No**
            - Monitor patient

- If no response to pacing or atropine:
  - Consider epinephrine infusion 2-10 micrograms/min titrated to effect *or* norepinephrine 4 micrograms/min (increase every 5 min in 4 micrograms/min increments to MAX 12 micrograms/min).
  - Consider OLMC contact.

- If capture is achieved and patient is uncomfortable, consider Midazolam 2.5 - 5.0 mg IV/IO or 5 mg IM/IN. May repeat IV/IO/IN dose once to a MAX of 5 mg.
- If capture is not achieved, try repositioning pads.
- Goal of therapy is to improve perfusion and maintain a BP of > 90 mmHg systolic.
Notes and Precautions: (Bradycardia):
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 Transcutaneous Pacing can be considered in unstable patients when vascular access is not available.
E. Transcutaneous Pacing is at best a temporizing measure and is not useful in asystole.
F. If Transcutaneous Pacing capture is not achieved, try repositioning pads.
G. If capture is achieved with Transcutaneous Pacing and patient is experiencing discomfort administer midazolam 2.5 - 5.0 mg IV/IO or 5 mg IM. May repeat IV/IO dose once to a MAX of 5 mg.
H. Atropine will likely be ineffective in heart transplant recipients because they lack vagal innervation.
I. 3rd 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 - Pediatric Bradycardia

**BRADYCARDIA WITH A PULSE**

- Start oxygen per *Airway Management* procedure.
  - Monitor vital signs, ECG and oxygen saturation. Establish IV/IO access.
  - Support ABCs

Bradycardia causing cardiorespiratory compromise or poor perfusion?

- **No - Pt stable**
  - Continue to support ABCs as needed.
  - Monitor patient.
  - Consider OLMC contact.

- **Yes - Pt unstable**
  - Start CPR if despite oxygenation and ventilation patient's heart rate is < 60 bpm with poor perfusion.
  - Reassess after 2 minutes of CPR.

Persistent symptomatic bradycardia?

- **No**

- **Yes**
  - Give 1:10,000 epinephrine 0.01 mg/kg IV/IO. Repeat epinephrine every 3-5 minutes.
  - If increased vagal tone or AV block, consider Atropine 0.02 mg/kg IV/IO.
    - Minimum single dose 0.1 mg; MAX single dose 0.5 mg. MAX total dose 1 mg.
  - Consider pacing per *Transcutaneous Pacing* procedure.
  - If capture is achieved and patient is uncomfortable, consider Midazolam 0.1 mg/kg IV/IO to a MAX of 2.5 mg.
  - If capture is not achieved, try repositioning pads.
  - Goal of therapy is to improve perfusion.

**Specific Precautions:**

A. Most pediatric bradycardia is due to hypoxia. Oxygenate and ventilate aggressively.
Premature Ventricular Complexes (PVCs):

A. Treat only in the setting of a suspected ischemic event.
B. If PVCs are associated with bradydysrhythmia, see section on bradydysrhythmias.
C. Lidocaine for PVCs:
   1. Initial bolus of 1.5 mg/kg over 1 to 2 minutes.
   2. If no change, administer 0.75 mg/kg every 5 minutes up to 3 mg/kg.
   3. When PVCs are suppressed administer 0.75 mg/kg every 10 minutes.
   4. All doses, after initial bolus, must be reduced to 1/4 of initial bolus in patients with congestive heart failure; shock; hepatic disease; or in patients over 70 years of age.
   5. Lidocaine should not be used without OLMC direction, if:
      a. BP is less than 90 mm/Hg.
      b. Heart rate is less than 50 beats per minute.
      c. Periods of sinus arrest.
      d. Presence of second or third degree AV block.

Wide Complex Arrhythmia with HX of Renal Failure (Hyperkalemia)

A. Renal failure may elevate blood potassium levels (hyperkalemia) causing bradycardia, hypotension, weakness, weak pulse and shallow respiration. Typical ECG changes include peaked T-waves, lowered P-wave amplitude or the loss of the P-wave altogether, prolonged PR interval, second degree AV block, and a widened QRS.
   1. Administer 10 mL calcium gluconate 10% solution slow IV over 5-10 minutes.
   2. If no change in rhythm and transport time is prolonged, consider alternative therapy as per OLMC.
      a. Glucose and insulin (glucose and insulin may be given if patient is insulin dependent and patient’s insulin is available).
      b. High dose albuterol (10 mg in saline by nebulizer).
      c. Sodium bicarbonate, one amp (50 mL) IV/IO.

NOTES:
Do not mix sodium bicarbonate with calcium preparations. Administer calcium gluconate at a site proximal to the IV catheter. Slowly flush remaining calcium gluconate from the catheter prior to administering sodium bicarbonate.
Chest Pain / Acute Coronary Syndrome

HX | PE | DDX
---|---|---
Pain (onset, duration, severity, location, radiation, aggravation) | Breath sounds | Acute MI
(N/V, SOB, diaphoresis, arm pain) | Peripheral edema | Unstable angina
Previous MI, angina, HTN, diabetes, COPD | | Pulmonary embolus
Previous cardiac surgeries, stents | | Pneumothorax
Medications | | Aortic dissection

**Treatment:**

A. Start O₂, follow *Airway Management* procedure.
B. Monitor vital signs, cardiac rhythm and oxygen saturation. Attempt to maintain O₂ saturation above 95%.
C. If ischemic event suspected, obtain 12-lead ECG if available. This may be done concurrently with other treatment and should not delay treatment or transport. See below for interpretation.
D. Start IV/IO prior to administration of nitroglycerin for patients who have never taken nitroglycerin; follow *Shock* protocol if indicated.
E. Drugs:
   1. Administer aspirin PO (approximately 324 mg) unless contraindicated.
   2. After 12-lead is obtained, nitroglycerin 0.4 mg SL (spray, tablet or powder) every 5 min, if systolic BP is equal to or greater than 100 mm/Hg, or until chest pain is relieved.
   3. For pain unrelieved after 3 nitroglycerin, and if the BP is greater than 100 mm/Hg systolic, administer fentanyl 25-100 micrograms IV/IO/IN; may repeat every 3-5 minutes as needed to a MAX of 400 micrograms. Or, fentanyl 25-100 IM; may repeat every 15 minutes to a MAX of 400 micrograms. Nitroglycerin may be continued for strong suspicion of acute coronary syndrome.
Specific Precautions

A. DO NOT DELAY ADMINISTRATION OF ASPIRIN TO OBTAIN 12 LEAD NTG administration to patients with an acute inferior wall myocardial infarction should be performed with close monitoring of vital signs and rhythm. NTG in these patients may result in symptomatic hypotension and/or shock which should be treated with usual measures (fluids, changes in position, medications if necessary).

B. Do not administer nitroglycerin without OLMC if patient has taken Viagra or other similar drugs in the last 24 hours or Cialis (tadalafil) within last 48 hours.

C. Contraindications to administration of aspirin:
   1. Allergy to aspirin or aspirin induced asthma.
   2. History of active bleeding disorder, (i.e., hemophilia).
   3. Current ulcer or GI bleeding.
   4. Suspected aortic dissection.

D. If 12-Lead ECG is obtained, use biological sex as assigned at birth. If patient does not disclose, use default setting (male).

Field Identified ST-Elevation MI (STEMI)

Indication

12-lead ECG with:
- Paramedic interpretation of probable STEMI: 1 mm elevation in 2 contiguous limb leads or 2 mm elevation in 2 contiguous chest leads

Action

A. As soon as STEMI is recognized, prompt and early notification of the receiving facility of “STEMI patient” or “STEMI alert” should be performed.

B. Rapid transport to destination hospital ED with interventional capability.

C. Non-diagnostic ECGs with potential “imitators” of ACS or ECGs that are clinically concerning should be described to the receiving hospital or OLMC. These may include:
   - LBBB or RBBB
   - LVH
   - SVT with aberrancy
   - Paced rhythms
   - Pericarditis
   - Benign early repolarization
   - Digitalis effect
Crush Injury

**Treatment:**

A. Control/stop hemorrhage.
B. Airway Management procedure if indicated.
C. Spinal immobilization if indicated.
D. Monitor cardiac rhythm for signs of hyperkalemia. (Widening QRS > .08ms, peaked T-waves, sine wave, etc).
E. Start IV/IO if feasible.
F. Consider pain management.
G. Wound care.
   1. Remove all restrictive dressings (clothing, jewelry, etc).
   2. Continually monitor distal pulse, motor and sensation in involved extremity.
   3. Bandage all open wounds. (Irrigate if needed.)
   4. Stabilize all protruding foreign bodies (impaled objects).
   5. Splint/immobilize injured areas.
   6. For suspected pelvic crushing injuries, follow the *Pelvic Wrap* procedure if indicated.
H. If severe crushing injury/compartment syndrome:
   1. If cardiac monitor is available, treat for hyperkalemia if present.
   2. If feasible, administer 1000 – 2000 mL (pediatric: 10 to 20 mL/kg) of isotonic fluid prior to extrication and maintain IV/IO infusion at 500 mL (peds 5 mL/kg per hour).
   3. Perform extrication.
   4. Reassess patient and monitor for signs of hyperkalemia.
I. If hyperkalemia is suspected or present, then:
   1. Administer 10mL calcium gluconate 10% solution slow IV over 5-10 minutes.
   2. High dose albuterol (10mg in saline by nebulizer).
   3. Sodium bicarbonate, one amp (50mL) IV/IO.
Precautions:

- If circumstances warrant, begin warming procedures to prevent hypothermia.
- If patient is trapped in a heavy dust environment, consider methods to provide nebulized oxygen. Consider the use of nebulized albuterol.
- If patient is severely trapped and requires prolonged extrication or potential amputation, contact OLMC for Trauma Surgeon advice and ensure that a technical rescue team is activated.
- During extrication, continually monitor patient condition, if possible.

Notes:

- Renal failure may elevate blood potassium levels (hyperkalemia) causing bradycardia, hypotension, weakness, weak pulse and shallow respiration. Typical ECG changes include peaked T-waves, lowered P-wave amplitude or the loss of the P-wave altogether, prolonged PR interval, second degree AV block, and a widened QRS.
- A venous tourniquet may have a role during extrication to control the effects of hyperkalemia in crush injuries.
Epistaxis

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior history of epistaxis</td>
<td>Estimate blood loss</td>
<td>Chronic sinusitis</td>
</tr>
<tr>
<td>Severity</td>
<td>Bilateral bleeding</td>
<td>Foreign body</td>
</tr>
<tr>
<td>Frequency</td>
<td>Blood in posterior pharynx</td>
<td>Trauma</td>
</tr>
<tr>
<td>Duration</td>
<td>Vital signs</td>
<td>Medications</td>
</tr>
<tr>
<td>Potential causes:</td>
<td>Signs of severe liver disease (ascites, icterus)</td>
<td>Bleeding disorders</td>
</tr>
<tr>
<td>• Trauma</td>
<td></td>
<td>Hypertensive crisis</td>
</tr>
<tr>
<td>• Medications (e.g. anticoagulation, currently on chemotherapy)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Underlying diseases such as hematological malignancy (e.g. leukemia, liver disease)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Bleeding disorder (e.g. hemophilia, Von Willebrand Disease)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Treatment:**
A. Place patient in position of comfort and have them tilt head forward.
B. Compress nose with direct pressure or approved nose clip device.
C. If Mean Arterial Pressure (MAP) < 65 mmHg, follow **Shock Protocol.**

**Diagram:**

```
  NO
 /       \
|        |
| Have patient blow nose to expel clots |
| O

Bleeding controlled with direct pressure

YES

Monitor only
```
Pediatric
1. Follow adult algorithm.
2. Oxymetazoline hydrochloride should be avoided if child cannot follow instructions to blow their nose or are unable to tolerate the administration of a nasal medication.

Specific Precautions
A. It is difficult to quantify blood loss with epistaxis.
B. Bleeding may also occur posteriorly. A posterior nasal bleed will continue to bleed in spite of direct pressure. In many cases, examining the back of the throat or asking the patient if bleeding “has slowed or stopped” is also helpful.
C. Posterior epistaxis is a true emergency and may require advanced ED techniques such as balloon tamponade or interventional radiology. Do not delay transport. Be prepared for potential airway issues.
D. Detailed medication history should be obtained to include Coumadin and newer anticoagulation agents (direct oral anticoagulants (DOAC’s) such as apixaban, rivaroxaban, dabigatran), aspirin, NSAIDS, antiplatelet agents that may contribute to bleeding.
E. For patients on home oxygen via nasal cannula, place the cannula in the patient’s mouth while the nares are compressed for active bleeding.
# Eye Emergencies

## HX
- **Mechanism of injury**
- **Timing of the injury**
- **Current vision (can they see?)**
- **Status of vision prior to injury (e.g. eyeglasses, contacts, glaucoma etc)**
- **Eye protection**
- **First aid rendered**
- **If chemical burn, what was the material or product.**

## PE
- **Visual Acuity (each eye separately)**
- **External Exam (upper and lower eyelids)**
- **Extraocular movements**
- **Eye**
  - Sclera (obvious penetration)
  - Cornea (blood, cloudy)
  - Blood in anterior chamber
  - **Pupils**

## DDX
- **Penetrating**
- **Corneal burns**
- **Corneal abrasion / foreign body**
- **Blow out fracture to eye**

## Treatment:

**A.** In order to decrease intraocular pressure, patients should be transported sitting at least a 30 degree angle unless contraindicated.

**B.** Monitor vital signs.

**C.** Treat specific injuries as follows:

1. **Chemical Exposure**
   - **a.** Administer proparacaine.
   - **b.** Irrigate from the center of the eye towards the eyelid with lactated ringer’s (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 affected eye with a hard shield or similar device and cover the other eye.
   - **b.** Follow Pain Protocol, as indicated and consider ondansetron per *Nausea and Vomiting* Protocol.
3. Superficial Foreign Body Sensation
   a. Do not wipe eye
   b. Administer proparacaine
   c. Consider irrigation with Lactated Ringer’s, isotonic saline or tap water for 30 minutes, or until foreign body is removed

Proparacaine Administration:

**Class:**
Local anaesthetic

**Pharmacology and Actions:**
Proparacaine hydrochloride is a short-acting local anaesthetic 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.

**Precaution:**
Systemic effects are rare with topical use.

<table>
<thead>
<tr>
<th>Adult Indication</th>
<th>Adult Dose</th>
<th>Adult Route(s)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign body or burn to eye</td>
<td>One drop in the affected eye. If effect is not felt within one minute, three additional drops, one drop at a time, may be given at one minute intervals. For transports longer than 15 minutes, if eye pain returns, 1-4 additional drops may be given.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pediatric Indication</th>
<th>Pediatric Dose</th>
<th>Pediatric Route(s)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same as adult</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Side Effects:**
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.

**Specific Precautions:**
Document blurring, double vision, perceived flashes of light or other visual changes. Contact lenses should be removed, if possible.
### Hyperthermia

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset of symptoms</td>
<td>LOC</td>
<td>Heat stroke</td>
</tr>
<tr>
<td>Environmental temperature/humidity</td>
<td>Sweating (present or absent)</td>
<td>Drugs (cocaine etc)</td>
</tr>
<tr>
<td>Physical activity</td>
<td>Skin</td>
<td>Sepsis</td>
</tr>
<tr>
<td>Muscle cramps</td>
<td>Neuro</td>
<td>CVA</td>
</tr>
<tr>
<td>Weakness</td>
<td></td>
<td>Primary seizure disorder</td>
</tr>
<tr>
<td>Headache/syncope</td>
<td></td>
<td>Encephalitis / meningitis</td>
</tr>
<tr>
<td>Drugs</td>
<td></td>
<td>Malignant hyperthermia</td>
</tr>
<tr>
<td>Medications</td>
<td></td>
<td>See below for heat illness DDX</td>
</tr>
</tbody>
</table>

#### Treatment:

- **A.** Undress patient and begin cooling measures that maximize evaporation and convection.
  
  (A spray bottle with tepid water works well.)
- **B.** Start O₂, follow **Airway Management** procedure.
- **C.** Monitor cardiac rhythm and follow **Cardiac Dysrhythmia** protocol.
- **D.** Infuse chilled saline fluid bolus (IV/IO) up to 2,000 mL.
- **E.** If the patient starts shivering, stop cooling measures.
- **F.** For seizures, follow **Seizure** protocol.

#### Specific 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 patient **without** good airflow will tend to increase temperature and should be avoided.
- **C.** **Do Not Let Cooling in the Field Delay Your Transport;** cool patient if possible while en route.
- **D.** Suspect hyperthermia in patients with altered mental status or seizures on hot, humid day.
# Hypothermia

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Exposure (submersion, cold environmental) Underlying medical conditions Elderly Infants, neonates Sepsis Shock Starvation Endocrine (diabetes, hypothyroid) Medications Spinal cord injury Burns</td>
<td>LOC Presence or absence of spontaneous respiration, oxygen saturation (if obtainable) Pulse (rate) ECG (underlying rhythm wide/ narrow QRS)</td>
<td>Etiology: Increased heat loss (environment, burns, prolonged extrication etc) OR Decrease heat production (starvation, age extremes etc) Severity of hypothermia best assessed by: Mental status Orientated: Mild Confused, disorientated: Moderate Comatose: Severe ECG QRS duration Narrow: Mild Sinus brady: Moderate Severe bradycardia (&lt;40) Wide QRS: Severe Consider underlying medical conditions if no environmental factors.</td>
</tr>
</tbody>
</table>

## Treatment:

A. Start $O_2$, follow *Airway Management* procedure with the following exception:
   1. Manage airway with BVM.
   2. If oral intubation is necessary, proceed carefully.
      a. If jaw is difficult to open, use BVM.
      b. Paralytics should not be used in these patients.

B. Remove all wet clothing as soon as possible and provide patient with warm blankets.

C. Place patient in a heated environment as soon as possible.

D. Start IV/IO as needed, if possible infuse warmed IV/IO fluids (99° to 113° F).

E. Patients who are profoundly hypothermic, (Patient “A”), may require pump rewarming; call OLMC for direction.

F. Apply AED or cardiac monitor, if available, and use the following guidelines.

   1. **Patient “A”** — Disorganized ECG rhythm, no pulses, follow *Arrest Algorithm* for cardiac arrest:
      a. CPR is advised for these patients.
      b. Call OLMC for direction regarding resuscitation and before administering any medications.

   2. **Patient “B”** — Organized ECG, with or without palpable pulses, handle gently.

F. No CPR or pacing if patient is bradycardic, call OLMC for direction regarding resuscitation and before administering any medications.
Specific Precautions:

A. In the profoundly hypothermic patient, medications may not be effective until circulation is adequately restored. Repeat dosages of medications commonly given during a standard arrest sequence may not be advised.

B. Search and Rescue teams may use protocols that apply to the wilderness environment. It is recognized that they may not be able to contact OLMC for direction when so stated in the protocol.
Musculoskeletal Injuries

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanism of injury (location, time)</td>
<td>LOC</td>
<td>Strain</td>
</tr>
<tr>
<td>Area of greatest pain</td>
<td>Neck/ spine pain</td>
<td>Minimal swelling, mild tenderness</td>
</tr>
<tr>
<td>Loss of consciousness</td>
<td>Extremity exam</td>
<td>Sprain</td>
</tr>
<tr>
<td>Restriction on normal function (i.e. able to walk, move arm etc)</td>
<td>(lacerations, swelling, discoloration, deformity, crepitus, angulation, amputation, restriction on range of motion)</td>
<td>Moderate to severe swelling, severe tenderness, inability to bear weight (weight bearing joints)</td>
</tr>
<tr>
<td></td>
<td>Pulse</td>
<td>Possible fracture</td>
</tr>
<tr>
<td></td>
<td>Capillary refill</td>
<td>All above + Deformity</td>
</tr>
<tr>
<td></td>
<td>Neuro deficit</td>
<td></td>
</tr>
</tbody>
</table>

Spinal Immobilization

**Treatment:**

A. Provide initial cervical spine immobilization using manual in-line stabilization.

B. Immobilize using a Full Spinal Immobilization or Spinal Motion Restriction (see Selective Spinal Immobilization protocol) if the patient has a mechanism with the potential for causing spinal injury and meets ANY of the following clinical criteria:
   1. Altered mental status.
   2. Evidence of intoxication.
   3. Distracting pain/injury (extremity fracture, drowning, etc.).
   5. Spinal pain or tenderness.
   6. Distracting situation (communication barrier, emotional distress, etc.).

C. Complete a secondary exam to include serial neurological status after immobilization.

D. Treat pain per Pain Management protocol.
Specific Precautions:

A. If any immobilization techniques cause an increase in pain or neurological deficits, immobilize patient in the position found or position of greatest comfort.

B. Carefully assess the patient’s respiratory status during transport. Loosen straps as needed to avoid respiratory compromise.

C. Comorbid age factors (< 12 or > 65 yrs) may impact the EMS Provider’s ability to assess the patient’s perception and communication of pain. A conservative approach to immobilizing these patients is strongly recommended.

D. Patients in the third trimester of pregnancy should have the right side of the backboard elevated six inches.

E. Pad backboards for all inter-facility transports. Consider padding backboards for prolonged scene transports.

F. If sports injury, immobilize patient per the *Sports Equipment Removal* procedure.

Amputation:

A. If amputation is above the wrist or ankle, enter the patient into the *Trauma System*.

B. Cover stump or partial amputation with sterile dressing, saturate with sterile Normal Saline and cover with dry dressing.
   1. Partial amputations should be splinted in anatomical position to avoid torsion and angulation.
   2. Control bleeding by direct pressure, indirect pressure and/or elevation, hemostatic dressings and/or tourniquet.

C. Wrap severed part in sterile dressing, place in plastic bag or wrap in plastic and keep dry.
   1. Place bag in ice water combination without salt, if available.
   2. Time is of the greatest importance to assure viability, if the transport time will be prolonged due to extrication or other circumstances, consider sending the amputated part ahead to be surgically prepared for reimplantation.

Sprains, Possible Fractures and Dislocations:

A. Check for pulses, movement and sensation (PMS) in the extremity distal to the injury site both before and after immobilization.

B. If pulses are absent distal to fracture/dislocation, apply axial traction to bring extremity into a more normal anatomical position. Once pulse is restored, immobilize extremity.

C. For suspected pelvic fracture, follow *Pelvic Wrap* procedure if indicated.

D. Elevate and apply ice or cold packs if time and extent of other injuries allow.
Open Fractures:
A. Control bleeding by direct pressure, indirect pressure and/or elevation, hemostatic dressings and/or tourniquet.
B. Apply sterile dressing.
C. Saturate with sterile Normal Saline.
D. Cover with dry dressing.
E. If the fracture/dislocation is open or involves a joint, splint in place unless neurovascular compromise is present distal to the fracture site.

Femur Shaft Fracture:
Apply traction splint for immobilization.

Pain Control for Isolated Extremity Injuries:
A. Consider fentanyl 25-100 micrograms IV/IO/IN; may repeat every 3-5 minutes as needed to a MAX of 400 micrograms. Or, fentanyl 25-100 IM; may repeat every 15 minutes to a MAX of 400 micrograms.

Pediatric Considerations:
1. Small children may require extra padding under the shoulders.
   a. Children require extra padding behind the T-spine and shoulders and are best immobilized on a pediatric backboard.
   b. If using an adult backboard:
      i. Since the pediatric patient is at risk of sliding from side to side on a backboard, it is recommended that the EMS Provider place rolled up blankets or other dense, soft support material on both sides of the pediatric patient prior to securing the chest and hip straps.
      ii. The location of the straps on the backboard may have to be adjusted so they securely hold the pediatric patient in place and do not compress the abdomen.
2. Fentanyl dose for children < 40 kg: 1 microgram/kg IV, IO, or IN. May repeat with 0.5-1 microgram/kg every 3-5 minutes as needed to a MAX total dose of 4 micrograms/kg. Or, fentanyl 1-2 micrograms/kg IM; may repeat every 15 minutes to a MAX total dose of 4 micrograms/kg. If ≥ 40 kg follow adult dosing.

Note:
• If an improvised tourniquet is present before medical provider arrival, place a commercial tourniquet per protocol and remove improvised tourniquet if operationally feasible.
### Nausea and Vomiting

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset, duration, total number</td>
<td>LOC</td>
<td>CNS (migraine, CVA)</td>
</tr>
<tr>
<td>Blood, bile?</td>
<td>Neuro deficits</td>
<td>Vestibular (vertigo, dizziness, middle ear)</td>
</tr>
<tr>
<td>Associated symptoms</td>
<td>Abdominal exam</td>
<td>Cardiac: Acute MI</td>
</tr>
<tr>
<td>(abdominal pain, headache, dizziness,</td>
<td>Ataxia</td>
<td>Eye (blurred vision)</td>
</tr>
<tr>
<td>pain, neuro symptoms)</td>
<td></td>
<td>GI (gastroenteritis)</td>
</tr>
<tr>
<td>Pregnancy</td>
<td></td>
<td>Pregnancy</td>
</tr>
<tr>
<td>Medications, allergies</td>
<td></td>
<td>Severe pain (MI, renal stone, fracture,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>trauma)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medication</td>
</tr>
</tbody>
</table>

**Treatment:**

A. Start O₂, follow *Airway Management* procedure, as indicated.

B. Start IV if needed; 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. Administer 8 mg ondansetron orally dissolving tablets (Zofran ODT) or 8 mg ondansetron slow IV push over 2 minutes or IM.
   1. If nausea and/or vomiting are inadequately controlled after 10 minutes, may repeat ondansetron for a total of 2 doses.
   2. If ondansetron unavailable or patient has a known allergy to ondansetron, consider prochlorperazine (Compazine) 5-10 mg slow IV push over 2 minutes or IM (pediatric 2.5 mg IM ONLY). If extrapyramidal reactions are observed, administer diphenhydramine 25-50 mg IV/IM (1 mg/kg pediatric).
   3. If ondansetron and prochlorperazine (Compazine) unavailable or if the patient has a known allergy to ondansetron and prochlorperazine, administer diphenhydramine 25-50 mg IV/IM (1 mg/kg pediatric).

F. If patient continues to vomit administer fluid challenge and consider other causes.
Priority of medications for control of nausea and vomiting*

<table>
<thead>
<tr>
<th>Priority</th>
<th>Medication</th>
<th>Dose (Adult)</th>
<th>Dose (Pediatric)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Isopropyl alcohol swap</td>
<td>Self-administered, inhalation</td>
<td>Self-administered, inhalation</td>
</tr>
<tr>
<td>2nd</td>
<td>Ondansetron (Zofran)</td>
<td>8 mg (may repeat x1) IV, IM or ODT</td>
<td>0.1 mg/kg IV, IM to MAX of 4 mg or 4 mg ODT</td>
</tr>
<tr>
<td>3rd</td>
<td>Prochlorperazine (Compazine)</td>
<td>5 - 10 mg IV, IM</td>
<td>2.5 mg IM ONLY</td>
</tr>
<tr>
<td>4th</td>
<td>Diphenhydramine</td>
<td>25 - 50 mg IV, IM</td>
<td>1 mg/kg to MAX of 50 mg</td>
</tr>
</tbody>
</table>

* If allergic to medication, go to next medication in priority list.

Specific Precautions

A. Do not administer ondansetron (Zofran®) to patients with a hypersensitivity to the drug or other 5-HT3 type serotonin receptor antagonists (i.e., dolasetron [Anzemet®] and granisetron [Kytril®])

B. Do not administer with alkaline medications or preparations, which may cause precipitation.

C. Ondansetron may result in QT prolongation. Use with extreme caution in patients with prolonged QT-interval. If ondansetron is administered, cardiac monitor must be applied.

Pediatric Considerations

1. Ondansetron use in patients under 2 years of age requires OLMC consultation except for children in spinal immobilization or children receiving chemotherapy.

2. For children 2-12 years of age, administer one (1) 4 mg ondansetron orally dissolving tablet (Zofran® ODT) or administer 0.1 mg/kg IV/IO to a MAX of 4 mg. Consider IM at same dose if unable to start IV and ODT tablet is contraindicated.
## Neonatal Resuscitation

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Painful bleeding in mother (Abruptio Placentae)</td>
<td>Meconium-stained fluid</td>
<td>Initial questions:</td>
</tr>
<tr>
<td>Prolonged rupture of membranes</td>
<td>Prolapsed cord</td>
<td>• Amniotic fluid clear of meconium?</td>
</tr>
<tr>
<td>Maternal fever, hypertension, edema,</td>
<td>APGAR score</td>
<td>• Breathing or crying?</td>
</tr>
<tr>
<td>seizures</td>
<td></td>
<td>• Good muscle tone?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pink color?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Term infant?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Management priorities:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Provide warmth</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Clear, open airway</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Dry, stimulate infant</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Oxygen</td>
</tr>
</tbody>
</table>

### Expected oxygen saturation of full term newborn

![Graph showing oxygen saturation over time](image)

- **SpO2% after birth**
  - Initial values:
    - 62%
    - 68%
    - 75%
    - 78%
    - 80%
  - Over time (0-6 minutes):
    - SpO2 % changes
    - Minutes: 0, 2, 4, 6

---

**Treatment**

revised 11/24/20

10.120 - Page 1
**BIRTH**

- Is this a term gestation?
- Is the amniotic fluid clear?
- Is the infant breathing or crying?
- Does the infant have good muscle tone?

**Routine Care**
- Warm and dry infant
- Clear airway if needed
- Assess APGAR
- Follow Normal Childbirth protocol

**Yes**

**No**

- Warm and dry infant
- Position and clear airway as needed
- If thick meconium is present and infant is depressed, tracheal suction of airway is required
- Dry, stimulate and reposition

**Evaluate respirations, heart rate, color**

- Apneic, gasping or HR < 100
- Breathing, HR > 100, Cyanotic

**Monitor for cyanosis**

- Persiant Cyanosis after 2 min
- Patient pink

**Provide positive pressure ventilation - 1 breath every 3 seconds**

- HR < 60
- HR > 60

**Effective ventilation**

- HR > 100 and Pink

**3:1**

- Establish vascular access for infants > 3 kg; consider IV if time and personnel permit.
- Administer 1:10,000 Epinephrine 0.01 mg/kg IV/IO. Repeat every 3-5 minutes.
- Administer fluid challenge with normal saline 10 mL/kg if acute blood loss or hypotension.
- In prolonged resuscitation, contact OLMC to consider sodium bicarbonate 1 mEq/kg IV/IO over 2 minutes.
- Check Capillary Blood Glucose. For glucose less than 40 mg% follow the *Altered Mental Status* protocol as excerpted below:
  a. If IV/IO established, give D10: 5 mL/kg (0.5 gram/kg) for neonates, infants, and children. May repeat once.
  b. If no IV/IO established and airway protective reflexes are not intact, give glucagon 0.02 mg/kg to a MAX of 1 mg.

* Consider endotracheal intubation.
Notes and Precautions

A. Do not use Atropine in neonatal resuscitation.

B. If meconium is lightly stained and infant is vigorous (strong respiratory effort, good muscle tone, heart rate > 100 bpm) endotracheal suctioning should not be performed.

C. 100% oxygen should not be used to initiate resuscitation. Begin resuscitation with room air and add supplemental oxygen if infant remains cyanotic or oxygen saturation less than 70% after 2 minutes. Expected oxygen saturation immediately after full newborn birth ranges between 70% to 85% within the first 5 minutes. Most full or near term infants will have oxygen saturation of 90% by 5 minutes. If supplemental oxygen is needed after 5 minutes, attempt to keep oxygen saturation between 90% to 95%.

D. An infant may need resuscitation if intrapartum risk factors for asphyxia are present (prolapsed cord, painful bleeding, prolonged rupture of membranes, maternal fever, multiple births, abnormal presentation, maternal hypo-hypertension or seizure).

E. To monitor HR, either auscultate heart tones or use 3-lead ECG. Palpation of HR is unreliable and intermittent.

Meconium Aspiration:

Meconium in the amniotic fluid can be aspirated resulting in a potentially fatal course or requiring high-pressure ventilation and resulting chronic lung disease. Many of these complications can at least be attenuated, if not prevented, by suctioning meconium from the airway PRIOR to ventilating. This can be emotionally difficult to do when confronted with a depressed, blue, bradycardic neonate, but direct tracheal suctioning through the ET tube should be considered part of establishing a patent airway in these neonates.

A. With all infants who have passed meconium, as soon as the baby’s head is delivered (before delivery of the shoulders), using a 10 French or larger suction catheter, suction the mouth, pharynx and nose.

B. After delivery, proceed with intubation for all infants who are depressed and have passed meconium or any infant passing thick, particulate meconium.
   1. Check blood glucose and follow Altered Mental Status and Coma protocol.
   2. Procedure:
      a. Suction the mouth, nose and posterior pharynx, using a 10 French or larger catheter hooked to machine suction, when the head is delivered and again after the rest of the infant has been delivered.
      b. Secure protected airway, intubate the infant with the appropriately sized endotracheal tube and suction with a meconium suction adapter or use a specially designed meconium aspiration catheter/endotracheal tube such as a Neovac® type device.
      c. Suction should not last more than 3 to 5 seconds.
         i. Do not suction with your own mouth!
         ii. Use the portable machine suction or wall suction if available.
   3. In an infant with severe asphyxia, clinical judgment should be used to determine the number of intubation attempts. It may not be possible to clear the trachea of all meconium before initiating other resuscitation measures.
OB/GYN Emergencies

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last menstrual period</td>
<td>Hypertension</td>
<td>Vaginal bleeding</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>Edema</td>
<td>Early pregnancy</td>
</tr>
<tr>
<td>• Single or multiple</td>
<td>Abdominal exam</td>
<td>Ectopic pregnancy</td>
</tr>
<tr>
<td>• Due date</td>
<td>Vaginal bleeding</td>
<td>Spontaneous pregnancy</td>
</tr>
<tr>
<td>• Abdominal pain/</td>
<td>If possibility of delivery</td>
<td>Late pregnancy</td>
</tr>
<tr>
<td>contractions (timing/duration)</td>
<td>exists, inspect perineum</td>
<td>Abruptio placenta</td>
</tr>
<tr>
<td>• Ruptured membranes</td>
<td>for bleeding, fluid (not color),</td>
<td>Placenta previa</td>
</tr>
<tr>
<td>Seizures</td>
<td>crowning or abnormal presentation</td>
<td>HTN/headache/edema/seizures</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Do not perform a digital exam</td>
<td>Eclampsia/pre-eclampsia</td>
</tr>
<tr>
<td>Vaginal bleeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Past medical /OB Hx</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**General Treatment:**
1. If multiple, or abnormal birth, consider second transport unit.
2. Start O₂ in all abnormal deliveries. Follow *Airway Management* procedure.
3. If in third trimester, transport on left side (pillow under right hip, or, if on board, tilt right side of board up 6 inches) to keep uterine pressure off inferior vena cava unless delivery is imminent.
4. Start IV/IO as needed. Vital signs may not be a reliable indicator of shock or respiratory distress in the pregnant patient.
5. Acute onset severe hypertension in pregnant and postpartum women.
   a. Includes all pregnant women and up to 6 weeks postpartum with symptoms.
   b. Symptoms include headache, visual disturbances, chest discomfort, shortness of breath, confusion, abdominal pain.
   c. Notify receiving hospital of patients with a sustained elevation in BP ≥ 140 mmHg systolic and/or ≥ 100 mmHg diastolic are present for at least 15 minutes or more.
   d. Initiate treatment (if feasible) if sustained elevation in BP > 160 mmHg systolic and/or ≥ 110 mmHg diastolic (either one or both) persists for at least 15 minutes or more.

**Treatment options:**
Labetalol (if available)
   a. Administer Labetalol 10 mg slow IV push over 1-2 minutes.
   b. Target systolic BP 140-150 mmHg and diastolic BP 90-100 mmHg.
   c. Labetalol may be repeated twice (up to 3 total doses) every 15 minutes (doubling doses if needed depending on effect of preceding dose; e.g. 1st dose - 10mg, 2nd dose - 20mg, 3rd dose - 40mg).
   d. Stop administration if HR < 60 bpm or other adverse effects.
   e. Maximum dose of Labetalol is 70 mg.
   f. Formulation 4 mL (5 mg/mL total 20 mg) Carpuject Sterile cartridge.
6. Seizures (eclampsia) follow *Seizure* protocol.
   a. Consult OLMC for administration of Magnesium Sulfate.
Childbirth:
A. Normal childbirth
   1. Use sterile or clean technique.
   2. Guide and control – but do not retard or hurry – delivery.
   3. Check for cord around baby’s neck and gently remove if found.
   4. After delivery, assess infant per Neonatal Resuscitation protocol. 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. 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. At 1 to 3 minutes 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.
   8. Do not delay transport to deliver the placenta. After the placenta has delivered, gently
      externally massage uterus to encourage contraction and prevent bleeding.
   9. If mother has significant postpartum hemorrhage (> 500 mL), continue uterine massage,
      treat for shock, and update receiving facility.
 10. Unless infant needs treatment, keep on mother’s chest for transport. Monitor vital signs of
      mother and infant during transport.

B. Abnormal Childbirth
  1. General:
     a. Transport to nearest appropriate hospital.
     b. Give receiving hospital earliest possible notification.
     c. Contact OLMC for advice.
     d. Transport position as in General Treatment #3 above.
  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 is not delivered within 3 minutes, suffocation can occur:
        i. Place your gloved hand in the vagina, with your palm toward the baby’s face.
        ii. 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.
     c. Assess for presence of pulse in umbilical cord, if presenting.
  3. Prolapsed cord:
     a. With a gloved hand, gently attempt to push the baby up the vagina several inches.
     b. Do not attempt to push the cord back.
     c. Assess for presence of pulse in umbilical cord.
     d. Transport patient in position that best ensures adequate fetal circulation and is safe.
4. **Limb presentation:**
   a. The presentation of an arm or leg through the vagina is an indication for immediate transport to the hospital.
   b. Assess for presence of pulse in umbilical cord, if presenting.

5. **Abruptio Placentae**: occurs in the third trimester of pregnancy when the placenta prematurely separates from the uterine wall leading to intrauterine bleeding.
   a. The patient experiences lower abdominal pain and the uterus becomes rigid.
   b. Shock may develop without significant vaginal bleeding.

6. **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 C-section.

**Notes and Precautions:**

A. Always consider the possibility of ectopic pregnancy in a woman of child-bearing age with abdominal pain or vaginal bleeding. The patient may decompensate quickly due to internal blood loss.

B. **APGAR Criteria:**

<table>
<thead>
<tr>
<th>Sign</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance:</td>
<td>Blue, pale</td>
<td>Body pink,</td>
<td>Completely pink</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extremities blue</td>
<td></td>
</tr>
<tr>
<td>Pulse:</td>
<td>Absent</td>
<td>Slow (less than 100)</td>
<td>Greater than or equal to 100</td>
</tr>
<tr>
<td>Grimace:</td>
<td>No response</td>
<td>Grimace</td>
<td>Cough or sneeze</td>
</tr>
<tr>
<td>Activity:</td>
<td>Limp</td>
<td>Some flexion</td>
<td>Active motion of extremities</td>
</tr>
<tr>
<td>Respiration:</td>
<td>Absent</td>
<td>Slow, irregular</td>
<td>Good, crying</td>
</tr>
</tbody>
</table>
# Pain Management

<table>
<thead>
<tr>
<th>ACUTE</th>
<th>CHRONIC</th>
<th>PRINCIPLES OF MANAGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is a symptom of illness or injury</td>
<td>Is the problem</td>
<td>Pain is best treated early</td>
</tr>
<tr>
<td>Serves a biological purpose</td>
<td>Has no biological function</td>
<td>Untreated or under treated pain produces more pain</td>
</tr>
<tr>
<td>Is associated with identifiable pathology</td>
<td>May or may not be associated with identifiable pathology</td>
<td>Analgesia and a search for the cause of the pain should happen simultaneously</td>
</tr>
<tr>
<td>Is present for less than 6 months</td>
<td>Is present for more than 6 months</td>
<td>Pain scales should be used routinely</td>
</tr>
</tbody>
</table>

## Treatment:

For acute pain and uncontrolled chronic pain:

A. Consider oxygen per *Airway Management* protocol.
B. Monitor vital signs and level of consciousness, consider ECG monitor.
C. Establish venous access if indicated. Determine location of pain and severity using numeric scale (1-10) or Faces scale.
D. Consider and treat underlying cause of pain.
E. Use non-pharmacological pain management (i.e., position of comfort, hot/cold pack, elevation, splinting, padding, wound care, therapeutic calming and communication).
F. Administer pain medication:
   1. **Mild to moderate pain** (Ex: 1-4 on Pain scale)
      -a. Acetaminophen 1000mg or
      -b. Ibuprofen 600 mg.
   2. **Moderate to severe pain** (Ex: 5-8 on Pain scale)
      -a. Ketorolac 15 mg IV or 30 mg IM (2-64 years old)
   3. **Severe pain** (Ex: 9-10 on Pain scale)
      -a. Ketorolac 15 mg IV or 30 mg IM
         -OR-
      -b. Fentanyl 25-100 micrograms IV/IO/IN; may repeat every 3-5 minutes as needed to a MAX of 400 micrograms. Or, fentanyl 25-100 IM; may repeat every 15 minutes to a MAX of 400 micrograms.
         -OR-
      -c. Sufentanil 5-10 micrograms IV/OI; may repeat every 3-5 minutes as needed to a MAX of 40 micrograms. Or, sufentanil 5-10 micrograms IM; may repeat every 15 minutes as needed to a MAX of 40 micrograms.
         -OR-
Pediatric Considerations:

1. Mild to Moderate pain:
   a. If no contraindication to oral medication, consider acetaminophen 15 mg/kg PO to a MAX of 1000 mg or ibuprofen 10 mg/kg PO to a MAX of 600 mg, if available.

2. Mild to Moderate pain:
   a. Ketorolac dose for pediatrics (<40 kg) is 0.5 mg/kg IV (MAX dose of 15 mg) or 1 mg/kg IM (MAX dose of 30 mg). Do not exceed adult dose. Do not repeat.

3. Severe pain:
   a. Fentanyl 1-2 micrograms/kg IM; may repeat every 15 minutes to a MAX total dose of 4 micrograms/kg. Do not exceed adult dosing.
      -OR-
   b. Sufentanil 0.1 micrograms/kg IV/IO/IM; may repeat every 3-5 minutes as needed to a MAX of 10 micrograms. Do not exceed adult dosing.
      -OR-
   c. For children under 20 kg, morphine 0.1 mg/kg IV or IM. May repeat every 3-5 minutes. Do not exceed adult dosing.

4. Contact OLMC if MAX dose of either medication is reached without adequate pain management.

Do not administer pain medications if any of the following are present:

a. Respiratory distress or O₂ saturation of < 90%

b. Known allergy to pain medications

c. Altered mental status

d. Systolic blood pressure of < 100 mm/Hg

G. Obtain a full set of vital signs and pain scale rating prior to and after each administration of pain medication.
<table>
<thead>
<tr>
<th>Pain</th>
<th>Pain Scale</th>
<th>Medication Dose (Adult)</th>
<th>Medication Dose (Pediatric)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild to Moderate</td>
<td>1 - 4</td>
<td>Acetaminophen 1000 mg PO -OR- Ibuprofen 600 mg PO</td>
<td>Acetaminophen 15 mg/kg PO (MAX of 1000 mg) -OR- Ibuprofen 10 mg/kg PO (MAX 600 mg)</td>
</tr>
<tr>
<td>Moderate to Severe</td>
<td>5 - 8</td>
<td>Ketorolac 15 mg IV or 30 mg IM</td>
<td>Ketorolac 0.5 mg/kg IV or 1 mg/kg IM (MAX of 30 mg)</td>
</tr>
<tr>
<td>Severe</td>
<td>9 - 10</td>
<td>Ketorolac 15 mg IV or 30 mg IM -OR- Fentanyl 25-100 micrograms IV/IO/IM (MAX of 400 micrograms) -OR- Sufentanil 5-10 micrograms IV/IO/IM (MAX of 40 micrograms) -OR- Morphine 2-8 mg IV/IO/IM (MAX of 20 mg) -OR- Ketamine 15 mg IV/IO/IM (with midazolam 2.5 mg)</td>
<td>Fentanyl 1-2 micrograms/kg IV/IO/IM (MAX of 4 micrograms/kg) -OR- Sufentanil 0.1 micrograms/kg IV/IO/IM (MAX of 10 micrograms) -OR- If &lt;20 kg, Morphine 0.1 mg/kg IV/IO/IM</td>
</tr>
</tbody>
</table>

**Faces Pain Scale**

0: No Hurt  
2: Hurts Little Bit  
4: Hurts Little More  
6: Hurts Even More  
8: Hurts Whole Lot  
10: Hurts Worst
# Poisons and Overdoses

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of ingestion or exposure&lt;br&gt;What, when, how much&lt;br&gt;Multiple patients with similar symptoms&lt;br&gt;Reason for ingestion (accidental or intentional)&lt;br&gt;Action by bystanders&lt;br&gt;Previous similar events</td>
<td>LOC&lt;br&gt;Pupils&lt;br&gt;Breath (odor)&lt;br&gt;Temperature (hyper/hypothermic)&lt;br&gt;Neuro status&lt;br&gt;ECG (rate, rhythm, QRS duration)</td>
<td>See toidromes</td>
</tr>
</tbody>
</table>

---

**Treatment:** [Consider HAZMAT Response]

A. Consider use of any of the following protocols:
   1. *Hazardous Materials -- Multiple Toxic Exposure*
   2. *Hazardous Materials Treatment*, if trained and authorized
   3. *Mass Casualty Incident*
   4. *Staging for High Risk Response*

B. External Contamination:
   1. Protect medical personnel.
   2. Remove contaminated clothing.
   3. Brush off any solid material from the skin.
   4. Flush contaminated skin and eyes with copious amounts of water.

C. Internal Ingestion:
   1. Assess and support ABCs.
   2. Start $\text{O}_2$, follow *Airway Management* procedure.
   3. If ingestion is Aspirin (ASA) and/or Tylenol (APAP) only and is less than 2 hours old, administer 1 gram/kg activated charcoal if available (MAX dose of 100 grams).
   4. For all other ingestions less than 2 hrs old contact OLMC for consideration of activated charcoal.
   5. For ingestions more than 2 hrs old, activated charcoal is not indicated.
   6. Start IV/IO if needed and follow *Shock* protocol.
7. If patient is poorly responsive or has depressed respirations:
   a. Determine blood glucose and follow *Altered Mental Status and Coma* protocol.
   b. If no IV/IO has been established, administer naloxone 2 mg IM/IN.
   c. If IV/IO already established, administer naloxone 0.5 mg IV/IO and observe for improved ventilations, IV/IO dose may be repeated every 2 minutes up to 2 mg.
   d. In most instances, a total dose of 2 mg IM/IN or IV/IO will be sufficient to reverse opioid intoxication. In some cases (methadone or designer drugs), larger doses of naloxone may be necessary. In these cases, additional doses of naloxone (2 mg IM/IN or IV/IO every 3-5 minutes) up to a MAX of 8 mg of naloxone may be administered to reverse opioid intoxication.

8. Monitor cardiac rhythm and follow *Cardiac Dysrhythmia* protocol.

D. Specific Poisonings:
   1. (See toxidrome table).
   2. Carbon Monoxide (CO) poisoning:
      a. High flow O₂.
      b. If patient has suspected cyanide poisoning, consider obtaining SpCO, if available, before administration of Cyanokit® since the latter will interfere with the carboxyhemoglobin monitor.
      c. If CO monitor (i.e. Rad-57) is available and CO reading is ≥ 15, then transport to nearest hospital (unless patient meets burn or trauma center criteria).
Pediatric Considerations: [Consider HAZMAT Response]

1. Consider possibility of neglect or abuse.
2. Determine blood glucose and follow *Altered Mental Status & Coma* protocol.
3. Activated charcoal dose is 1 gram/kg (MAX dose of 100 grams).
4. Naloxone dose is 0.1 mg/kg, MAX 2 mg per dose.
5. IV/IO Atropine dose, per OLMC, may be very high in children that have orally ingested organophosphate poisons.

Specific Precautions:

A. Inhalation poisoning, SLUDGE symptoms (salivation, lacrimation, urination, defecation, gastrointestinal symptoms and emesis), or acid/alkali exposure may be dangerous to rescuers.
B. Do not neutralize acids or alkalis.
Table D.1. - Toxidromes

<table>
<thead>
<tr>
<th>Toxidrome</th>
<th>Examples</th>
<th>Clinical Features</th>
<th>Antidotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sympathomimetic</td>
<td>Cocaine, Methamphetamine</td>
<td>Agitation, Diaphoresis, Hypertension</td>
<td>Benzodiazepine (OLMC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hyperthermia, Dilated pupils, Tachycardia</td>
<td></td>
</tr>
<tr>
<td>Opioid</td>
<td>Heroin, Hydromorphone, Methadone, Oxycodone</td>
<td>Depressed Mental Status, Hypoventilation, Constricted pupils</td>
<td>Naloxone</td>
</tr>
<tr>
<td>Cholinergic (Anti-cholinesterase)</td>
<td>Pesticides, Carbamates, Organophosphates, Nerve agents</td>
<td>Muscarinic, Nicotinic, Central</td>
<td>Atropine, Pralidoxime (HAZMAT, OLMC)</td>
</tr>
<tr>
<td>Sedative-Hypnotic</td>
<td>Barbiturates, Benzodiazepines, GHB</td>
<td>Depressed Mental Status, Hypotension, Hypothermia</td>
<td>Supportive Therapy (No antidote)</td>
</tr>
<tr>
<td>Cardiotoxic Drugs</td>
<td>Beta-blockers, Calcium Channel Blockers</td>
<td>Bradycardia, Conduction Issues, Hypotension</td>
<td>Glucagon (OLMC), Calcium (OLMC)</td>
</tr>
<tr>
<td>Anticholinergic</td>
<td>Atropine, Jimson Weed, Scopolamine, Diphenhydramine</td>
<td>Delirium, Hyperthermia Tachycardia, Warm Dry Skin</td>
<td>Physostigmine (ED)</td>
</tr>
<tr>
<td>Sodium Channel Blockade</td>
<td>Tricyclic Antidepressants, Anti-arythmics</td>
<td>Altered Mental Status, Hypotension, Seizures, Wide-Complex Tachycardia</td>
<td>Sodium Bicarbonate (OLMC)</td>
</tr>
</tbody>
</table>

++Muscarinic: Diarrhea, Urination, Miosis, Bradycardia, Bronchospasm, Bronchorrhea, Emesis, Lacrimation, Salivation, Secretions, Sweating
++Nicotinic: Mydriasis, Tachycardia, Weakness, Hypertension, Hyperglycemia, Fasciculations
+++Central: Confusion, Convulsions, Coma
Psychiatric and Behavioral Disorders

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent crises</td>
<td>Pupils</td>
<td>Confusion</td>
</tr>
<tr>
<td>Behavioral change</td>
<td>Orientation</td>
<td>Metabolic (electrolyte)</td>
</tr>
<tr>
<td>Suicide/homicidal ideation</td>
<td>Mental status exam</td>
<td>Infectious (encephalitis, sepsis)</td>
</tr>
<tr>
<td>Past medical, psych history</td>
<td>appearance, behavior</td>
<td>Neurologic (CVA, tumor)</td>
</tr>
<tr>
<td>Medications</td>
<td>orientation affect/</td>
<td>Medication</td>
</tr>
<tr>
<td>Drugs</td>
<td>mood, thought</td>
<td>Drug abuse</td>
</tr>
<tr>
<td>ETOH</td>
<td>(delusions, illogical etc),</td>
<td>Psych</td>
</tr>
<tr>
<td></td>
<td>hallucinations (visual/auditory)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>memory (recent/past)</td>
<td></td>
</tr>
</tbody>
</table>

Treatment:

A. Immediate danger to medical personnel or patient:
   1. Follow **Staging for High Risk Response** protocol.
   2. Protect yourself and others.
   3. Summon law enforcement.

B. No evidence of immediate danger to medical personnel or patient:
   1. Assess ABCs. Follow **Airway Management** procedure, if needed.
   2. Assess orientation and level of consciousness, follow **Altered Mental Status and Coma** protocol if indicated.

C. General approach to the patient:
   1. Show self-confidence and convey concern for the patient.
   2. One EMS Provider should establish rapport and interact with the patient.
   3. Do not stay alone with the patient. Have enough help to restrain the violent patient.
      See **Patient Restraint (Physical)** procedure.
   4. If chemical restraint is indicated, see **Patient Restraint (Chemical)** procedure.

Choice of Destination

A. Voluntary patient:
   1. Hospital destination is determined by patient preference.
   2. If the patient has no preference, transport to Unity Hospital or Portland Providence.

B. Involuntary patient, patients on Directors Hold or Police Officer Mental Hold:
   1. Patients of 9-1-1 incidents, transported by ambulance, must be evaluated at a licensed hospital Emergency Department.
Respiratory Distress

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent illness</td>
<td>LOC</td>
<td>Upper airway obstruction</td>
</tr>
<tr>
<td>Fever, chills</td>
<td>Skin color</td>
<td>Lung</td>
</tr>
<tr>
<td>Cough</td>
<td>Stridor</td>
<td>• Bronchitis</td>
</tr>
<tr>
<td>Chest pain</td>
<td>Distended neck veins</td>
<td>• Asthma</td>
</tr>
<tr>
<td>PMH (Asthma/CHF/COPD)</td>
<td>Breath sounds</td>
<td>• COPD</td>
</tr>
<tr>
<td></td>
<td>Peripheral edema</td>
<td>• Pneumonia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• PE</td>
</tr>
</tbody>
</table>

|                  |                             | CHF/MI / Tamponade                 |
|                  |                             | Trauma (pneumothorax / flail chest)|
|                  |                             | Toxins (carbon monoxide, cyanide etc)|
|                  |                             | Metabolic acidosis (diabetic ketoacidosis etc) |
|                  |                             | Sepsis                             |

Breath Sounds in Respiratory Distress

**Characteristics**
- Clear, symmetric
- Crackles, symmetric
- Wheezing, symmetric
- Clear, asymmetric or absent
- Crackles, asymmetric
- Wheezing, asymmetric
- Stridor

**Possible Causes**
- Hyperventilation, MI, metabolic, pulmonary embolus
- Pulmonary edema, extensive pneumonia
- Asthma, pulmonary edema, COPD
- Pneumothorax, pulmonary embolus, COPD
- Pneumonia, pulmonary edema
- Foreign body, pulmonary embolus, COPD
- Croup, epiglottitis, foreign body
T**reatment:**

A. Start O₂, follow **Airway Management** procedure, as indicated. Use pulse oximeter.
B. Start IV/IO as needed.
C. Monitor cardiac rhythm and follow **Cardiac Dysrhythmia** protocol.
D. Treat underlying cause as follows:
   1. Upper Airway (croup, epiglottitis, anaphylaxis, foreign body):
      a. Obstructed airway procedures for complete obstruction.
      b. Treat anaphylaxis per **Anaphylaxis and Allergic Reaction** protocol.
      c. Foreign body: Remove using laryngoscopy if complete obstruction.
      d. Complete Obstruction: If you cannot effectively ventilate the patient and they are deteriorating, consider cricothyrotomy.
   2. Respiratory Distress Unknown Etiology:
      a. Consider nebulized albuterol (1 unit dose), may repeat as needed.
      b. If a second and/or third treatment is needed, add ipratropium (1 unit dose) to albuterol treatment.
   3. Pulmonary Edema:
      a. Sit patient upright.
      b. If BP less than 100 mm/Hg: Treat possible cardiogenic shock. See **Shock** protocol.
      c. If BP greater than 100 mm/Hg:
         i. Nitroglycerine 0.4 mg SL (spray, tablet or powder), repeat nitroglycerine every 3-5 minutes.
            ii. If the patient remains in severe respiratory distress (e.g., unable to speak more than one or two words, low O₂ saturation [< 90 %], RR > 40) start CPAP if available.
            iii. Consider albuterol 2.5 mg by nebulizer. May repeat as needed.
            iv. Furosemide (if SBP > 100 mmHg and fluid overload state [JVD, rales, peripheral edema, hypertension]).
               a. If patient is not currently taking furosemide, administer 20 mg IV/IO.
               b. If patient is taking furosemide, administer 40 mg IV/IO.
         d. If severe respiratory distress and patient not tolerating CPAP, administer IV/IO nitroglycerine 1 mg. May repeat once in 5 minutes.
            i. If patient is tolerating CPAP but still with severe respiratory distress, continue CPAP and administer IV/IO nitroglycerine 1 mg. May repeat once in 5 min.

**NOTES:**
Do not administer nitroglycerine without OLMC if patient has taken Viagra® or other similar drugs in the last 24 hours or Cialis® (tadalafil) within last 48 hours.
4. COPD
   a. DuoNeb (albuterol and ipratropium) by nebulizer. May repeat twice as needed.
   b. If patient has severe respiratory distress administer dexamethasone (Decadron®) 10 mg IV, IO, IM, or PO.
   c. If the patient remains in moderate to severe respiratory distress (e.g., unable to speak more than one or two words, low O₂ saturation (< 90%), RR > 40) administer CPAP if available.
   d. If clinically indicated, administer continuous nebulized albuterol treatment.

5. Asthma:
   a. DuoNeb (albuterol and ipratropium) by nebulizer. May repeat twice as needed.
   b. If patient has moderate to severe asthma based on the Severity Assessment Guide, administer dexamethasone (Decadron®) 10 mg IV, IO, IM, or PO.
   c. If patient is deteriorating, administer 1:1,000 epinephrine 0.3 to 0.5 mg IM.
   d. If transport time is prolonged and patient’s asthma is severe, contact OLMC for consideration of magnesium sulfate (usual dose is 2 grams over 20 minutes).
   e. If clinically indicated, administer continuous nebulized albuterol treatment.

Asthma Severity Assessment:

<table>
<thead>
<tr>
<th>ASTHMA SEVERITY ASSESSMENT GUIDE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MILD</strong></td>
</tr>
<tr>
<td>Short of breath</td>
</tr>
<tr>
<td>Able to speak</td>
</tr>
<tr>
<td>Heart rate</td>
</tr>
<tr>
<td>Respiratory rate</td>
</tr>
<tr>
<td>Lung sound</td>
</tr>
<tr>
<td>Accessory muscle use</td>
</tr>
<tr>
<td>Alertness</td>
</tr>
<tr>
<td>ECTO₂</td>
</tr>
</tbody>
</table>
**Pediatric Patients:**

1. **Upper Airway Obstruction**
   a. In patients 6 months to 6 years of age with audible stridor at rest, administer 5 mL epinephrine 1:1,000 or racemic epinephrine 11.25 mg (0.5 mL) diluted in 2.5 mL normal saline, nebulized. May repeat once. Contact OLMC for additional dosing.
   b. Suspected anaphylaxis or foreign body:
      i. Treat anaphylaxis and foreign body obstruction per adult guidelines.
   c. Suspected croup, epiglottis, or laryngeal edema:
      i. If suspected croup, administer dexamethasone per peds guide.
      ii. If the child deteriorates, perform BVM.
      iii. If unable to ventilate with BVM, perform intubation.
      iv. If intubation unsuccessful and unable to ventilate effectively, perform needle cricothyrotomy.

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

3. **Acute Bronchiolitis (< 2 years old)**
   Mild-moderate respiratory distress (see Infant Respiratory Distress Guide below)
   a. Administer oxygen via blow-by, nasal cannula or mask to keep SpO₂ > 92%.
      Monitor EtCO₂ if available.
   b. If nasal secretions and/or congestion, use nasal suction with adapter if available.
      If secretions are thick, may use normal saline to loosen.
   c. If wheezing, administer albuterol 2.5 mg via nebulizer. If improvement, may use every 10 minutes. Discontinue if patient’s heart rate is > 200.
   d. If patient worsens and is still wheezing, administer epinephrine 5 mL of 1:1000 via nebulizer.
      If improvement, may use every 10 minutes. Discontinue if patient’s heart rate is > 200.
   e. If unable to keep SpO₂ > 92% with oxygen or patient has continued significant work of breathing despite treatment:
      i. **30-90 days old:** titrate High Flow Nasal Cannula (pediatric) Oxygen (HFNCO) starting at 2 LPM up to 4 LPM.
      ii. **Greater than 90 days old:** titrate High Flow Nasal Cannula Oxygen up to 6 LPM.

4. **Severe respiratory distress (see Infant Respiratory Distress Assessment Guide below)**
   a. Suction nares as described above.
   b. Initiate high flow nasal cannula oxygen as described above with EtCO₂ monitoring.
   c. If wheezing, administer 5 mL epinephrine 1:1,000 via nebulizer. If improvement may use every 10 minutes. Discontinue if patients heart rate is > 200.
10.160 Respiratory Distress

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).

d. Prepare for positive pressure ventilation with BVM and intubation for apnea, EtCO₂ > 55 or inability to maintain SpO₂ > 85%.

5. BRUE (Brief Resolved Unexplained Event)
An episode that is frightening to the observer and is characterized by some combination of apnea, color change (cyanosis or pallor) change in muscle tone (flaccid or rigid), and choking or gagging.

a. BRUE is a group of symptoms, not a disease process.
b. BRUEs are most common in infants under one year of age, but may occur up to two years of age. They are more frequent in premature infants and infants with other health conditions such as cystic fibrosis, bronchiolitis and congenital heart disease.
c. Serious underlying causes can include pneumonia, bronchiolitis, seizure, sepsis, intracranial hemorrhage, and meningitis.
d. Many infants will have returned to normal by the time EMS arrives.
e. Consider non-accidental trauma.
f. Transport via ALS to an ED capable of treating critically ill infants even if the infant currently appears in no distress.

<table>
<thead>
<tr>
<th>Respiratory Rate</th>
<th>MILD</th>
<th>MODERATE</th>
<th>SEVERE</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 2 months</td>
<td>≤ 60</td>
<td>61-69</td>
<td>≥ 70</td>
</tr>
<tr>
<td>2-12 months</td>
<td>≤ 50</td>
<td>51-59</td>
<td>≥ 60</td>
</tr>
<tr>
<td>1-2 years</td>
<td>≤ 40</td>
<td>41-44</td>
<td>≥ 45</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Retractions</th>
<th>Subcostal or intercostal</th>
<th>2 of: subcostal, intercostal, substernal retractions, OR nasal flaring</th>
<th>3 of: subcostal, intercostal, substernal, suprasternal, supraclavicular retractions, OR nasal flaring OR head bobbing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyspnea</td>
<td>1 of: difficulty feeding, decreased vocalization, or agitation</td>
<td>2 of: difficulty feeding, decreased vocalization, or agitation</td>
<td>Stops feeding, no vocalization OR drowsy and confused</td>
</tr>
<tr>
<td>Auscultation</td>
<td>End-expiratory wheeze only</td>
<td>Expiratory wheeze only</td>
<td>Inspiratory and expiratory wheezing OR diminished breath sounds OR both</td>
</tr>
</tbody>
</table>
# Seizures

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seizure</td>
<td>LOC</td>
<td>Hypoxia</td>
</tr>
<tr>
<td>• Onset, duration</td>
<td>O₂ saturation</td>
<td>Hypoglycemia</td>
</tr>
<tr>
<td>• Type (grand mal, focal etc.)</td>
<td>Active seizure (focal/ grand mal)</td>
<td>Febrile</td>
</tr>
<tr>
<td>• Fever</td>
<td>Neuro deficits</td>
<td>Trauma</td>
</tr>
<tr>
<td>• Urine/fecal incontinence</td>
<td>Evidence of trauma</td>
<td>CNS (CVA, meningitis, tumor)</td>
</tr>
<tr>
<td>History</td>
<td></td>
<td>Drugs/OD</td>
</tr>
<tr>
<td>• Diabetes</td>
<td></td>
<td>Idiopathic</td>
</tr>
<tr>
<td>• Head trauma</td>
<td></td>
<td>ETOH withdrawal</td>
</tr>
<tr>
<td>• Pregnancy</td>
<td></td>
<td>Electrolyte disturbance</td>
</tr>
<tr>
<td>• Previous seizure</td>
<td></td>
<td>Cardiac arrest</td>
</tr>
<tr>
<td>• Current medications (including compliance)</td>
<td></td>
<td>Eclampsia</td>
</tr>
<tr>
<td>• Other (drug/ETOH, fever)</td>
<td></td>
<td>Shock</td>
</tr>
<tr>
<td>• Toxic exposure</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Treatment:

A. History of seizure with current altered mental status (postictal) or witnessed seizure.
   1. Move hazardous objects away from patient and protect head; restrain only if necessary.
   2. Start O₂; follow [Airway Management](#) procedure.
   3. Place patient on left side for transport.
   4. Continue assessment and document level of consciousness every 5 minutes.
   5. Monitor cardiac rhythm and follow [Cardiac Dysrhythmias](#) protocol.

B. If patient is in status seizure (continuous seizure or repetitive seizures without regaining consciousness): Proceed as in “A” above, and do the following:
   1. **Total dose of midazolam, regardless of route (IM, IN, IV, IO) is 25 mg.**
   2. If no IV/IO access, administer midazolam 5 mg IM/IN. If seizure continues, may repeat every 3-5 minutes to a MAX of 10 mg IM/IN. If still seizing, obtain IV/IO access. Administer midazolam 2.5-5.0 mg IV/IO every 3-5 minutes to a MAX of 15 mg IV/IO. If still in status seizures, contact OLMC for possible midazolam drip.
   3. If IV/IO is immediately available, administer midazolam 2.5-5.0 mg IV/IO every 3-5 minutes to a MAX of 25 mg IV/IO.

   **CAUTION:** This dosage may cause apnea and hypoventilation in a large proportion of patients. Please apply oximeter, EtCO₂ and cardiac monitor when feasible.
4. Monitor patient’s respiratory status closely after midazolam administration.
5. Check blood glucose and treat per *Altered Mental Status and Coma* protocol.

**C.** Transport may be unnecessary if the patient:

1. Clears completely and is fully oriented within 20 minutes after arrival of EMS responders, and
2. Is taking prescribed medications, and
3. Has a physician, and
4. Is experiencing the usual frequency of seizures.

**D.** If patient is not transported, have the patient (or guardian) sign an Information Form and document the patient’s mental status (see *Non-Transport* procedure).

**E.** The patient should always be encouraged to contact a physician as soon as possible.

**F.** All first-time seizure patients require medical evaluation by a physician. Contact OLMC if patient refuses transport.

---

**Pediatric Considerations:**

1. If patient is in status seizure (continuous seizure or repetitive seizures without regaining consciousness):
   a. Total dose of midazolam, regardless of route (IM, IN, IV, IO) is 25 mg.
   b. If no IV/IO access, administer midazolam 0.3 mg/kg IM/IN. If seizure continues, may repeat every 3-5 minutes (Total MAX of 10 mg IM/IN). If still seizing, obtain IV/IO access. Administer midazolam 0.1 mg/kg IV/IO every 3-5 minutes (Total MAX of 15 mg IV/IO). If still in status seizures, contact OLMC for possible midazolam drip.
   c. If IV/IO is immediately available, administer midazolam 0.1 mg/kg IV/IO every 3-5 minutes (Total MAX of 25 mg IV/IO).

   **CAUTION:** This dosage may cause apnea and hypoventilation in a large proportion of patients. Please apply oximeter, EtCO\textsubscript{2} and cardiac monitor when feasible.

2. Febrile seizures are generally found between the ages of 1-6 and are usually short in duration.
3. If, on arrival, the patient is not actively seizing (postictal) an IV is not required.
4. Check blood glucose and treat per *Altered Mental Status and Coma* protocol.
5. All hypoglycemic or first-time pediatric seizure patients should be transported.

---

**Specific Precautions:**

A. Remember to check for a pulse once a seizure terminates. Seizure activity may be the first sign of cerebral hypoxia or dysrhythmia.

B. New onset seizures in a pregnant woman, especially in the third trimester, may indicate toxemia of pregnancy that is life threatening to the mother and fetus.

C. Avoid administering vecuronium or rocuronium to patient with status seizures as these may mask continuing seizure activity.

D. New onset seizures in any patient need medical evaluation.
Midazolam for Seizures (Adult)

Total dose (no matter what route) is 25 mg (IV, IO, IM, IN)

IV/IO established?

NO

Administer
5 mg IM/IN
Midazolam

Still seizing?

May repeat x 1
every 3 - 5 minute to
MAX of 10 mg

Still seizing?

Establish IV/IO

YES

Administer
2.5 - 5.0 mg IV/IO
Midazolam

Still seizing?

May repeat every
3 - 5 minute to
MAX of 15 mg

Still seizing?

Consult OLMC
Consider Midazolam drip

Total dose (no matter what route)
is 25 mg (IV, IO, IM, IN)
Midazolam for Seizures (Pediatric)

Total dose (no matter what route) is 25 mg (IV, IO, IM, IN)

IV/IO established?

NO

Administer 0.3 mg/kg IM/IN
(MAX of 5 mg)
Midazolam

Still seizing?

May repeat x 1
every 3 - 5 minute to
MAX of 10 mg

Still seizing?

Establish IV/IO

YES

Administer 0.1 mg/kg IV/IO
(MAX of 5 mg)
Midazolam

Still seizing?

May repeat every
3 - 5 minute to
MAX of 15 mg

Still seizing?

Consult OLMC
Consider Midazolam drip

Total dose (no matter what route)
is 25 mg (IV, IO, IM, IN)
Sepsis

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Known or suspected infection</td>
<td>Altered LOC</td>
<td>Hypovolemia</td>
</tr>
<tr>
<td>Weak immune system</td>
<td>Hypotension</td>
<td>Cardiogenic shock</td>
</tr>
<tr>
<td>Malnutrition</td>
<td>Hyperthermia</td>
<td>Pulmonary embolus</td>
</tr>
<tr>
<td>Recent surgery</td>
<td>Tachycardia</td>
<td>Anaphylaxis</td>
</tr>
<tr>
<td>Current indwelling catheter</td>
<td>Increased respiratory rate</td>
<td>Adverse effect of medication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adrenal Insufficiency</td>
</tr>
</tbody>
</table>

Treatment:

A. Perform primary and secondary exam.
B. Maintain SpO2 above 95%.
C. Establish large bore vascular access, if possible
D. If MAP is >65 mmHg (SBP >90 mmHg) and septicemia is suspected, initiate 500-1000mL fluid bolus (10-20 ml/kg for pediatrics).
E. If MAP is <65 mmHg (SBP < 90 mmHg), treat per SHOCK protocol:
   1. Target is MAP > 65 mmHg
F. Check blood glucose.
G. Notify the receiving hospital with “Sepsis Alert” if all items below are present:
   1. Suspected infection +
   2. EtCO₂ is < 25mmHg AND
   3. Two or more qSOFA criteria

Notes and 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. For age appropriate pediatric vital signs, refer to Pediatric Guide.

### qSOFA

<table>
<thead>
<tr>
<th>Physical Exam</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypotension</td>
<td>1</td>
</tr>
<tr>
<td>MAP &lt;65 mmHg (SBP &lt;90 mmHg)</td>
<td></td>
</tr>
<tr>
<td>Altered LOC</td>
<td>1</td>
</tr>
<tr>
<td>Tachypnea ≥ 22/min</td>
<td>1</td>
</tr>
</tbody>
</table>
Shock

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>Fever</td>
<td>Hypovolemic</td>
</tr>
<tr>
<td>Hemorrhage (external /</td>
<td>LOC</td>
<td>Cardiac</td>
</tr>
<tr>
<td>internal)</td>
<td>Capillary refill</td>
<td>Septic</td>
</tr>
<tr>
<td>Chest pain / SOB</td>
<td>Skin appearance (rash, swelling, trauma)</td>
<td>Anaphylactic</td>
</tr>
<tr>
<td>Fever / sepsis</td>
<td>Neck veins</td>
<td>Obstructive (PE/pneumothorax/pericardial tamponade)</td>
</tr>
<tr>
<td>Allergy / anaphylaxis</td>
<td>Lung sounds</td>
<td>Spinal</td>
</tr>
<tr>
<td>Environmental (e.g. heat)</td>
<td>Abdominal tenderness</td>
<td></td>
</tr>
<tr>
<td>Dehydration</td>
<td>Pelvis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Extremity fracture</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neuro</td>
<td></td>
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</tbody>
</table>

**Treatment:**

A. **Do not delay transport.**
B. Start O₂, follow *Airway Management* procedure.
C. Start IV/IO.
D. Determine type of shock and treat as follows:
   1. Hypovolemic Shock:
      a. Control external bleeding with direct pressure, elevation, tourniquet, and/or hemostatic dressings.
      b. Administer 500-1000 mL fluid challenge to maintain a MAP > 65 mmHg (SBP > 90 mmHg).
         Repeat fluid boluses if continued signs of shock and no pulmonary edema.
      c. For shock secondary to trauma or suspected AAA, do not over resuscitate. Goal is MAP 55-65 mmHg (SBP 70-90 mmHg) for trauma patients **without** head trauma. For patients with head trauma, maintain MAP > 65 mmHg (SBP 90 mmHg)
   2. Cardiogenic Shock:
      a. If suspected cardiac event follow *Chest Pain* protocol.
      b. Monitor cardiac rhythm and follow *Cardiac Dysrhythmia* protocol.
      c. Administer 250-500 mL fluid challenge to maintain a MAP > 65 mmHg (SBP > 90 mmHg).
         Repeat once if continued signs of shock and no pulmonary edema.
         MAX of 1000 mL.
      d. Consider push dose epinephrine until norepinephrine infusion is administered.
d. If MAP < 50 mmHg (SBP < 60 mmHg), administer norepinephrine
   infusion at 4 micrograms/min and titrate to effect. If no response, increase every
   5 minutes in 4 micrograms/min increments to MAX of 12 micrograms/minute.
   Goal is a MAP > 65 mmHg (SBP > 90 mmHg).

3. Distributive Shock, including anaphylaxis, sepsis, and neurogenic shock.
   a. If anaphylaxis is suspected, follow Anaphylaxis and Allergic Reaction
      protocol.
   b. Administer 500-1000 mL fluid challenge to maintain a MAP > 65 mmHg
      (SBP > 90 mmHg). Repeat fluid boluses if continued signs of shock and no
      pulmonary edema.
   c. If MAP < 50 mmHg (SBP < 60 mmHg), administer norepinephrine
      infusion at 4 micrograms/minute. If no response, increase every 5 minutes in
      4 micrograms/min increments to MAX of 12 micrograms/minute.
      Goal is a MAP > 65 mmHg (SBP > 90 mmHg).
   d. Consider push dose epinephrine until norepinephrine infusion is administered.

4. Obstructive Shock, including suspected cardiac tamponade, tension pneumothorax,
   dissecting aneurysm, and massive pulmonary embolism.
   a. Administer 500-1000 mL fluid challenge to maintain a MAP > 65 mmHg
      (SBP > 90 mmHg). Repeat fluid boluses if continued signs of shock and
      no pulmonary edema.
   b. Tension Pneumothorax — needle decompression.
   c. If not responding to fluid administration and MAP < 50 mmHg
      (SBP < 60 mmHg), administer norepinephrine infusion at 4 micrograms/minute
      and titrate to effect. If no response, increase every 5 minutes in 4 micrograms/min
      increments to MAX of 12 micrograms/minute. Goal is a MAP > 65 mmHg
      (SBP > 90 mmHg).
   d. Consider push dose epinephrine until norepinephrine infusion is administered.
Pediatric Considerations:

Treatment:
1. Do not delay transport.
2. Start O₂, follow *Airway Management* procedure.
3. Start IV/IO.
4. Determine type of shock and treat as follows:
   a. Hypovolemic Shock:
      i. Control external bleeding with direct pressure, elevation, tourniquet, and/or hemostatic dressings.
      ii. Administer 20 mL/kg fluid challenge (10 mL/kg in neonates) to maintain age appropriate systolic pressure. Repeat twice if continued signs of shock and no pulmonary edema to a MAX of 60 mL/kg (30 mL/kg in neonates).
   b. Cardiogenic Shock:
      i. If suspected cardiac event follow *Chest Pain* protocol.
      ii. Monitor cardiac rhythm and follow *Cardiac Dysrhythmia* protocol.
      iii. Administer 20 mL/kg fluid challenge (10 mL/kg in neonates) to maintain age appropriate systolic pressure. Repeat twice if continued signs of shock and no pulmonary edema to a MAX of 60 mL/kg (30 mL/kg in neonates).
      iv. If blood pressure remains low administer norepinephrine infusion at 0.1 micrograms/kg/minute and titrate to effect. If no response in 5 minutes, increase to 0.2 micrograms/kg/minute. If still no response after 5 more minutes, may increase to 0.4 micrograms/kg/minute.
   c. Distributive Shock, including anaphylaxis, sepsis, and neurogenic shock.
      i. If anaphylaxis is suspected, follow *Anaphylaxis and Allergic Reaction* protocol.
      ii. Administer 20 mL/kg fluid challenge to maintain age appropriate systolic pressure. Repeat twice if continued signs of shock and no pulmonary edema.
      iii. If blood pressure remains low administer norepinephrine infusion at 0.1 micrograms/kg/minute and titrate to effect. If no response in 5 minutes, increase to 0.2 micrograms/kg/minute. If still no response after 5 more minutes, may increase to 0.4 micrograms/kg/minute.
   d. Obstructive Shock, including suspected cardiac tamponade, tension pneumothorax, dissecting aneurysm, and massive pulmonary embolism.
      i. Administer 20 mL/kg fluid challenge (10 mL/kg in neonates) to maintain age appropriate systolic pressure. Repeat twice if continued signs of shock and no pulmonary edema to a MAX of 60 mL/kg (30 mL/kg in neonates).
      ii. Tension Pneumothorax — needle decompression.
      iii. If obstructive shock and not responding to fluid administration administer norepinephrine infusion at 0.1 micrograms/kg/minute and titrate to effect. If no response in 5 minutes, increase to 0.2 micrograms/kg/minute. If still no response after 5 more minutes, may increase to 0.4 micrograms/kg/minute.
Determine type of shock and treat as follows:

**Hypovolemic (bleeding)**
- Control external bleeding.
- Give 500 - 1,000 mL fluid challenge to maintain a MAP > 55-65 mmHg (SBP ≥ 70-90 mmHg).
- Repeat fluid boluses if continued signs of shock and no pulmonary edema.

**Obstructive (tension pneumothorax)**
- Needle decompression if tension pneumothorax.

**Distributive (sepsis, neurogenic)**

**Cardiogenic (STEMI, cardiomyopathy)**
- Follow appropriate cardiac dysrhythmia protocol.
- Give 250 - 500 mL fluid challenge.
- Repeat once if continued signs of shock. MAX of 1,000 mL.
- Maintain MAP of 55-65 mmHg.

If not responding to fluid challenge and MAP < 50 mmHg (SBP < 60 mmHg), norepinephrine infusion at 4 micrograms/min (MAX of 12 micrograms/min).
- Maintain MAP of 55-65 mmHg.

Consider OLMC contact
Shock (Pediatric)

Determine type of shock and treat as follows:

- **Hypovolemic (bleeding)**
  - Control external bleeding

- **Obstructive (tension pneumothorax)**
  - Needle decompression if tension pneumothorax.

- **Distributive (sepsis, neurogenic)**

- **Cardiogenic (STEMI, cardiomyopathy)**
  - Follow appropriate cardiac dysrhythmia protocol.

Give 20 mL/kg fluid challenge (10 mL/kg in neonates) to maintain age appropriate systolic pressure. Repeat twice if continued signs of shock and no pulmonary edema to a MAX of 60 mL/kg (30 mL/kg in neonates).

If not responding to fluid challenge, norepinephrine infusion at 0.1 micrograms/kg/minute.

If no response in 5 min, increase to 0.2 micrograms/kg/minute. After 5 more min may increase to 0.4 micrograms/kg/minute.

Consider OLMC contact

**Lowest normal pediatric pressure by age:**

- **i.** Less than one month: > 60 mmHg.
- **ii.** One month to 1 year: > 70 mmHg.
- **iii.** Greater than 1 year: 70 + 2x age in years.
Notes and Precautions:

A. For shock secondary to trauma or suspected AAA, do not over resuscitate. Goal is MAP 55-65 mmHg (SBP 70-90 mmHg) for trauma patients without head trauma. For patients with head trauma, maintain MAP > 65 mmHg (SBP 90 mmHg).

B. Closely monitor patient’s respiratory status and vital signs. Avoid fluid overload.

C. For sepsis, neurogenic, and cardiogenic shock, goal is to maintain MAP > 65 mmHg (SBP > 90 mmHg).

D. For patients in shock with known or suspected adrenal insufficiency, consider administration of dexamethasone (10 mg adults or 0.6 mg/kg pediatrics) in addition to fluids and/or norepinephrine.

E. If an improvised tourniquet is present before medical provider arrival, place a commercial tourniquet per protocol and remove improvised tourniquet if operationally feasible.

Key Considerations:

A. Mechanism of injury, medications, recent illness, medical history.
**Stroke/CVA**

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time last known normal (LKN)</td>
<td>LOC</td>
<td>Hypo/Hyperglycemia</td>
</tr>
<tr>
<td>Current symptoms (weakness, speech, inability to walk, coordination)</td>
<td>Cardiac rhythm</td>
<td>Drugs /OD</td>
</tr>
<tr>
<td>Trauma or surgery in last 3 months</td>
<td>Signs of trauma</td>
<td>CVA</td>
</tr>
<tr>
<td>Recent seizure</td>
<td>Pupils</td>
<td>TIA</td>
</tr>
<tr>
<td>Medications (Coumadin, clopidogrel (Plavix®) or Heparin)</td>
<td>Neuro exam (see stroke scale)</td>
<td>Trauma</td>
</tr>
<tr>
<td>GI Bleeding</td>
<td></td>
<td>Seizure (postictal)</td>
</tr>
<tr>
<td>Previous stroke / TIA</td>
<td></td>
<td>Hypo/Hyperthermia</td>
</tr>
<tr>
<td>Diabetes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
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</tr>
</tbody>
</table>

**Treatment:**

A. Start Oxygen per *Airway Management* protocol.

B. Monitor vital signs and oxygen saturation.

C. If feasible, apply cardiac monitor and continuously assess rhythm.

D. Check CBG and treat per *Altered Mental Status and Coma* protocol.

E. Complete *Portland Prehospital Stroke Screen*.

F. If PPSS is positive, perform C-STAT evaluation.

G. Notify ED of inbound Stroke Alert.

H. If PPSS and C-STAT is positive, transport to nearest Interventional Stroke Center.

I. If PPSS is positive and C-STAT is negative, transport to nearest Stroke Center.

J. Establish IV access 18 gauge or larger (in proximal site if possible).

K. Transport patient in supine position with head elevated no more than 30 degrees, if tolerated.

L. Document serial neurologic examinations.
## PPSS - PORTLAND PREHOSPITAL STROKE SCREEN

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age over 45 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. No prior history of seizure disorder</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. New onset of neurologic symptoms in last 24 hours</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Patient was ambulatory at baseline (prior to event)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. CBG between 60 &amp; 400</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

### Neurological examination

<table>
<thead>
<tr>
<th>Test</th>
<th>Normal</th>
<th>Abnormal</th>
</tr>
</thead>
</table>
| **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 |
| **SPEECH**
(have patient repeat “You can't teach an old dog new tricks”)  
  - **Normal**: no difficulty in repeating
  - **Abnormal**: patient has difficulty finding words, speaks in long meaningless sentences, and/or cannot understand or follow simple verbal instructions | Yes |

If questions 1 – 5 are all answered “Yes” or “Unknown” and at least 1 of the 4 neurological examination findings are abnormal the patient is considered to have a POSITIVE screen. **Continue to C-STAT evaluation.**
Interventional Capable Centers:
1. Emanuel
2. Meridian Park
3. Providence Portland
4. Sunnyside Kaiser
5. Southwest Washington Medical Center
6. St. Vincent’s Medical Center
7. OHSU

**Specific Precautions:**
A. Do not treat hypertension or administer aspirin.
B. Acute stroke interventions include thrombolitics (TPA) which can be administered up to 4.5 hours from LKN and interventional radiology for thrombectomy up to 24 hours after LKN.

### C-STAT – CINCINNATI STROKE TRIAGE ASSESSMENT TOOL

<table>
<thead>
<tr>
<th>POINTS</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GAZE</strong></td>
<td>Condition where both eyes move differently to each other.</td>
</tr>
<tr>
<td>Absent</td>
<td>0</td>
</tr>
<tr>
<td>Present</td>
<td>2</td>
</tr>
<tr>
<td><strong>ARM WEAKNESS</strong></td>
<td>Cannot hold up arm(s) for 10 seconds.</td>
</tr>
<tr>
<td>Absent</td>
<td>0</td>
</tr>
<tr>
<td>Present</td>
<td>1</td>
</tr>
<tr>
<td><strong>LEVEL OF CONSCIOUSNESS</strong></td>
<td>Incorrectly answers at least one of two LOC questions AND does not follow at least one of two commands.</td>
</tr>
<tr>
<td>Absent</td>
<td>0</td>
</tr>
<tr>
<td>Present</td>
<td>1</td>
</tr>
</tbody>
</table>

*** C-STAT positive is defined as a score ≥ 2 ***

If PPSS and C-STAT is positive, transport to nearest Interventional Stroke Center
Submerged Patient

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
</table>
| Events leading to submersion:  
• MVA  
• jumping off bridge  
• swimming  
• seizure  
• diving accident  
Duration of submersion  
Estimated water temperature at recovery depth | Mental status  
Oxygenation  
Estimated core temperature  
Skin appearance  
Lung sounds  
Neurological exam  
ECG | Trauma (cervical spine)  
Hypoxia  
Hypotension  
Hypothermia  
Aspiration pneumonia |

**Treatment:**

A. Start O₂, follow *Airway Management* procedure.
B. Take spinal precautions and consider Trauma System entry.
C. Treat per *Hypothermia* protocol, if indicated.
D. Consider IV/IO as needed.
E. Monitor cardiac rhythm and follow *Cardiac Arrest* and/or *Cardiac Dysrhythmia* protocol, except:
   Do not resuscitate patients in cardiac arrest if submerged for more than 30 minutes, with the following exceptions:
   Resuscitation may be initiated if the patient is recovered within 60 minutes, if:
   1. Child less than 6 years, and water temperature less than 40° F at recovery depth.
   2. Patient may have been trapped in an underwater air pocket.
   3. Water is less than 40° F at recovery depth and information suggests patient may have been swimming on the surface for at least 15 minutes before becoming submerged.
   4. Paramedic discretion, contact OLMC.
Trauma Patient Evaluation and Treatment

<table>
<thead>
<tr>
<th>HX</th>
<th>PE</th>
<th>DDX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanism of injury</td>
<td>Vital signs</td>
<td>Interventions</td>
</tr>
<tr>
<td>Description of scene</td>
<td>GCS</td>
<td>Control of bleeding</td>
</tr>
<tr>
<td>Initial presentation</td>
<td>Identified injuries or</td>
<td>Airway</td>
</tr>
<tr>
<td>Loss of consciousness</td>
<td>abnormalities</td>
<td>Breathing</td>
</tr>
<tr>
<td>Location of identified</td>
<td></td>
<td>Circulation (IV access)</td>
</tr>
<tr>
<td>injuries</td>
<td></td>
<td>Immobilization</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Analgesia</td>
</tr>
</tbody>
</table>

Treatment:

Treatment priority should be approached in this order:

A. Control exsanguinating hemorrhage.
B. Airway maintenance (including control of the cervical spine). If unable to establish and maintain an adequate airway, the patient should be transported to the nearest acute care facility to obtain definitive airway control.
C. Breathing.
D. Control of circulation.
E. Treatment of shock.
F. Splinting of fractures.
G. Neurological examinations.
H. Detailed patient assessment.

Procedure:

A. Bleeding Control
   1. Identify hemorrhage:
      a. Apply direct pressure, or indirect pressure.
      b. Apply tourniquet if bleeding from an extremity is not controlled by direct pressure, or indirect pressure.
      c. If bleeding persists or if unable to apply tourniquet apply external clotting agent.
      d. If hemorrhage in femoral or axillary regions continues in spite of tourniquets/external clotting agents, apply and maintain continuous direct pressure or deploy junctional tourniquets or XSTAT if available.
      e. If hemorrhage in neck region, apply external clotting agents and direct pressure.

B. Assess and Maintain Airway - Protect Cervical Spine
   1. Support respirations per *Airway Management* procedure.
   2. When feasible, intubate if GCS < 8.
3. Ventilate patient to maintain EtCO$_2$ between 35-40 mmHg. If patient exhibits signs of herniation, ventilate to maintain EtCO$_2$ between 30-35 mmHg.
4. Maintain oxygen saturation > 90%.

C. Breathing
1. Seal open pneumothorax.
2. Start O$_2$, follow Airway Management procedure.
3. Decompress suspected tension pneumothorax(s) in patients with severe respiratory distress or shock.

D. Circulatory Control
1. Initiate two (2) large bore IVs or humeral IO with Lactated Ringer’s or Normal Saline during transport.
2. Maintain MAP > 65 mmHg (SBP > 90 mmHg) in patients with head injury.
3. Maintain MAP 55-65 mmHg (SBP 70-90 mmHg) in patients with suspected thoracic, abdominal, or pelvic hemorrhage.
4. Administer 2 gm IV/IO Tranexamic Acid (TXA) as soon as feasible if patient meets moderate to severe head or traumatic hemorrhagic shock criteria.

E. If suspected pelvic fracture with mechanical or hemodynamic instability, apply pelvic splint or pelvic immobilization device.
1. Perform pelvic stability assessment prior to immobilization with spider straps.
F. Moderate to Severe Head Trauma (GCS 3-12 with a reactive pupil)
   1. Administer 2 gm IV/IO Tranexamic Acid (TXA) as soon as feasible.

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Adult ≥15 years old</td>
<td>- GCS = 3 with no reactive pupil</td>
</tr>
<tr>
<td>- ≥ 50 kg if age unknown</td>
<td>- &gt;1 hour from time of injury or time unknown</td>
</tr>
<tr>
<td>- Blunt or penetrating injury</td>
<td>- Any chest compressions (manual or mechanical)</td>
</tr>
<tr>
<td>- ≤ 1 hour from of injury</td>
<td>- Seizures, MI, Stroke, or Dialysis (head injury only)</td>
</tr>
<tr>
<td>- IV/IO established</td>
<td>- Known or suspected pregnancy</td>
</tr>
<tr>
<td><strong>Physiological criteria:</strong></td>
<td>- Drowning</td>
</tr>
<tr>
<td>- GCS between 3 - 12 with a reactive pupil</td>
<td>- Hanging</td>
</tr>
<tr>
<td>- AND/OR - MAP &lt; 55 mmHg (SBP &lt; 70 mmHg)</td>
<td></td>
</tr>
</tbody>
</table>

G. Perform fracture immobilization per protocol.
   1. For isolated penetrating head, neck, or torso trauma, immobilization of the cervical spine is unnecessary unless there is overt neurologic deficit or an adequate physical examination cannot be performed, e.g., a patient with altered mental status or a patient with distracting injury.

H. Prevent hypothermia.
   1. If a patient deteriorates to cardiac arrest during transport, perform CPR and notify the trauma facility.

Note:
- In a situation where the mechanism of injury appears inconsistent with the patient’s and not severe enough to induce traumatic arrest, consider a primary medical cause for the patient’s cardiac arrest.
- Traumatic arrest is approached in a distinct fashion from medical cardiac arrest. TXA is not for cardiac or traumatic arrest.
- DO NOT allow chest compressions to interfere with addressing the reversible causes of the arrest (such as needle decompression).
- If the patient is being transported undergoing CPR, the use of a mechanical CPR device is appropriate when available.
- Consider early transport for patients with pregnancy > 22 weeks. Notify receiving hospital that patient is pregnant.
- If an improvised tourniquet is present before medical provider arrival, place a commercial tourniquet per protocol and remove improvised tourniquet if operationally feasible.
- Suspected isolated spinal cord injury (i.e. Neurogenic Shock - injury to spinal cord alone with motor loss and hypotension) should be treated with vasopressors rather than volume and/or TXA. (Ex: diving injury with suspected cervical spine injury)(Ex: diving injury with suspected cervical spine injury).
- Isolated falls from standing most frequently results in head injury and not hemorrhagic shock.