



PEDIATRIC SPECIFIC PATIENT CARE PROTOCOLS



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Patient Care Protocols

Preface

These protocols are intended to guide the Emergency Medical Technician – Paramedic, in the treatments of **pediatric** patients. Anyone who wants to change the protocols can make a request in writing to the State Emergency Medical Control Committee, or you may make the request by email to Dr. John Campbell, EMS Medical Director.

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These Patient Care Protocols contain ALL the allowable procedures for EMTs. EMTs are responsible for their actions within the respective scope of privilege of the license that they hold. OLMD cannot order EMTs to perform procedures or administer medications that are not presented in these protocols. EMTs should respectfully decline any orders which would cause them to violate their scope of privilege.

The medication section of the protocols is provided for information purposes only. EMTs may administer medications only as listed in the protocol unless OLMD orders a deviation.

These Patient Care Protocols also serve as a reference for physicians providing OLMD to EMTs. Treatment direction, which is more appropriate to the patient's condition than the protocol, should be provided by the physician as long as the EMT scope of privilege is not exceeded. Treatment direction includes basic care, advanced procedures, and medication administration. OLMD can expect an EMT to respectfully decline any orders which would cause them to violate their scope of privilege.

Protocol Updates

The Patient Care Protocol manual is revised through edition updates.

Edition updates are performed by request of the State Emergency Medical Control Committee (SEMCC) or the Office of EMS & Trauma (OEMST) Director. Edition updates incorporate revised and new protocols which have been approved since the previous edition release. The editions are numbered. The protocols are updated through REVISIONS. Each protocol can be revised individually and the revision and revision date are noted on the protocol in the upper right hand corner. The revisions are lettered.

Patient Care Protocols
Section 1: Treatment Protocols

Section 1.1: General Patient Care

NOTE: WHEN FILLING OUT THE EPCR, THIS PROTOCOL CAN BE LISTED IF THERE IS NO SPECIFIC PROTOCOL FOR USE IN TREATING YOUR PATIENT

Scene Size-Up

Primary Survey to Include History and Vital Signs

Airway:

1. Maintain patency.
2. Suction as needed.
3. Consider intubation.

Breathing:

1. Oxygen as needed to maintain oxygen saturation (pulse oximeter) reading >95%.
2. Assist breathing as needed.

Circulation:

1. Consider/establish IV or Saline lock.
2. Consider drawing one or two tubes of blood for hospital or prehospital analysis.
3. Consider ECG monitor.

**FOLLOW PROTOCOL SPECIFIC HISTORY, ASSESSMENT, AND TREATMENT
FOLLOW COMMUNICATION PROTOCOL
SECONDARY SURVEY
ONGOING EXAM**

Section 1.2: Communications

Notify Nurse at Receiving Hospital for:

1. Stable patients.
2. Stable patients requiring only Category A treatment.
 - Contact the nurse as soon as reasonably possible after leaving the scene.
 - The nurse is responsible for notifying the receiving physician.

Call OLMD:

1. Call as early as reasonably possible about all unstable patients.
2. Before using Category B procedures or medications.
3. If in doubt as to protocol or procedures needed.
4. If you need medical advice.

Special Note:

When making your report to the receiving hospital, do not refer to a patient as a “psychiatric patient” unless he/she is under a psychiatric hold as described below.

In prehospital care no one who is acting inappropriately is a “psychiatric” patient, unless that patient is under a psychiatric hold by a doctor, mental health professional, or police office. Any patient with altered mental status or inappropriate behavior should be treated according to the appropriate medical protocol, such as coma or altered mental status.

Section 1.3: Abdominal Pain

Specific Information Needed:

1. Pain: PQRST – Place, Quality, Radiation, Severity, and Time began.
2. Association symptoms: Nausea, vomiting (bloody or coffee-ground), diarrhea, constipation, melena, urinary difficulties, menstrual history, or fever.
3. History: Previous trauma, abnormal ingestion, medications, known disease, surgery, pregnant or missed periods.

Physical Assessment:

1. Vital signs.
2. Abdomen: Tenderness, rebound tenderness, guarding, rigidity, bowel sounds, distention, or pulsating mass.
3. Emesis: Type and amount.
4. Note any evidence of blood in emesis or of rectal blood.

Treatment:

1. Airway – ensure patency (vomiting precautions).
2. Breathing – Oxygen as needed to maintain oxygen saturation (pulse oximeter) reading >95%.
3. Circulation – obtain vital signs frequently, and monitor for shock.
 - Consider IV, saline lock or large bore, normal saline, at a TKO rate.
 - If shock syndrome present, proceed to Shock Protocol (1.28).
4. Position of comfort.
5. Give nothing by mouth.
6. Reassess patient and obtain vital signs frequently.
7. Consider Morphine Sulfate for patients with severe pain as seen with kidney stones.
Pediatric (CAT B): 0.1 mg/kg not to exceed 5 mg.

Specific Precautions:

1. Abdominal pain may be the first warning of catastrophic internal bleeding (ruptured aneurysm, liver, spleen, ectopic pregnancy, perforated viscous, etc.). Since the bleeding is not apparent, you must think of volume depletion and monitor the patient closely to recognize shock.
2. Use caution with fluid administration in patients with suspected dissecting aortic or abdominal aneurysm. Do not try to exceed systolic BP of 90 mmHg.
3. Nitrous Oxide causes bowel distention and is contraindicated in abdominal pain.

Section 1.4: Allergic Reaction

Specific Information Needed:

1. Present history: Recent exposure of the patient to specific allergen. Route of exposure, e.g., inhaled, oral, intravenous or dermal. Types of common allergens include medications, foods, or insect bites.
2. Past history: Known allergies, previous type of allergic reaction. Previous treatment required.
3. Symptoms: Pruritic (itching), dyspnea, sensation of airway closure, generalized weakness or dizziness.

Physical Assessment:

1. Skin – allergic reactions can present as hives, swelling or generalized red skin (may not be present).
2. Pulmonary – bronchoconstriction (wheezing), stridor (severe upper airway constriction), or hoarseness (moderate upper airway obstruction).
3. Edema – facial, tongue and lips or most concern due to potential for airway compromise.
4. Hemodynamic – tachycardia and hypotension.

Treatment:

Minor Reaction – No sign of airway, respiratory or hemodynamic compromise.

Reaction limited to skin.

1. Airway – monitor for development of increase in severity.
2. Oxygen as needed to maintain oxygen saturation (pulse oximeter) reading >95%.
3. Circulation – IV, Saline lock or large bore, NS at KVO rate. Closely monitor for changes.

Moderate Reaction – Skin rash and mild or moderate respiratory symptoms (wheezing), however, no sign of airway compromise or shock.

1. Airway – monitor for development of respiratory compromise or increase in severity.
2. Breathing – oxygen 12-15 L/M, with non-rebreather mask.
3. Circulation – IV, Saline lock or large bore, NS at a KVO rate. Monitor for signs of hypotension.
4. Attach cardiac monitor.
5. Epinephrine 1:1,000 (CAT A).
Pediatrics: 0.01mg/kg up to 0.3 mg, SC.
6. If wheezing is present, begin inhalation therapy with Albuterol (CAT A).
Pediatrics: 2.5 mg (nebulized, rotohaler, MDI w/spacer).
7. Consider Diphenhydramine (CAT A).
Pediatrics: 1 mg/kg IV, IM (do not exceed adult dose).
8. If patient has self-administration device for epinephrine or medications for allergy, the EMT may assist the patient in self-administration.

Section 1.4: Allergic Reaction (continued)

Major Reaction – Severe respiratory symptoms or signs of airway compromise or shock; field treatment should not delay transport – Load & Go, treat en route.

1. Airway – maintain patency, consider intubation.
2. Breathing – oxygen 12-15 L/M, with non-rebreather mask.
3. Consider bag-valve-mask assistance if necessary.
4. Circulation – attach cardiac monitor – reassess vital signs frequently.
 - IV, large bore, with normal saline, at fluid bolus rate.
 - **Pediatrics** under 8 years of age – volume challenge 20cc/kg and reassess.
5. Epinephrine 1:10,000 (CAT A).
Pediatrics: 0.01 mg/kg (0.1cc/kg) up to 0.3 mg (3cc), IVP every 5 minutes if needed.
6. If wheezing is present, begin inhalation therapy with Albuterol en route (CAT A).
Pediatrics: 2.5mg (nebulized, rothaler, MDI w/spacer).
7. Consider Diphenhydramine (CAT A).
Pediatrics: 1 mg/kg IV, IM (do not exceed adult dose).

Specific Precautions:

1. Adverse reactions associated with epinephrine:
 - Hypertension, tachycardia, ectopy
 - Tremor, anxiety, occasional vomiting.
 - Chest pain.
2. Epinephrine is a mixed catecholamine. Its effects on the cardiovascular system include increased heart rate, arrhythmias, and vasoconstriction of the coronary arteries can also lead to angina. Epinephrine is relatively contraindicated in patients with known coronary artery disease, angina or previous heart attack except in life threatening circumstances. In these cases, call OLMD before giving.
3. Epinephrine should be avoided in the elderly unless the benefits of treatment outweigh the risks of arrhythmias, angina or uncontrolled hypertension. In this case, call OLMD before giving.
4. The two forms of epinephrine must not be confused or over-dosage may occur. These forms are epinephrine 1:1000 dilution, which is appropriate for subcutaneous administration, and the 1:10,000 dilution, which is for intravenous use.

Section 1.5: Altered Mental Status

Specific Information Needed:

1. History: Last time seen conscious or normal, Progression of symptoms, recent symptoms such as headache, seizure, confusion, or trauma. Any history of medical problems or medications, toxin exposure, seizure, or stroke? Any history of psychiatric problems, recent crisis, emotional trauma, bizarre or abrupt changes in behavior, suicidal ideas, alcohol/drug intoxication, psychotropic or behavioral drugs? If multiple patients, suspect poisoning
2. Surroundings: Bring pill bottles, syringes, etc. with patient. Note any peculiar odors in environment.

Physical Assessment:

1. Vital signs. Note pupil size, symmetry, and reactivity.
2. Mental status. Altered mental status includes not only unconsciousness or confusion, but also irrational activity such as verbal attacks, spitting, or combativeness. Note level of consciousness and neurologic status. Document GCS score if applicable. Document status each time vital signs are taken.
3. Look for signs of trauma, needle tracks.
4. Characteristic odor on breath.
5. Medical alert tag.

Treatment:

1. Continually monitor patient and environment for scene safety.
BE PREPARED TO EXIT THE SCENE QUICKLY.
2. Airway - ensure patency while maintaining cervical spine precautions if trauma is suspected.
3. Breathing – Oxygen as needed to maintain oxygen saturation (pulse oximeter) reading >95%. If possibility of carbon monoxide poisoning, give 100% oxygen. Pulse oximeter is unreliable if carbon monoxide is present. Assist ventilations with BVM as indicated.
4. Circulation -consider IV, Saline lock or large bore, normal saline at a TKO rate. Attach cardiac monitor and perform 12 lead ECG if possible. If shock is present, proceed to 4.28 Shock Protocol.
5. Draw one red top tube for hospital analysis (optional if local hospital will not accept).
6. Glucometer- Adult: glucose < 70 administer 25GM D50W IVP (CAT A).
(Give thiamine, 100mg IVP [CAT A] before the D50W if there is any evidence of malnutrition or alcohol abuse).
If the patient is comatose from hypoglycemia and you cannot get an IV line, consider thiamine 100mg IM (CAT A) and glucagon 1mg IM (CAT B).
Pediatric: Glucose <60 administer 2-4cc/kg D25W (CAT A).
(Glucose <60 and can't get IV: consider glucagon 0.5mg IM for children under 44 lbs [CAT B]).

Section 1.5: Altered Mental Status (continued)

7. If respiratory depression is present, consider naloxone (CAT A.)
Adult: 2 mg IVP, every 5 minutes up to a total of 8 mg.
In children <5 years, give 0.1mg/kg (>5 years or 20 kg give 2 mg).
8. If potentially SUICIDAL:
Do not leave the patient alone.
Remove or have someone remove dangerous objects (i.e., knives, guns, pills),
Inquire HX regarding depression, helpless, or hopeless feelings and suicidal thoughts,
CAUTION: SUICIDE PATIENTS ARE POTENTIALLY HOMICIDAL.
9. If displaying hallucinations or delusions- CAUTION OF VIOLENT BEHAVIOR.
10. Transport in calm, quiet manner with continual monitoring.
11. Consider restraint, if necessary: see Patient Restraint procedure.
12. Contact receiving hospital with patient report as soon as possible during transport.

Specific Precautions:

1. In cases of dangerous environment, safety of personnel on scene is paramount.
2. Be particularly attentive to airway. Aspiration of secretions, vomiting, and inadequate ventilations may be present in patients with severely altered mental status.
3. Hypoglycemia may present as focal neurologic deficit or altered mental status, particularly in elderly persons. Repeated administrations of dextrose may be needed. Consult with OLMD.
4. Any patient treated under this protocol should have a medical evaluation and should not be considered a psychiatric patient unless under a bona fide mental health hold by a physician, mental health professional, or police officer. Medical causes of altered mental status should be considered first before psychiatric causes of altered mental status.

Section 1.6: Amputation

Specific Information Needed:

1. Time of amputation.
2. Mechanism of amputation.
3. Medications, bleeding tendencies, or problems with prior surgery.

Physical Assessment:

1. Excessive bleeding.
2. Vital signs.
3. Note structural attachments in partial amputations.

Treatment:

1. Airway – ensure patency.
2. Breathing – oxygen as needed to maintain oxygen saturation (pulse oximeter) reading >95%.
3. Circulation – control bleeding with direct pressure.
4. If bleeding cannot be controlled by direct pressure, elevation, and pressure points – use tourniquet. If tourniquet does not control bleeding, consider hemostatic agent.
5. Consider IV, Saline lock or large bore, normal saline at a TKO rate.
6. If shock syndrome present, proceed to Shock Protocol: DO NOT DELAY TRANSPORT. START IV EN ROUTE IF TRANSPORT IS IMMEDIATELY AVAILABLE.
7. Amputation category:
Stump: Control bleeding – cover with sterile dressing. DO NOT COVER TOURNIQUET IF UTILIZED TO CONTROL BLEEDING. Consider hemostatic agents.
Severed Part: Wrap in sterile dressing moistened with sterile saline, and place in a plastic bag. Place the bag in ice water combination without salt. The part should be transported with the patient if possible.
Partial Amputation: Control bleeding, consider hemostatic agents, saturate wound with sterile saline, cover with dry dressing, and splint in anatomical position. Avoid torsion and angulations. Reduce any torsion by moving part into normal anatomical position.
8. If the patient has severe incapacitating pain, consider Morphine Sulfate.
Pediatric (CAT B): 0.1 mg/kg not to exceed 5mg.

Specific Precautions:

1. Do not immerse the amputated part in a liquid or use dry ice.
2. Time is of the greatest importance to assure viability. If the extrication time will be prolonged, consider sending the amputated part ahead to be surgically prepared for reimplantation.
3. If bleeding cannot be controlled by direct pressure, elevation, and pressure points, a tourniquet should be applied as close as practical to the injury site. The tourniquet

Section 1.6: Amputation (continued)

should not be covered. Note on the patient the time of application, and document in the record.

4. If the part is recovered and appears to be reimplantable, consider transport to a hospital with reimplantation capability, OLMD should be consulted if there is any question concerning the viability of the part or transport distance.

Section 1.7: Burns

Specific Information Needed:

1. Environmental Hazards – smoke, toxic chemicals or fumes, potential for explosion, electrical sources, etc.
2. Type of exposure – any information concerning products involved should be collected at the scene if possible. Note if patient was in a closed space, and if inhalation of smoke or fumes occurred.
3. Duration of exposure. Associate trauma or blast injury.
4. History of loss of consciousness.
5. Past medical history – especially cardiac or pulmonary disorders.

Physical Assessment:

1. Airway – inhalation exposure can cause airway compromise. Note presence of stridor, facial swelling, carbonaceous sputum, singed nasal hair or drooling.
2. Breathing – smoke or chemical exposure can cause bronchospasm. Note presence of wheezing. Carbon monoxide poisoning routinely will cause dyspnea. Pulse oximeter gives false high reading in presence of carbon monoxide poisoning or cyanide poisoning.
3. Circulation – large burns will cause severe fluid loss. Note tachycardia, signs of volume depletion and hypotension.
4. Neurological – carbon monoxide will cause cerebral anoxia. Check for headache, confusion or decreased level of consciousness.
5. Skin – Identify severity (superficial – erythema only; partial thickness – blistered area; full thickness – scarred or leathery areas) and extent (refer to the rule of nines)
6. Associated trauma – Burns associated with explosion have great potential for other injuries. All unconscious patients have potential for cervical spine injury. Perform rapid trauma survey.

Treatment:

1. Take scene safety precautions.
2. Airway – maintain patency, consider intubation.
3. Breathing – Oxygen 12-15 L/M, with non-rebreather mask – do not rely on pulse oximeter, as it is unreliable in the setting of carbon monoxide exposure or cyanide exposure.
4. If known cyanide exposure or smoke inhalation victim who shows clinical evidence of closed-space smoke exposure (soot in mouth or nose, sooty sputum) and is either comatose, in shock, or in cardiac arrest, consider Cyanokit (hydroxocobalamin 5 grams) IV over 15 minutes (CAT A). Not for Peds.
5. If patient is wheezing, consider Albuterol (CAT B)
Pediatrics (CAT B): 2.5 mg (nebulized, rothaler. MDI with spacer)
6. Circulation –
 - IV, large bore, normal saline, in unaffected area at 250 cc/hr for burns over 20%, with at least, partial thickness involvement and the hospital arrival time will be in excess of 20 minutes

Section 1.7: Burns (continued)

Pediatric patients: give NS 20 bb/kg over 30 minutes, then reassess.

- IV, large bore, normal saline, in unaffected area at KVO rate for:

- All electrical burns.
 - Significant chemical exposures.
 - All inhalation exposures.
 - Any patient with loss of consciousness.
 - Any patient with potential for other associated trauma.
7. Cardiac monitor (essential if electrical exposure) -12 lead if available.
 8. Brush off dry chemicals if present on skin before flushing with large amounts of water.
 9. Liquid chemicals should be flushed with copious amounts of normal saline.
 10. Eyes may be irrigated with normal saline.
 11. Cover affected areas with a dry burn sheet.
 12. If patient has severe pain, consider Morphine Sulfate:
Pediatrics (CAT B): 0.1 mg/kg not to exceed 5 mg.

INDICATIONS TO ENTER PATIENT INTO THE TRAUMA SYSTEM AND TRANSPORT DIRECTLY TO A READY BURN CENTER IF WITHIN REGIONAL TRANSPORT TIME CRITERIA

1. Partial or full thickness burns >10% of the total body surface area
2. Partial or full thickness burns of the face, hands, feet, genitalia, perineum, or major joints
3. High voltage (1,000 volts or greater) electrical burns, including lightning injury
4. Chemical burns with obvious partial or full thickness skin damage. Also any patient requiring decontamination in an industrial, agricultural, or law enforcement setting (Decontamination should be performed prior to transport)
5. Inhalation injury from a thermal or chemical exposure in an enclosed area
6. If in doubt, consult Medical Direction or the Trauma Communications Center

Specific Precautions:

1. Scene hazards – electrical wires, chemical fumes, carbon monoxide, or fire. Do not attempt rescue in hazardous environment unless trained in this area.
2. Airway involvement – always consider the possibility of airway compromise. Airway swelling can occur rapidly.

Unconsciousness – always consider the possibility of occult head or cervical spine injury. Suspect the possibility of carbon monoxide exposure. Pulse oximeter is unreliable if carbon monoxide is present.

Do not induce hypothermia by applying cold or moist dressing to burned areas, as the body may lose excessive heat through burned skin. Maintaining a good core body temperature is essential.

Section 1.7: Burns (continued)

3. Consider the possibility of abuse when certain burns are encountered. These include cigarette burns, iron burns, grill burns, and any burns in the elderly or **children** where the described mechanism of injury appears to be unlikely.
4. Cardiac involvement – consider the potential for myocardial injury, ischemia, and arrhythmia in any patient with electrical or inhalation injury.
5. Avoid initiative IVs in burned areas except in extreme circumstances.
6. Transport – Do not delay the transport of the seriously burned patient to administer volume boluses of fluid. Fluid loss occurs over the course of hours. Initiate fluids en route if burns are extensive, or the potential for airway compromise exists.

Rule of Nines

When it is necessary to know the Percentage of Total Body Surface (TBS), such as when making the decision to transport directly to a burn center, the rule of nines is useful. In **children**, relatively more area is taken up by the head and less by the lower extremities. Accordingly, the rule of nines is modified.

Child Body Part	Percentage of Total Body Surface (TBS)
Arm (shoulder to fingertips)	9%
Head and neck	18%
Leg (groin to toes)	14%
Anterior trunk	18%
Posterior trunk and buttocks	18%

Infant Body Part	Percentage of Total Body Surface (TBS)
Arm (shoulder to fingertips)	9%
Head and neck	14%
Leg (groin to toes)	16%
Anterior trunk	18%
Posterior trunk	18%

SPECIAL NOTE:

An accurate description of the burn, including location and severity, should be provided to the receiving facility. The rule of nines is not intended to replace such a description.

Section 1.8: Cardiac Arrest

Specific Information:

1. History – preceding symptoms, onset, and downtime without CPR.
2. Past History – diseases, medications, and allergies.
3. Surrounding evidence of medication ingestion. Is there penetrating or blunt injury?
4. Appropriateness of resuscitative efforts – in unexpected or unwitnessed cardiovascular collapse, proceed with the protocol unless obvious signs of death are present (rigor, etc). In all others, begin treatment, and then request further information from family members. OLMD may also be of assistance. (See Death In The Field Protocol).

Once resuscitative efforts have been initiated, they should be continued until arrival at the receiving hospital, or until a joint decision has been made with Medical Direction or the attending physician, that resuscitation should cease. (See Death In The Field Protocol)

Physical Assessment:

1. Determine presence of arrest.
 - Unresponsive
 - Absent or terminal respiration
 - Absent pulses over major arteries
2. If signs of penetrating torso injury are present with cardiopulmonary arrest, patient's only chance for survival is immediate transport.
 - Ventilate and transport rapidly to appropriate facility
 - CLOSED CHEST MASSAGE IS NOT INDICATED BEFORE TRANSPORT IN THESE CIRCUMSTANCES, IF THIS MEANS A DELAY IN IMMEDIATE TRANSPORT.**
 - Once en route, contact OLMD to determine whether to continue resuscitative efforts (See Death in the Field Protocol).

Treatment: PEDIATRIC VFIB/PULSELESS VTACH

This sequence was developed to treat a broad range of **Pediatric** patients with ventricular fibrillation or pulseless ventricular tachycardia. Some patients may require care not specified herein. This algorithm should not be construed as prohibiting such flexibility. Flow of algorithm presumes that VF/VT is continuing. If for any reason this protocol cannot be followed in treatment order or medication amounts, OLMD must be contacted.

1. ABCs.
2. Perform CPR until monitor/defibrillator is attached or until quick-look paddles are applied.
3. Confirm VF/VT is present on monitor.
4. Defibrillate once at 2 J/kg.
 - (If Biphasic Defibrillator – use the manufacturer's recommended setting)
5. Immediately resume CPR for five cycles without checking pulse or rhythm.
6. Reassess rhythm – if no change in rhythm, immediately continue CPR.

Section 1.8: Cardiac Arrest (continued)

7. Ventilate at appropriate rate with a bag-mask. Intubation is rarely needed.
8. Start a large bore IV, with normal saline at a TKO rate. Consider IO if IV cannot be started.
9. Epinephrine 0.01 mg/kg (0.1 cc/kg) of 1:10,000, IVP or IO.
Repeat at 3-5 minute intervals.
10. Defibrillate 4 J/kg (or Biphasic recommendation) AFTER EACH DOSE OF MEDICATION (do 30-60 seconds of CPR to circulate the medication first).
11. Give Lidocaine 1.0 mg/kg, IVP/IO or Amiodarone 5 mg/kg, IVP/IO.

Treatment: PEDIATRIC VENTRICULAR ASYSTOLE & PEA

This sequence was developed to assist treating a broad range of patients in asystole and PEA. Some patients may require care not specified herein. This algorithm should not be construed to prohibit such flexibility. The flow of the algorithm presumes asystole is continuing.

1. Continue CPR.
2. Ventilate at appropriate rate with bag-mask. Intubation is rarely needed.
3. Start large bore IV with normal saline at TKO rate. Consider IO if IV cannot be started. If the patient has a venous port you may access it if you are trained and have the proper equipment.
4. Confirm asystole in more than on lead (If rhythm remains unchanged – TREAT AS ASYSTOLE – DO NOT DEFIBRILLATE).
5. Epinephrine 0.01 mg/kg (0.1 cc/kg) of 1:10,000, IVP or IO. Repeat at 3-5 minute intervals.
6. Consider and treat other possible causes:

Possible Cause	Treatment
Hypovolemia	Fluid challenge, consider IO for Peds
Hypoxia	Airway, Oxygen, Stop bleeding
Hydrogen ion (acidosis)	Airway
Hypo/hyperkalemia	Transport
Hypoglycemia	Glucose
Hypothermia	Warm cover/fluids/environment, Transport
Toxins	See Poisoning & Overdose Protocol
Tamponade	Airway, Oxygen, Transport
Tension Pneumothorax	Needle Decompression, Oxygen, Transport
Thrombosis	Airway, Oxygen, Transport
Trauma	Airway, Oxygen, SMR, Transport

Section 1.9: Quick Reference to Cardiac Medications

NEONATES (AGE: Birth to One Month)

MEDICATION	INDICATION	DOSAGE
Atropine (CAT A)	Asystole	0.02 mg/kg (0.1 mg MIN)
Sodium Bicarbonate (CAT A)	Metabolic Acidosis	1 mEq/kg Initial dose (dilute 50% with NS)
Dextrose – 25% (CAT A)	Low blood glucose	2-4 cc/kg
Epinephrine (CAT A)	Bradycardia, Cardiac Arrest	0.01 mg/kg, 1:10,000 IV, IO 0.1 mg/kg, 1:1,000 ET
Magnesium Sulfate (CAT B)	Torsades de Pointes	50 mg/kg up to 2 grams total IV over 10 – 20 minutes
Naloxone (CAT A)	Respiratory depression (Narcotic induced)	0.1 mg/kg

INFANTS AND CHILDREN (AGE: One Month to Eight Years)

MEDICATION	INDICATION	DOSAGE
Amiodarone (CAT B)	Pulseless VF/VT	5 mg/kg IVP/IO
	Ventricular Tachycardia	5 mg/kg IV/IO over 20-60 minutes
Atropine Sulfate (CAT A)	Bradycardia	.02 mg/kg (minimum 0.1 mg) MAX single dose 0.5 mg
Dextrose – 25% (CAT A)	Low Blood Glucose	2 – 4 cc/kg
Dopamine HC ₁ (CAT B)	Cardiogenic Shock, Low Cardiac Output	2 – 20 mcg/kg/min
Epinephrine (CAT A)	Fine V-Fib, Low Output, Cardiac Arrest	0.01 mg/kg of 1:10,000 IV, IO 0.1 mg/kg of 1:1,000 ET
Lidocaine (CAT A)	Ventricular Tachycardia, V-Fibrillation	1.0 mg/kg bolus; 20 – 50 mcg/kg/min drip
Naloxone (CAT A)	Respiratory Depression (Narcotic Induced)	0.1 mg/kg; For >5 years or 20 kg: 2 mg IV, SC, IM, ET
Sodium Bicarbonate (CAT A)	Metabolic Acidosis	1 mEq/kg/dose (Dilute 50% with D5W)
Magnesium Sulfate (CAT B)	Torsades de Pointes	25 mg/kg IV/IO MAX Dose 2 Grams

Section 1.9: Quick Reference to Cardiac Medications (continued)

ADULTS (AGE: Eight Years and Above)

MEDICATION	INDICATION	DOSAGE
Amiodarone (CAT A)	VFib/Pulseless VTach	300 mg IV Repeat 150 mg in 5 minutes if necessary
	Stable Ventricular Tachycardia	150 mg IV over 10 minutes
Atropine Sulfate (CAT A)	Bradycardia	0.5 mg every 3-5 min, 3 mg MAX
	Asystole	1 mg initial, every 3-5 min, 3 mg MAX
Calcium Gluconate (CAT A)	Hyperkalemia	1-2 grams IV
Dopamine (CAT B)	Cardiogenic Shock	5-20 mcg/kg/min
Epinephrine (CAT A)	Cardiac Arrest	1 mg IVP q 3-5 min of 1:10,000 IF UNABLE TO GET IV:2-2.5 mg 1:1,000 with 10 cc sterile water, ET
Lidocaine (CAT A)	VFib/Pulseless VTach	1.5 mg/kg bolus initially then 0.75 mg/kg q 5 min to MAX of 5 mg/kg
Magnesium Sulfate (CAT B)	Torsades de Pointes	2 grams IV over 5 minutes
Sodium Bicarbonate (CAT A)	Acidosis	1 mEq/kg initially
	Hyperkalemia	0.5 mEq/kg q10 min
Vasopressin (CAT A)	Adult shock resistant VFib/Pulseless VTach Adult Asystole/PEA	40 units IVP, one time only. Can replace the first or second dose of Epi.

Section 1.11: Cardiac Dysrhythmias

Specific Information:

1. Chief complaint – sudden or gradual onset: heart racing, skipping, pounding, etc.
2. Related symptoms – dizziness, angina, syncope, dyspnea, and palpitations
3. Medications

Physical Assessment:

1. Vital signs.
2. Signs of low cardiac output:
 - Altered level of consciousness.
 - Presence of shock syndrome.
 - Signs of congestive heart failure.

NOTE: DYSRHYTHMIAS MAY NOT REQUIRE TREATMENT IN THE FIELD IF THE PATIENT HAS NO SIGNS OF IMPAIRED PERFUSION (i.e., NO SIGN OF LOW CARDIAC OUTPUT).

Treatment: PEDIATRIC BRADYCARDIA

Bradycardia in **children** is usually due to respiratory causes, not cardiac. Treatment only required with signs of cardio-respiratory compromise.

1. Airway – ensure patency.
2. Breathing – oxygen 10-15 L/M, **Pediatric** mask.
3. Pulse oximeter – maintain oxygen saturation level >95%.
4. Circulation – cardiac monitoring (12-lead if available).
5. Start IV, saline lock or large bore, with normal saline (consider IO if needed), at TKO rate.
6. Perform chest compressions if, despite oxygenation and ventilation, the heart rate is below 60 in infant or child and is associated with poor systemic perfusion.
7. Epinephrine IV/IO (Cat A) – 0.01 mg/kg (1:10,000).
 - If given ET, increase dose to 0.1 mg/kg (1:1,000)
 - Repeat every 3-5 minutes at the same dose until heart rate is 80 or more.
8. Administer Atropine 0.02 mg/kg (Cat A). May repeat once in 5 minutes if heart rate is not 80 or above (maximum total dose of 1 mg).
 - Minimum dose: 0.1 mg
9. Consider external pacing if unresponsive to Atropine.
10. Contact receiving hospital with patient report as soon as possible during transport.

Section 1.11: Cardiac Dysrhythmias (continued)

Treatment: PEDIATRIC TACHYCARDIA WITH PULSE

1. Airway – ensure patency.
2. Breathing – oxygen to maintain oxygen saturation (pulse oximeter) reading >95%.
3. Circulation – cardiac monitoring.
4. Establish IV access.
5. Patient determined in HEMODYNAMICALLY STABLE (narrow complex regular rhythm) condition.

Treatment (Category B)

1. Consider Vagal maneuvers
2. Adenosine, 0.1 mg/kg (maximum first dose 6 mg), followed with 2-3 ml of saline bolus.
3. If rhythm does not convert, contact OLMD.

Narrow Complex – Irregular Rhythm

CONTACT OLMD

Wide Complex – Regular and Irregular Rhythm

CONTACT OLMD

6. Patient determined in HEMODYNAMICALLY UNSTABLE condition: (altered mental status, ongoing chest pain, hypotension or other signs of shock)

Establish IV access

Consider sedation – Contact OLMD

Synchronous cardioversion (CAT B)

0.5 joules/kg, (If Biphasic Defibrillator – use the manufacturer's recommended setting)

If no chance – contact OLMD.

Section 1.12: Childbirth

Specific Information Needed:

1. History of pregnancy(s) – Due date, bleeding (recent, within 1 week), swelling of face or extremities, and prior problems with pregnancy. Known multiple pregnancies? Ask patient if she feels as though she is delivering: i.e., rectal pressure.
2. Current problems – If pain, where? Regular? Timing? Ruptured membrane? Urge to push?
3. Medical history – medications, medical problems, patient's age, and number of prior pregnancies.

Physical Assessment:

1. Vital signs – Fetal heart rate, if possible.
2. Swelling of face or extremities
3. Contractions and relaxation of uterus
4. Where privacy is possible, inspect perineum for:
Vaginal bleeding or fluid – Color?
Crowning (check during contraction)
Abnormal presentation (foot, arm, cord, or breech).

Treatment:

1. Airway – ensure patency.
2. Breathing – oxygen to maintain oxygen saturation (pulse oximeter) reading >95%
3. Circulation – start IV, Saline lock or large bore, with normal saline at TKO rate
4. If signs of shock, proceed to Shock Protocol (1.28)
5. If not pushing or bleeding, transport left lateral recumbent position
6. Immediate transport category – previous cesarean section, known imminent multiple births, abnormal presenting parts, excessive bleeding, and premature birth.

Normal Delivery:

1. ABCs (above)
2. Clean or sterile technique
3. Guide and control delivery
4. Suction, mouth (not throat), then nose with bulb syringe after head delivers and before torso delivers
5. Check for cord around the neonate's neck when head is visible and after suctioning
6. Protect neonate from falls and temperature loss
7. Wrap in clean or sterile blanket
8. Check vitals – if compromised, initiate resuscitation
9. Clamp cord in two places approximately 8" – 10" from neonate
10. Cut cord between clamps
11. Give neonate to mother, allow to nurse (aids in contracting uterus)
12. If excessive maternal bleeding, massage uterus gently and proceed to Shock Protocol (1.28)
13. Transport, do not wait to deliver placenta

Section 1.12: Childbirth (continued)

14. If placenta delivers spontaneously, bring to hospital
15. Determine APGAR score at birth and five minutes later
16. Monitor neonate and mother
17. Contact receiving hospital with patient report as soon as possible during transport

Abnormal Delivery:

1. ABCs (above)
2. Oxygen, 15 L/M via non-rebreather mask
3. Place mother in Trendelenburg position or knee chest if prolapsed cord
4. Gently elevate presenting body part to relieve pressure on cord and keep cord moist with saline gauze if exposed
5. Contact OLMD for specific treatments
6. Immediate transport to appropriate facility
7. Start maternal IV – large bore, with normal saline at TKO rate
8. If thick meconium is present, aggressively suction and consider intubation of the neonate
9. Contact receiving hospital with patient report as soon as possible during transport
10. Contact OLMD if additional ALS intervention is necessary

Section 1.13: Newborn

General Information:

Follow Childbirth Protocol if neonate is not delivered prior to your arrival. If meconium stain present at birth, suction the neonate's mouth, then nose until clear (consider intubation to allow deep suctioning).

If delivery has taken place and a transport unit has arrived, transport and treat en route. Do not wait for or attempt to deliver the placenta. If placenta delivers spontaneously, bring it to the hospital.

Treatment:

1. Airway – ensure patency, suction the neonate's mouth then nose with bulb syringe.
2. Evaluate neonate's ABCs as you:
 - Clamp and cut the cord per guidelines of the CHILDBIRTH PROTOCOL
 - Perform tactile stimulation
 - Dry neonate, and wrap in clean or sterile blanket
 - Determine APGAR score:

APGAR SCORE	0 POINTS	1 POINT	2 POINTS	SCORES
HEART RATE	ABSENT	<100 BPM	>100 BPM	
RESPIRATORY EFFECT	ABSENT	WEAK CRY	STRONG CRY	
MUSCLE TONE	FLACCID	SOME FLEXION	ACTIVE MOTION	
REFLEX IRRITABILITY	NO RESPONSE	GRIMACE	VIGOROUS CRY	
COLOR	BLUE, PALE	BODY PINK, EXTREMITIES BLUE	BODY PINK, EXTREMITIES PINK	
			TOTAL APGAR:	

3. If APGAR is 6 or below:
 - Begin AHA BCLS Procedures
 - Assisted ventilation with high concentration of oxygen
 - Chest compressions (rate 120) if heart rate below 60
 - Consider intubation
 - Contact OLMD if additional ASL intervention is necessary
4. Contact receiving hospital with patient report as soon as possible during transport
5. Complete two patient care records (one for mother and one for newborn) and be sure to record time of delivery
6. REPEAT APGAR SCORE AT ONE AND FIVE MINUTES

Section 1.13: Newborn (continued)

Specific Precautions:

Do not pull on cord and do not compress the cord

Bundle, keep head covered, and keep near mother to prevent heat loss

Section 1.15: Fractures and Dislocations

Specific Information Needed:

History of trauma: Mechanism of injury.

Physical Assessment:

1. Localized TIC (Tenderness, Instability, and Crepitation)
2. PMS (Pulses, Motor function, and Sensation)
3. Angulation, deep lacerations, and exposed bone fragments.

Treatment:

1. Airway – ensure patency.
2. Breathing – consider oxygen 4-6 L/M, by nasal cannula
3. Pulse oximeter, maintain oxygen saturation >95%.
4. Circulation
If vitals are stable, consider IV, large bore, with normal saline at TKO rate.
If vitals are unstable (shock symptoms) – proceed to Shock Protocol (1.28).
5. Consider spinal motion restriction.
6. Examine for additional injuries. Elevate, and treat, if necessary, those with higher priority.
7. Examine for additional injuries. Elevate, and treat, if necessary, those with higher priority.
8. If a high index of suspicion of pelvic or femur shaft fractures, provide large bore IV with normal saline, and follow Shock Protocol (1.28) as indicated.
9. Apply sterile dressings to open fractures
10. Splint and apply axial traction as needed.
11. Elevate simple fractures. Apply ice or cold packs if time and extent of other injuries allow.
12. Transport as necessary. Monitor circulation (pulse and skin temperature), neurological, and motor function in affected extremity.
13. Contact hospital with patient report as soon as possible during transport.
14. If the patient has severe incapacitating pain, consider Morphine:
Pediatrics (CAT B): 0.2 mg/kg not to exceed 5 mg.
15. Nitrous Oxide (CAT B): Do not use if a patient has undiagnosed abdominal pain or head injury – see contraindications.

Specific Precautions:

1. Fractures do not necessarily lead to deformity or loss of function, e.g., impacted fractures may cause pain but little or no deformity or loss of function.
2. Extremity injuries benefit from appropriate care, but are of low priority in a patient with multiple injuries.

Section 1.17: Head Trauma

Specific Information Needed:

1. History – Mechanism of injury, LOC changes, record pertinent medical history from patient or family.
2. Protective devices – helmet or seat belts.

Physical Assessment:

1. Evaluate airway patency, breathing capability, and gross injuries to extremities and trunk.
2. LOC exam accomplished. Document with Glasgow Coma Scale Score (Document all 3 component scores, as well as the total – Eyes, Verbal, and Motor).
3. Pupil position and response to light stimulation.
4. External evidence of head trauma, (e.g., blood from ears, or scalp lacerations).

Treatment:

1. Airway – ensure patency – MAINTAIN NEUTRAL ALIGNMENT OF CERVICAL SPINE.
2. Breathing – oxygen 12-15 L/M, by non-rebreather mask.
3. Intubate and provide ventilator support (at a rate of 8 bpm) with bag valve device of CGS Score <9 and you have a long transport time or cannot maintain oxygen saturation (pulse oximeter) reading >95% with other methods. DO NOT HYPERVENTILATE!
4. Do not allow patient to become hypoxic! Keep oxygen saturation reading >95%.
5. Circulation – closely monitor vitals, control external bleeding by direct pressure unless suspicion of skull fracture, and cardiac monitor.
6. Start IV, Saline lock or large bore, with normal saline at TKO rate.
7. If shock syndrome present, proceed to Shock Protocol.
8. Maintain a normal Blood Pressure.
9. Glucometer – **Pediatric**: Glucose < 60 administer 2-4 cc/kg D25W (CAT A) (Glucose <60 and can't get IV: consider glucagon 0.5mg IM for **children** under 44 lbs [CAT B]).
10. Continue to monitor vital signs and changes in LOC.
11. Contact hospital with patient report as soon as possible during transport.

Specific Precautions:

1. Notify OLMD of changes in the patient's GCS score in relation to time intervals.
2. Always consider cervical spine injury in all patients with head trauma.
3. Shock syndrome findings do not occur in an isolated head injury. Look elsewhere for the cause of shock. However, head injury in infants can cause shock. Do not allow the patient to become hypotensive.
4. Other causes of alteration of level of consciousness should be ruled out.
5. Hypoventilation can cause cerebral edema. Maintain rate of 8 breaths per minute or, if using capnography, maintain CO₂ 35-45.

Section 1.17: Head Trauma (continued)

6. Call OLMD if signs cerebral herniation (extensor posturing, dilated or nonreactive pupils, or decrease in GCS of >2 if the initial was <9) Hyperventilation (rate 20 bpm) is CAT B.
7. Air transport for a head injury patient is not contraindicated.

Section 1.19: Hyperthermia

Specific Information Needed:

1. Sudden collapse or gradual development?
2. Exercise induced?
3. Previous history of hyperthermia?
4. Environmental conditions.

Physical Assessment:

1. Vital signs – oral temperature (if available) of 106 degrees (41 degrees C) or greater. If available, rectal temperature may be obtained.
2. Skin hot and dry and usually no sweating.
3. Suspect hyperthermia in patients with acute psychosis or seizures on a hot, humid day.

Treatment:

1. Airway – ensure patency.
2. Breathing – oxygen 12-15 L/M, by non-rebreather mask.
3. Pulse oximeter, maintain oxygen saturation >95%.
4. Circulation – Start IV, large bore, with NS. Give 20 cc/kg bolus in **pediatrics**.
5. Attach cardiac monitor
6. Cool patient by appropriate interventions. Call OLMD for guidance.
7. If patient is actively seizing, administer Diazepam (See Seizure Protocol):
Pediatrics under 5 years of age (CAT B): 0.2-0.5 mg/kg slow IVP until seizure stops to maximum of 5 mg. Rectally (CAT B): 0.5 mg/kg
Pediatrics over 5 years of age (CAT B): 1 mg slow IVP until seizure stops to a maximum of 5 mg.
8. Contact receiving hospital with patient report as soon as possible during transport.

Specific Precautions:

1. Heat stroke is a medical emergency. Differentiate from heat cramps (abdominal or leg) or heat exhaustion (hypovolemia of gradual fluid loss), however, be aware that heat exhaustion can progress to heat stroke. No progression through the stages is necessary for the diagnosis.
2. Wet sheets over patient with good air flow will tend to increase temperature and should be avoided.
3. Definitive cooling may require an ice water bath. DO NOT LET COOLING IN THE FIELD DELAY YOUR TRANSPORT. Cool patient if possible while en route.

Section 1.20: Hypoglycemia

Specific Information Needed:

1. Onset – Sudden or gradual? When was patient last well?
2. History – Of recent stress, either emotional or physical, last meal, and presence/absence of hunger or thirst.
3. Past history – Diabetes mellitus, medical alert tag, last insulin (time/amount), and/or oral hypoglycemic agents?

Physical Assessment:

1. Vital signs.
2. Rate and quality of respiration.
3. Breath odor.
4. Mental status.
5. Skin – color, temperature, and hydration.
6. Signs of adrenaline effect, diaphoresis, tachycardia, tremor, and/or seizures.
7. Medical alert tag.

Treatment:

1. Airway – ensure patency
2. Breathing – oxygen to maintain oxygen saturation (pulse oximeter) reading >95%.
3. Circulation – attach cardiac monitor.
4. If patient is unconscious or unable to effectively take oral glucose, start IV, saline lock or large bore, with normal saline at a TKO rate.
5. Draw a red top tube for hospital analysis (optional if local hospital will not accept).
6. Glucometer – **Pediatric**: Glucose <60 administer 2-4 cc/kg D25W (CAT A) (Glucose <60 and can't get IV: consider glucagon 0.5 mg IM for **children** under 44 lbs [CAT B]).
7. Contact receiving hospital with patient report as soon as possible during transport.

Specific Precautions:

1. The diabetic will frequently know what is needed – Listen to the patient, but remember hypoglycemia is often associated with mental confusion.
2. Hypoglycemia can present as seizures, coma, behavior problems, intoxication, confusion or stroke-like picture with focal deficits (particularly in elderly patients).
3. Patients who are elderly or who have been hypoglycemic for prolonged periods of time may be slower to awaken.
4. If a glucometer is not available, the TREATMENT should be for HYPOGLYCEMIA for a patient who is unconscious or has an altered mental status.
5. Hypoglycemia is not an indication for use of IO access except in extreme circumstances. All such uses of IO will be reviewed by state QI committee.

Section 1.21: Hypothermia

Specific Information Needed:

1. Length of exposure?
2. Environmental conditions?
3. Past medical history? Medications?

Physical Assessment:

Define categories of accidental hypothermia by physical findings (patient will be categorized by lowest physiological variable):

- Apnea – Put metal or glass slide under nostrils for 30-45 seconds or use capnography.
- Pulse – Palpate carotid pulse for 30-45 seconds.
- ECG – Attach ECG leads and interpret rhythm.
- LOC – Determine LOC by verbal and motor responsiveness.

1. MILD TO MODERATE HYPOTHERMIA (90 – 95 F)

Core body temperature (if available) is less than 95 F but greater than 90 F. Patient may present with a history of exposure to cold, altered mental status, shivering, stiffness of muscles, stumbling or staggering gait, cool or cold skin, or mottled/pale skin.

2. SEVERE HYPOTHERMIA (less than 90 F)

Core body temperature (if available) is less than 90 F. Patient may present with any of the above symptoms listed above except shivering, and they may also present with absent or difficult to detect respiratory effort, and/or peripheral pulses, respiratory, and/or cardiac arrest.

TREATMENT:

A. MILD/MODERATE HYPOTHERMIA

1. Airway – ensure patency.
2. Breathing – warm humidified Oxygen 12-15 L/M.
3. Circulation – attach cardiac monitor.
4. Consider Saline lock or IV, large bore, with normal saline (warmed if possible). Adjust rate for **pediatric** – consult OLMD).
5. Remove wet garments.
6. Protect against heat loss and wind chill.
7. Maintain horizontal position.
8. Avoid rough movement and excess activity.
9. Add heat to patient's head, neck, chest, and groin.
10. Heat environment as much as possible.
11. If patient has normal mental status, you may give warm fluids to drink.
12. Contact receiving hospital with patient report as soon as possible during transport.

Section 1.21: Hypothermia (continued)

B. SEVERE HYPOTHERMIA WITH VITAL SIGNS PRESENT

Same as Mild/Moderate except:

1. Start IV, large bore, with normal saline (warmed if possible).
Pediatric; Consult OLMD.
2. Give nothing by mouth.

C. SEVERE HYPOTHERMIA WITH ABSENCE OF VITAL SIGNS

1. Notify OLMD immediately.
2. Airway – ensure patency, and consider intubation.
3. Breathing – warm, humidified Oxygen 12-15 L/M via bag-valve-mask.
4. Circulation – chest compressions per AHA BCLS guidelines.
5. Cardiac monitor – if VFib, defibrillate:
Pediatric: 2 J/kg.
(Biphasic defibrillators – use manufacturer's recommended settings.)
6. Start IV, large bore, with normal saline (warmed if possible).
Pediatric – Consult OLMD.
7. Heat environment as much as possible.
8. Contact receiving hospital with patient report as soon as possible during transport.

Specific Precautions:

1. Handle patient gently – do not jostle.
2. Do not force oral intubation.
3. Do not intubate by nasotracheal route.
4. Do chest compressions only if chest is compressible and patient has a disorganized rhythm.
5. If terrain is difficult, evacuate patient first and treat second.
6. OLMD must make decision about whether to give medications in hypothermic arrest.

Section 1.22: Near Drowning

Specific Information Needed:

1. How long patient was submerged?
2. Approximate temperature of water.
3. Associated trauma. Did patient jump or dive into water? Was MVC involved?
4. Was this a Scuba diving accident?

Physical Assessment:

1. Vital signs.
2. Neurologic status: Note, record, and monitor mental status.
3. Initial presence of crackles or other signs of pulmonary edema, and/or respiratory distress. Monitor any changes during transport.

Treatment:

1. If chance of spinal injury – STABILIZE CERVICAL SPINE IMMEDIATELY.
2. Airway – clear upper airway, ensure patency, and consider intubation (vomiting precautions).
3. Breathing – Oxygen 15 L/M, by non-rebreather mask, assist with BVM and suction as necessary.
4. Circulation – attach cardiac monitor, perform 12-lead ECG if available.
5. Start IV, Saline lock or large bore, with normal saline at a TKO rate.
6. Glucometer – **Pediatric**: Glucose below 60 administer 2-4 cc/kg D25W (CAT A) (Glucose <60 and can't get IV: consider glucagon 0.5 mg IM for **children** under 44 lbs [CAT B]).
7. Consider body temperature – refer to Hypothermia Protocol (1.22).
8. Contact receiving hospital with patient report as soon as possible during transport.

Specific Precautions:

1. If patient is still in water, rescue by trained, equipped personnel only.
2. Patient will vomit, protect the airway!
3. All NEAR-DROWNING SHOULD BE TRANSPORTED. Even if patients initially appear fine, they can deteriorate. Monitor closely. Pulmonary edema is likely.
4. Hypothermia may be a problem. If suspected, refer to Hypothermia Protocol (1.22).
5. It is a common error to underestimate injuries in near-drowning from diving, jumping, MVC, etc.

Section 1.23: Poisons and Overdoses

Specific Information Needed:

1. Scene safety? Do not enter an area that is possibly contaminated with a hazardous material unless properly protected. Do not enter scene if physical danger is present. Wait for police and/or HazMat to clear or secure a dangerous scene.
2. Type of ingestion: What, when and how much was ingested? Bring the poison, the container, and everything questionable in the area with the patient to the Emergency Department. Look for multiple patients with same signs and symptoms.
3. Reason for ingestion: Screen for child neglect, and/or suicidal problem.
4. Past history: Medications, diseases, psychiatric history, and/or drug abuse.
5. Action taken by bystanders: Induced emesis: “antidote” given?

Physical Assessment:

1. Vital signs.
2. Level of consciousness.
3. Breath odor.
4. Neurologic status.
5. Eye findings – pupil size, reactivity, and equality.
6. Vomitus.
7. Needle marks or tracks.
8. SLUDGES? (Salivation, Lacrimation, Urination, Defecation, Gastric Emesis, and Sweating).

Treatment:

A. EXTERNAL/INHALATION POISONING

1. If local protocol does not exist, consider Hazardous Material Protocol.
2. Protect medical personnel.
3. Remove the patient from contaminated area or remove contaminant from the patient.
4. Remove contaminated clothing.
5. Flush contaminated skin and eyes with copious amounts of water.
6. Airway – ensure patency.
7. Breathing – Oxygen 15 L/M, by non-rebreather mask, maintain oxygen saturation (pulse oximeter) reading >95%, assist with BVM if necessary.
8. If suspicion of Carbon Monoxide poisoning, remember pulse oximeter is unreliable.
9. Circulation – cardiac monitor.
10. Start IV, Saline lock or large bore, with normal saline at TKO rate.
11. If shock syndrome present, proceed to Shock Protocol.
12. If cholinergic poisoning (organophosphate, SLUDGE), administer Atropine (CAT B)
Pediatrics (CAT B): 0.02 mg/kg IVP, MIN dose 0.1 mg, MAX single dose is 0.5 mg.

Section 1.23: Poisons and Overdoses (continued)

13. Contact receiving hospital with patient report as soon as possible during transport.

B. INTERNAL POISONING

1. Airway – ensure patency (vomiting precautions).
2. Breathing – Oxygen 15 L/M, by non-rebreather mask, maintain oxygen saturation (pulse oximeter) reading >95%, assist with bag-valve-mask if necessary.
3. Circulation – attach cardiac monitor.
4. Start IV, Saline lock or large bore, with normal saline at a TKO rate.
5. If shock syndrome present, proceed to Shock Protocol.
6. If depressed respirations/diminished responsiveness consider Naloxone (CAT A).
Pediatrics: 0.1 mg/kg until age 5 years or 20 kg; 2 mg for above age 5 years or above 20 kg.
7. Draw one red top tube for hospital analysis (optional if local hospital will not accept).
8. Glucometer – **Pediatric:** Glucose <60 administer 3-4 cc/kg D25W (CAT A) (Glucose <60 and can't get IV: consider glucagon 0.5 mg IM for **children** under 44 lbs [CAT B]).
9. Consider administration of Activated Charcoal (CAT B) – Contact OLMD.
10. If tricyclic antidepressant (Include: amitriptyline, amoxapine, ascendin, desipramine, deylrel, elavil, endep, imipramine, ludiomil, norpramine, pamelor, sinequan, triavil, tofranil, and others):
Hyperventilate stuporous patients at a rate of at least 20/min. if possible.
Treat hypotension with volume replacement (dopamine or other vasoconstrictive medications are contraindicated)
Administer 1 mEq/kg of Sodium Bicarbonate, slow IVP (CAT B).
11. If known beta blocker overdose consider glucagon (CAT B): **Pediatrics** 0.5 mg IV for **children** under 44 lbs.
12. If known calcium channel blocker overdose with hypotension consider:
Calcium gluconate (CAT B): **Pediatrics** 60 mg/kg [0.6 cc/kg] IV – maximum dose 1 gram
Glucagon (CAT B): **Pediatrics** 0.5 mg IV for **children** under 44 lbs.
NOTE: flush the line with saline between giving calcium and glucagon to prevent precipitation.
13. If known cyanide exposure or smoke inhalation victim who shows clinical evidence of closed-space smoke exposure (soot in mouth or nose, sooty sputum) and is either comatose, in shock, or in cardiac arrest, consider Cyanokit (hydroxycobalamin 5 grams) IV over 15 minutes (CAT A). Not for Peds.
14. If dysrhythmias present, proceed to Cardiac Dysrhythmia Protocol (1.11).
15. Contact OLMD if additional ALS intervention is necessary.
16. Contact receiving hospital with patient report as soon as possible during transport.

Section 1.23: Poisons and Overdoses (continued)

Specific Precautions:

1. Inhalation poisoning is particularly dangerous to rescuers. Recognize an environment with continuing contamination and extricate rapidly by properly trained and equipped personnel.
2. Do not induce vomiting in patients who:
Have ingested strong acid, strong base, iodides, silver nitrate, strychnine, phenothiazine, hydrocarbons gasoline and other (petroleum products), camphor, tricyclics, INH, or short acting sedatives or any medication which may alter the patients level of consciousness.
Are unconscious, obtunded, seizing, or have no gag reflex.
Are in the third trimester of pregnancy.
3. Do not try to neutralize acids with strong alkalis. Do not try to neutralize alkalis with acids.
4. Activated charcoal is ineffective in some ingestions such as heavy metals, mineral acids, petroleum products or cyanide.
5. Each OLMD physician is encouraged to involve the Poison Control Center in the decision making to determine treatment and whether transport is appropriate.

Section 1.25: Respiratory Distress

Specific Information:

1. History – Acute insult or injury, or slow deterioration. Obtain careful history of fever, chills, and purulent sputum products.
2. Past history – Chronic lung or heart problems (diagnosis?); medications, home oxygen, past allergic reactions, or recent surgery.
3. Associated symptoms: Chest pain, and/or paresthesias of mouth or hands.

Physical Assessment:

1. Vital signs including pulse oximetry to maintain oxygen saturation >95%.
2. TACHYPNEA:
Birth to 6 months >60 BPM.
7 months to 1 year >40 BPM.
2 – 4 years >30 BPM.
Over 5 years >20 BPM.
3. Level of consciousness.
4. Cyanosis.
5. Evidence of upper airway obstruction: Hoarseness, bucking, drooling, coughing, inspiratory stridor, irrational behavior, and/or poor cooperation.
6. Evidence of lower airway obstructions: Breath sounds: Clear, crackles, wheezing, symmetrical, and/or labored. Abnormality on inspiration or expiration?
7. Secondary findings. Signs of congestive failure: Distended neck veins when upright, wet lung sounds, and/or peripheral edema.
8. Hives, and/or airway edema.
9. Evidence of trauma

Treatment:

1. Airway – ensure patency.
If partial or complete obstruction: follow AHA's guidelines for management of conscious or unconscious obstructed airway.
If croup or epiglottitis, calm the patient much as possible. Have parent hold child in arms and give oxygen.
Consider intubation (not for epiglottitis or croup).
2. Consider allergic reaction. If present, treat per Allergic Reaction Protocol (Severe).
3. Breathing – Oxygen 12-15 L/M, by non-rebreather mask, be prepared to assist ventilations with bag-valve-mask, pulse oximeter, to maintain oxygen saturation of >95%.
4. Circulation – attach cardiac monitor. Perform 12 lead ECG if available.
If vital signs are stable consider IV, Saline lock or large bore, with normal saline at TKO rate.
If vital signs are unstable utilize Shock Protocol with IV, large bore, with normal saline at TKO rate and adjust to patient's needs.

Section 1.25: Respiratory Distress (continued)

5. If wheezing is present (asthma, allergic reaction, or burns with wheezing): Inhalation therapy with Albuterol en route. Dosage for adults and **children** is 2.5 mg Albuterol administered by nebulization, rotohaler, or by metered dose inhaler with spacer.
6. If symmetrical crackles present (pulmonary edema): Nitroglycerin and CPAP are CAT A. All other treatment is CAT B – Contact OLMD:
Nitroglycerin (CAT A): 0.4 mg sublingual (tablet or spray) if systolic BP>110 mm Hg.
CPAP (CAT A)
Furosemide (CAT B): 20-40 mg IVP.
Morphine Sulfate (CAT B): 2-4 mg slowly IV. Watch for respiratory depression.
7. If pneumothorax is present – watch for signs of tension and transport immediately. If tension pneumothorax is suspected, contact OLMD about possible decompression.
8. If symptoms and signs are consistent with asthma, COPD, pulmonary edema, CHF, or pneumonia and the patient continues to have SPO₂ reading <95% after oxygen therapy, consider CPAP (CAT A).
9. Consider endotracheal intubation (CAT A) for those patients who have indications (See 6.1).
10. Contact OLMD if additional ALS intervention is necessary.
11. Contact receiving hospital with patient report as soon as possible during transport.

Breath Sounds in Respiratory Distress

Characteristics	Possible Diagnosis
Clear, symmetric	Hyperventilation, MI, metabolic, or pulmonary embolus
Crackles, symmetric	Pulmonary edema, extensive pneumonia
Wheezing, symmetric	Asthma, pulmonary edema, COPD, or allergic reaction
Clear, asymmetric or absent	Pneumothorax, pulmonary embolus, COPD
Crackles, asymmetric	Pneumonia, pulmonary edema
Wheezing, asymmetric	Foreign body, pulmonary embolus, COPD

Specific Precautions:

1. If you are unable to differentiate the cause of the respiratory distress, the proper course is to administer oxygen and transport. When in doubt and the patient is in severe distress, discuss your alternatives with OLMD.
2. Wheezing in older persons is frequently due to pulmonary edema, not asthma. Your patient may make the wrong diagnosis. Consider also pulmonary embolus.
3. **Children** with croup, epiglottitis, or laryngeal edema usually have respiratory arrest due to exhaustion or spasm. You will still be able to ventilate with mouth-to-mouth, pocket mask or bag-valve-mask technique. Do not attempt intubation. Note compliance.
4. Do not over diagnose “hyperventilation” in the field. Your patient could have a pulmonary embolus or other serious problem: give him/her the benefit of the doubt.

Section 1.25: Respiratory Distress (continued)

Treatment with oxygen will not harm the person hyperventilating, and it will protect you from underestimating the problem.

Section 1.26: Seizures

Specific Information Needed:

1. Seizure history: Onset, time interval, previous seizures, and type of seizure.
Consider febrile seizures in **children**.
2. Medical history: Medications and compliance, head trauma, diabetes, headaches, drugs, alcohol, and/or pregnancy.

Physical Assessment:

1. Vital signs including pulse oximetry to maintain oxygen saturation of >95%.
2. Seizure activity. Determine focal or generalized and length.
3. Level of consciousness.
4. Head and facial trauma.
5. Incontinence. (Urinary and/or fecal).
6. Focal neurologic signs.
7. Headache.

Treatment:

1. Airway – ensure patency – nasopharyngeal airways may be useful.
2. DO NOT FORCE ANYTHING BETWEEN THE TEETH.
3. DO NOT USE BLIND INSERTION AIRWAY DEVICES.
4. Breathing – Oxygen 12-15 L/M, by non-rebreather mask.
5. Pulse oximeter – maintain oxygen saturation >95%, assist ventilations if necessary, and suction as needed.
6. Circulation – attach cardiac monitor, perform twelve lead if any suspicion of cardiac or stroke etiology.
7. Consider saline lock IV if patient is not continually seizing.
8. If patient actively or continually seizing, start IV or IO, saline lock or large bore, with NS at TKO rate.
9. Glucometer – **Pediatric**: Glucose <60 administer 2-4 cc/kg D25W (CAT A)
(Glucose <60 and can't get IV: consider glucagon 0.5 mg IM for **children** under 44 lbs [CAT B]).
10. Administer diazepam or lorazepam:
Diazepam:
Pediatrics (CAT B): Under 5 years of age slow IV push (0.2 – 0.5 mg/kg) until seizure stops to maximum of 5 mg; or rectally, 0.5 mg/kg. Over 5 years of age slow IV push 1 mg until seizure stops to a maximum of 5 mg.
Lorazepam:
Pediatrics (CAT B): Neonate – 0.05 mg/kg slow IV.
Infants/Children: 0.1 mg/kg slow IV, Max dose 2 mg.
11. Left lateral recumbent position for transport.
12. Contact receiving hospital with patient report as soon as possible during transport.
13. Document patient's level of consciousness at time of transport.

Section 1.26: Seizures (continued)

Specific Precautions:

1. Move hazardous materials away from patient. Restrain the patient only if needed to prevent injury. Protect patient's head.
2. Trauma to tongue is unlikely to cause serious problems. Trauma to teeth may occur.
3. Attempts to force an airway into the patient's mouth can completely obstruct his airway.
4. Medical personnel are often called to assist epileptics who seize in public. If patient clears completely and does not request transport, is taking his medications, has his own physician and is experiencing his usual frequency of seizures, transport may be unnecessary. Document patient's mental status and have patient sign a refusal form.
5. Don't forget to check for a pulse once a seizure terminates. Seizure activity may be the first sign of cerebral hypoxia from cardiac arrest.
6. Focal motor seizures are generally treated in the prehospital setting.
7. Seizures in **pediatric** patients are commonly febrile seizures and are usually benign and short lived.

Section 1.27: Shock

SHOCK SYNDROME for purposes of these protocols is defined as inadequate organ perfusion. Signs and symptoms may include, but are not limited to:

1. Pulse over 120 with systolic BP < 90 mmHg (adult) in conjunction with suspected blood loss.
2. Skin cold and clammy. (May be absent in early septic shock).
3. Mental status: Confusion, restlessness, and/or apathy.
4. Other: Marked thirst.

CLASSIFICATION OF SHOCK:

Determine the type of shock, so that appropriate treatment may be started in the field.

1. Hypovolemic Shock: Shock characterized by the loss of circulating blood volume. This may be due to direct hemorrhage or through loss of fluids from severe vomiting, diarrhea, burns and or peritonitis.
2. Cardiogenic Shock: Pump failure.
3. Distributive Shock: Characterized by abnormal vascular tone. Includes anaphylaxis, early sepsis, and neurogenic shock.
4. Obstructive Shock: Mechanical obstruction to blood flow to or from the heart. Includes cardiac tamponade, tension pneumothorax, dissecting aneurysm, and pulmonary embolism.

TREATMENT: HYPOVOLEMIC SHOCK

1. Airway - ensure patency.
2. Breathing - Oxygen 12-15L/M, by non-rebreather mask, assist ventilations with BVM as needed.
3. Pulse oximeter – maintain oxygen saturation >95%.
4. Circulation - attach cardiac monitor, perform 12 lead ECG if available.
5. Stop significant external hemorrhage, if present. If external bleeding from an extremity cannot be controlled by pressure, application of a tourniquet is the reasonable next step in hemorrhage control. Use a hemostatic agent if unable to stop severe bleeding with pressure or tourniquet.
6. IV, with normal saline, large bore times two if sites permit (CAT A):
Adults: Consider fluid challenge of 250cc bolus, reassess, and then titrate to a B/P high enough to provide adequate perfusion.
Patients with history of hypertension, or with head injury, do not tolerate mild hypotension.
In these cases, titrate to a systolic B/P of 120 mmHg.
If a patient in hypovolemic shock has a venous port you may access it if you have been trained and have the equipment.
Pediatrics: 20 cc/kg, reassess. May repeat up to 3 times.

Section 1.27: Shock (continued)

7. Consider hypothermia—hypothermia due to major heat loss must be considered and treated even in warm weather—proceed to Hypothermia Protocol.
8. DO NOT DELAY TRANSPORT. TREAT PATIENT ENROUTE.
9. Contact receiving hospital with patient report as soon as possible during transport.

Treatment: Cardiogenic Shock

1. Airway - ensure patency.
2. Breathing - Oxygen 12-15 L/M, by non-rebreather mask, maintain oxygen saturation >95%.
3. Circulation - attach cardiac monitor. Perform 12 lead ECG if available. If dysrhythmia identified, proceed to appropriate Cardiac Dysrhythmia Protocol.
4. IV, Saline lock or large bore, with normal saline at TKO rate.
5. Contact receiving hospital with patient report as soon as possible during transport.
6. Consider Dopamine drip (CAT B):
Pediatric (CAT B): Rate starts 2-5 mcg/kg/min. Titrate to effect.

Treatment: Distributive Shock

1. Anaphylaxis - proceed to Allergic Reaction Protocol (Severe).
2. Sepsis and Neurogenic:
3. Airway - ensure patency.
4. Breathing - Oxygen 12-15 L/M, by non-rebreather mask, (COPD caution).
5. Pulse oximeter – to maintain oxygen saturation >95%.
6. Assist ventilations if needed with bag-valve-mask.
7. Consider intubation.
8. Circulation- attach cardiac monitor.
9. IV, large bore, with normal saline at TKO rate.
10. If hypotensive, consider fluid challenge (20 cc/kg at 250 cc per bolus).
11. Consider Dopamine drip (CAT B):
Pediatric (CAT B): Rate starts 2-5 mcg/kg/min. Titrate to effect.
12. Contact receiving hospital with patient report as soon as possible during transport.

Treatment: Obstructive Shock

- Cardiac Tamponade
 - Tension Pneumothorax
 - Dissecting Aneurysm
 - Pulmonary Embolism
1. Airway – ensure patency.
 2. Breathing - Oxygen 15 L/M, by non-rebreather mask,
 3. Pulse oximeter – to maintain oxygen saturation >95%.
 4. Circulation – attach cardiac monitor

Section 1.27: Shock (continued)

5. Closely monitor vital signs.
6. IV, large bore, with normal saline at TKO rate.
7. If SEVERE HYPOTENSION, contact OLMD for appropriate fluid flow rate.
8. Consider Dopamine drip (CAT B):
Pediatric (CAT B): Rate starts 2-5 mcg/kg/min. Titrate to effect.
9. Transport rapidly.
10. Contact receiving hospital with patient report as soon as possible during transport.
11. Contact OLMD if patient has a symptomatic tension pneumothorax

Section 1.29: Suspected Spinal Injury

This protocol is intended to provide the out-of-hospital provider with an approach to spinal motion restriction (SMR). Full SMR as an automatic response to trauma has come under scrutiny recently and may not always be in the patient's best interest.

Traditional approaches have relied on mechanism of injury as interpreted by the individual practitioner. This "gut instinct" has resulted in many patients being immobilized as a risk management measure while leaving others not having SMR based on a "minor" mechanism that may indeed have been severe enough to cause injury. Patients packaged on hard SMR devices may develop complications or problems due to laying on a spineboard. These complications or problems could potentially be avoided if a spinal assessment tool is utilized to reduce the number of patients unnecessarily placed on spine boards.

Specific Information Needed:

1. Violent mechanism of injury (witness, scene, situation).
2. High energy transfer (ejection, helmet damage, starred windshield, etc.).

Procedure:

If any suspicion, maintain the spine in the neutral position until assessment is complete.

1. Airway – ensure patency and suction as necessary (vomiting precautions).
2. Breathing – Oxygen 10-15 L/M, by non-rebreather mask, maintain oxygen saturation >95%.
3. Circulation - if vital signs stable, consider Saline lock or IV, large bore, with normal saline at KVO rate.
4. If vital signs are unstable or hypotensive—proceed to Shock Protocol.
5. Assess for possible spinal injury and need for SMR.
6. A step-by-step assessment of the trauma patient is followed to determine if SMR is indicated.

The assessment is designed to error on the side of SMR. A flow chart is provided and extensive training on this procedure is essential. (See end of protocol for chart).

Step 1: Mechanism of Injury

Elements that should increase suspicion for spine injury include axial loading (diving), blunt trauma to the head or neck, a motor vehicle crash (automobile, snow machine, ATV etc.), a fall over three feet, and/or an adult who falls from a standing height. This mechanism does not automatically require a collar and long board; rather, the mechanism should serve to alert medical providers to the need for spine injury screening. Some patients may be predisposed to spinal injury; people with conditions like arthritis of the spine, including ankylosing spondylitis, may have spinal injuries after minor trauma.

Section 1.29: Suspected Spinal Injury (continued)

Step 2: Patient Reliability

The assessment can only be utilized if the patient is alert, calm, cooperative, and not intoxicated. If there is a communication barrier, including poor communications skills (as in young **children**) or a language barrier, the patient cannot be properly assessed and based on mechanism and any complaint of injury the patient should receive SMR.

Step 3: Distracting Injury

Any painful injury might distract the patient from the pain of a cervical spine injury. This is usually a long bone fracture but could be any fracture, skin injury, or internal injury. Both medical as well as traumatic causes for pain can be considered a distracting injury (e.g. the patient with chest pain who crashes his car while driving to the hospital). If the patient has an injury that seems to be causing enough pain to provide a distraction, the cervical spine cannot be cleared clinically.

Step 4: Neurologic Evaluation (Abnormal Motor/Sensory Exam)

A patient who is reliable and has no distracting injury should then be checked for any neurologic deficits. Perform the following assessments bilaterally in the upper and lower extremities. Responses should be symmetrical. Any abnormalities should prompt SMR.

Motor:

- Have the patient spread the fingers of his or her hand and resist as you try to squeeze them together. There should be some resistance as you squeeze.
- Ask the patient to hold his or her hand out with the palm facing down. While supporting the wrist, ask the patient to resist while you push down on the dorsal surface of the hand or fingers. The patient should be able to provide some resistance.
- “Gas pedal test”-Place your hand on the bottom of the patient’s foot at the great toe. Ask the patient to push down against resistance. The patient should be able to apply pressure to your hand.
- Move your hand to the top of the foot and ask the patient to pull their toe towards their nose against your resistance. The patient should be able to apply pressure to your hand.

Sensory:

- Assess for the ability to distinguish soft and sharp sensation in each hand and foot. Use a sharp object and a soft object. A corner of a gauze pad and a pencil may be used.
- Another option is to break a wooden shaft cotton-tipped applicator. Do not puncture the skin. The sensory exam should be considered positive if the patient complains of distal paresthesias or dysesthesias (abnormal

Section 1.29: Suspected Spinal Injury (continued)

sensations e.g. tingling, or painful sensations) even if they are able to “feel” their extremities.

- Alternately apply the soft and then the sharp object to each extremity. Do not let the patient know which one was used. Ask the patient whether the sensation is soft or sharp. Repeat soft and sharp in all extremities.
- The patient should be able to distinguish soft from sharp.

Step 5: Complaints of Pain or Examination Tenderness

- If a patient complains of pain anywhere in the spine, he or she must be treated as though a spinal injury has occurred.
- Palpate the entire spine. Any complaint of pain or tenderness to palpation along any part of the spine should be considered an indication that the patient requires full SMR.
- Ask the patient about sensations of numbness, tingling, shooting pain, or motor weakness in any extremity. Any positive response requires full SMR.
- Evaluate for other injury/ies that is/are so painful the patient may be distracted from awareness of neck pain.
- Determine if the patient has pain over the spine. If pain is elicited from palpation, apply SMR.
- Some components of the sensory examination are subjective. When in doubt, apply SMR.

Step 6: SMR

- SMR includes the use of a cervical collar, head immobilizer device, spinal motion restriction, padding where necessary, and adequate straps, so that the patient remains securely in place, even if the patient must be rolled in order to clear the airway. Other appropriate devices (KED, etc) may be needed, depending on patient situation.
- Follow the manufacturer’s guidelines when utilizing any SMR devices.

7. Contact receiving hospital with patient report as soon as possible during transport.

DOCUMENTATION:

In any case where there is head and/or facial injury, or a mechanism of injury suggesting the possibility of a cervical spine injury, clear and concise documentation is absolutely essential. In the cases where the decision not to provide SMR is made, documentation must include the following information:

Subjective:

- The examination was performed on a reliable patient.
- The patient denies having any spinal pain.
- The patient denies having any extremity weakness or loss of movement.

Section 1.29: Suspected Spinal Injury (continued)

- The patient denies having any tingling or feeling of pins and needles in the extremities.

Objective:

- There is no pain on palpation of the spine.
- Motor function is intact in all of the extremities.
- Sensation is intact in all extremities.

Specific Precautions:

1. Use of a backboard for stabilization of some other injury than the spine, or to move the patient does not mean that SMR is indicated.
2. Use of cervical motion restriction in adults should always be followed with SMR. Do not secure the head to the backboard before securing the body (it can cause torsion on the neck).
3. SMR with a cervical collar and a vacuum mattress is a recommended technique. A vacuum mattress, when available, is preferred for all but short transports.
4. Vomiting should be expected in head injury patients. Therefore, the patient should be securely strapped to a long board to enable board and patient to be turned as a unit.
5. EMTs should be aware that additional help may be necessary during transport to turn patient and manage airway while maintaining cervical spine integrity.
6. Chin straps that could compromise the airway should be removed as the patient is secured to the long board. (Leg straps which may compromise cervical spine stabilization should also be removed.)
7. Most **children** require padding under the shoulders to maintain neutral spinal alignment.
8. A rigid cervical collar, continuous manual in-line support during rapid extrication onto a long spine board, and rapid transport should be substituted for more time consuming methods in the severely traumatized patient requiring immediate life saving intervention.
9. Airway problems, respiratory difficulty, and shock are common in the traumatized patient. Alternate techniques for performing airway procedures should be used in spinal injured patients. To maintain proper control of the cervical spine during endotracheal intubation, inline stabilization must be performed by two EMTs.

Section 1.29: Suspected Spinal Injury (continued)
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10. If any motion restriction techniques cause an increase in pain or neurologic deficit; the patient should be stabilized in position found or position of greatest comfort.
11. Geriatric patients (over 55) should raise a higher index of suspicion for the EMT due to physiologic aging changes; the EMT's awareness of the need to provide for cervical spine motion restriction should be more acute in these patients.

Section 1.30: Syncope

Specific Information Needed:

1. Present history: Onset, duration, seizure activity, precipitating factors. Was the patient sitting, standing or lying. Is the patient pregnant?
2. Past history: Medications, diseases, or prior syncope.
3. Symptoms: Vertigo, nausea, chest or abdominal pain.

Physical Assessment:

1. Vital signs.
2. Neurologic exam.
3. Signs of head trauma.
4. Consider blood glucose check.
5. Obtain rhythm strip.

Treatment:

1. Airway - ensure patency.
2. Breathing - Oxygen 10-15 L/M, by non-rebreather mask.
3. Pulse oximeter, maintain oxygen saturation >95%.
4. Circulation - cardiac monitor, 12-lead if available
If vital signs are stable, consider IV, Saline lock or large bore, with normal saline at a TKO rate.
If vital signs are unstable or hypotensive—proceed to Shock Protocol.
5. Glucometer:
Pediatric: Glucose <60 administer 2-4 cc/kg D25W (CAT A).
(Glucose <60 and can't get IV: consider glucagon 0.5 mg IM for **children** under 44 lbs [CAT B]).

Specific Precautions:

1. Most syncope is vasovagal, not cardiac. Placing the patient in the recumbent position should be sufficient to restore vital signs and level of consciousness to normal. Other causes may be: Cardiac Arrhythmias, ischemia, hypertension, peripheral vascular disease, orthostatic, hypoglycemia, stroke, circulatory diseases, and transient ischemic attack.
2. Syncope while in a recumbent position is almost always cardiac.
3. Syncope of recent onset in middle-aged or elderly patients is often cardiac and deserves special concern.
4. Occult GI Bleeds may also present with syncope as may dissecting aneurysms.
5. Syncope by definition is a transient state of unconsciousness from which the patient has recovered. If the patient is still unconscious, the treatment should be as in the Coma Protocol or Shock Protocol as appropriate.

Section 1.32: Vomiting

Specific Information Needed:

1. When did symptoms begin?
2. Is the cause of the vomiting known?
3. Has the patient ingested any potential poison or spoiled food?
4. Has there been blood or material like coffee grounds in the vomitus?
5. Has the patient also had diarrhea?
6. If female of child-bearing age, is the patient pregnant?
7. Are there any associated symptoms (such as abdominal pain)?
8. Does the patient have a head injury or severe headache?
9. If headache, is there a history of migraine headaches?

Physical Assessment:

1. Vital signs (are there signs of shock)?
2. Skin: Are there signs of dehydration (poor skin turgor, dry mucous membranes)?
3. Is jaundice present?
4. Head: any sign of head trauma?
5. Abdomen: Tenderness, rebound tenderness, guarding, rigidity, bowel sounds, and distention.
6. Neurologic exam: LOC, pupils, and focal findings?

Treatment

Pediatric (CAT B): 1 month to 12 years and <40kg

Administer Ondansetron (Zofran) 0.1 mg/kg IV or IM not to exceed 4 mg

Precautions:

1. Can cause allergic reactions
2. Can cause extrapyramidal reactions
3. Must call for order before giving to a child (CAT B)

PATIENT CARE PROTOCOLS

SECTION 2: MEDICATIONS

This section of the protocols is intended as information only.
Medications may be administered only as defined by protocol unless online medical direction orders a deviation.

Section 2.1: Activated Charcoal

Pharmacology and Actions:

Absorbs toxins by chemical binding and prevents GI absorption.

Indications:

Poisoning or overdose following emesis, or when emesis is contraindicated.

Contraindications:

Patients who are unconscious or who may have a rapidly diminishing level of consciousness.

Precautions:

1. Activated Charcoal may be ineffective in ingestion of toxins such as heavy metals, mineral acids, petroleum products, or cyanide.
2. Administration of Activated Charcoal can result in aspiration or significant particulate obstruction of the airway.

Administration (CAT B):

Pediatrics (CAT B) – 1.0 gm/kg

Administer in aqueous based solution with Sorbitol (cathartic).

Side Effects:

Nausea and Vomiting.

Section 2.2: Adenosine

Pharmacology and Actions:

Adenosine is a naturally occurring nucleoside that has the ability to slow conduction through the AV node. Since most cases of PSVT involve AV nodal reentry, adenosine is capable of interrupting the AV nodal circuit and stopping the tachycardia, restoring normal sinus rhythm. It is not associated with hypotension and can be used safely in both wide and narrow complex tachycardias. It is eliminated from the circulation rapidly, having a half life in the blood of less than 10 seconds. This allows for the use of repeated doses in rapid succession if needed.

Indications:

To convert symptomatic PSVT to normal sinus rhythm including PSVT that is associated with accessory bypass tracts (e.g., WPW).

Contraindications:

1. Second or third degree heart block.
2. Sick sinus syndrome.
3. Known hypersensitivity.
4. Pregnancy (relative contraindication).
5. Dipyridamole (a coronary vasodilator), Carbamazepine (Tegretol).

Precautions:

1. When doses larger than 12mg are given by infusion, there may be a decrease in blood pressure secondary to a decrease in the peripheral vascular resistance.
2. The effects of adenosine are antagonized by the methylxanthines such as caffeine or theophylline. This would mean that larger doses of adenosine may be required in the presence of methylxanthines.
3. IV adenosine has been shown to produce bronchospasm in asthmatic patients.
4. If the patient becomes hemodynamically unstable, cardioversion should occur.

Administration:

Administer in less than 5 seconds via IV bolus, preferably through a large bore IV in an antecubital vein. The medication should be administered through an IV port as close to the patient as possible so it is not diluted in the tubing. Repeat doses may be administered if no response to initial treatment.

Pediatric (CAT B):

Initial – 0.1 mg/kg rapid, followed by 2-3 ml of saline (MAX initial dose – 6 mg)
Second – 0.2 mg/kg rapid followed by 2-3 ml of saline (MAX second dose – 12 mg).

Side Effects:

Dizziness, facial flushing, headache, nausea, and shortness of breath.

Section 2.3: Albuterol

Pharmacology and Actions:

Albuterol sulfate is a potent, relatively selective beta2-adrenergic bronchodilator. The pharmacological effects are at least in part attributable to stimulation through beta-adrenergic receptors of intracellular adenylyl cyclase which catalyzes the conversion of ATP to cyclic-AMP. Increased cyclic-AMP levels are associated with relaxation of bronchial smooth muscle and inhibition of release of mediators of immediate hypersensitivity from cells, especially mast cells. The onset of improvement in pulmonary function is within 2 to 15 minutes after the initiation of treatment and the duration of action is from 4-6 hours. As a beta2 agonist, albuterol induces bronchial dilation, but has occasional beta1 overlap with clinically significant cardiac effects.

Indications:

Bronchial asthma and reversible bronchial spasm that occur with chronic pulmonary disease.

Contraindications:

Symptomatic tachycardia.

Precautions:

Clinically significant arrhythmias may occur especially in patients with underlying cardiovascular disorders such as coronary insufficiency and hypertension. Patient's basic arrhythmia should be established and the patient's arrhythmia then monitored for any change.

1. Stop treatment if:
 - a. Pulse increases by 20 BPM.
 - b. Frequent PVC's develop.
 - c. Any tachyarrhythmias other than sinus tachycardia appear.
2. Paradoxical bronchospasm may occur with excessive administration.

Administration:

Respiratory Distress, Moderate & Severe Allergic Reactions, Burns, and CHF (CAT A)

Pediatric (CAT A): (CAT B) for burns

2.5 mg, nebulized with 6LPM oxygen.

Or 1-2 sprays from a rotohaler, 90mcg per spray.

Or 1-2 puffs from a metered dose inhaler with spacer, 90mcg per puff.

Albuterol may be administered by any level EMT as a patient assisted medicine when the patient has her/his own medicine.

Side Effects:

Dizziness, anxiety, palpitations, headache, sweating, skeletal muscle tremors are a common side effect.

Section 2.4: Amiodarone

Pharmacology and Actions:

Intravenous Amiodarone is a complex medication with effects on sodium, potassium, and calcium channels as well as alpha- and beta-adrenergic blocking properties.

Indications:

Life threatening cardiac arrhythmias such as ventricular fibrillation or pulseless ventricular tachycardia that persists after defibrillation.

Contraindications:

Second or Third degree AV blocks.

Precautions:

May cause bradycardia after conversion.

Administration:

Pediatrics (CAT A): 5 mg/kg diluted in 20 cc of Normal Saline, IVP/IO.

Side Effects:

Hypotension, nausea, tremors, ventricular ectopic beats.

Section 2.6: Atropine Sulfate

Pharmacology and Actions:

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

1. Increases heart rate (by blocking vagal influences).
2. Increases conduction through A-V node (i.e., increases ventricular sensitivity to atrial impulses).
3. Reduces motility and tone of GI tract.
4. Reduces action and tone of the urinary bladder (may cause urinary retention).
5. Dilates pupils.
6. Blocks cholinergic (vagal) influences already present. If there is little cholinergic stimulation present, effects will be minimal.

Indications:

1. To increase the heart rate in symptomatic bradycardias or pacemaker failure.
2. To increase heart rate in PEA.
3. To improve conduction in heart block.
4. As an antidote for some insecticide exposures (anti-cholinesterases, e.g., organophosphate) and nerve gases.

Contraindications:

1. Contraindicated in atrial fibrillation and flutter because increased conduction may speed ventricular rate excessively.
2. Contraindicated in patients with heart transplants (causes paradoxical bradycardia).

Precautions:

1. Bradycardias in the setting of an acute MI are common. Don't treat them unless there are signs of poor perfusion (low blood pressure, mental confusion).
2. Chest pain could be due to an MI or to poor perfusion caused by the bradycardia itself. Consult OLMD before using.

Administration (CAT A for cardiac dysrhythmias, CAT B for poisons/overdoses):

Pediatrics (CAT A):

0.02 mg/kg IV. May be repeated once.

Minimum dose: 0.1 mg. Maximum total dose: 1 mg for child.

Organophosphate Poisoning (CAT B):

Requires more of the medication: 2mg IV push over 10-15 seconds and titrate to effect.

Side Effects and Special Notes:

2nd and 3rd degree block may be chronic and without symptoms. Symptoms occur mainly with acute change. Treat the patient, not the arrhythmia.

Section 2.7: Calcium Gluconate

Pharmacology and Actions:

Calcium is essential for maintenance of the functional integrity of nervous, muscular, and skeletal systems and cell membrane and capillary permeability. It is also an important activator in many enzymatic reactions and is essential to a number of physiologic processes including transmission of nerve impulses; contraction of cardiac, smooth, and skeletal muscles. Calcium increases threshold potential, thus restoring normal gradient between threshold potential and resting membrane potential, which is elevated abnormally in hyperkalemia.

Indications:

1. Hyperkalemic Asystole (usually seen in dialysis patients).
2. Calcium channel blocker overdose with hypotension.

Contraindications:

Should not be used if danger of digitalis overdose.

Precautions:

Call OLMD with name of medication the patient has taken as an overdose to confirm that it is a calcium channel blocker.

Administration (CAT A for hyperkalemic asystole, CAT B for calcium channel blocker overdose):

Pediatric: for calcium blocker overdose, 60 mg/kg (0.6 cc/kg of 10% solution) – maximum dose 1 gram to be given over two minutes.

Side Effects and Special Notes:

None

Section 2.8: 50% Dextrose

Pharmacology and Actions:

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

Indications:

1. Hypoglycemic states (Blood Glucometer of <70 adults or <60 in **children**) associated with any focal or partial neurologic deficit or altered state of consciousness.
2. The unconscious patient, when a history is unobtainable and glucometer malfunctions.

Contraindications:

None in prehospital setting.

Precautions:

1. A blood glucometer should be utilized.
2. In patients with any focal or partial neurologic deficit or altered state of consciousness, D50W should be used with caution unless you can document a blood glucose less than 70.
3. Extravasation of 50% dextrose will cause necrosis of tissue. The IV should be secure and any return of blood into the syringe or tubing should be checked 2-3 times during administration. If extravasation does occur, immediately stop administration of medication.
4. Report extravasation of the medication to receiving hospital personnel and document.

Administration (CAT A):

Draw one red-top tube prior to administration (optional if local hospital will not accept) and use a blood glucometer to determine blood glucose level.

Pediatrics:

Dilute to Dextrose 25% in preschool **children**.

2-4 ml/kg of D25W IV.

Side Effects and Special Notes:

1. 50% dextrose should be used whenever documented hypoglycemia exists.
2. Do not draw blood for glucose determination from site proximal to an IV containing glucose or dextrose.
3. If there is any evidence of malnutrition or alcohol abuse, thiamine should precede the administration of D50W in any adult patient.

Section 2.9: Diazepam

Pharmacology and Actions:

Diazepam acts as a tranquilizer, an anticonvulsant and a skeletal muscle relaxant.

Indications:

1. Status seizures. In the field, this is a seizure which has lasted longer than 5 minutes or two consecutive seizures without regaining consciousness.
2. Do not give unless patient is actively seizing.
3. May be given prior to cardioversion. (CAT B).

Contraindications:

Alcohol intoxication and CNS depression.

Precautions:

1. Since diazepam can cause respiratory depression and/or hypotension, the patient must be monitored closely. Very rarely cardiac arrest may occur.
2. For the above reasons, diazepam should not be given without a good IV line in place and a bag valve mask ready.
3. Impaired pulmonary function, elderly, and **pediatrics**.

Administration (CAT A except CAT B in pediatrics and cardioversion):

Pediatrics (CAT B):

Under 5 years of age – slow IV push (0.2-0.5 mg/kg) until seizure stops at MAX of 5 mg or 0.5 mg/kg if administered rectally.

Over 5 years of age – slow IV push 1 mg until seizure stops to a MAX of 5 mg.

Side Effects and Special Notes:

1. Common side effects include drowsiness, dizziness, fatigue and ataxia. Paradoxical excitement or stimulation sometimes occurs.
2. Should not be mixed with other agents or diluted with intravenous solutions. Turn off IV flow while administering, and give through the end of IV tubing closest to the vein.
3. Most likely to produce respiratory depression in patients who have taken other depressant medications, especially alcohol and barbiturates, or when given rapidly.
4. Consider rectal administration 0.5 mg/kg (if unable to administer IV) in seizing **children**. Contact OLMD.
5. Contact OLMD for cardioversion dosage.

Section 2.10: Diphenhydramine

Pharmacology and Actions:

1. An antihistamine which blocks action of histamines released from cells during an allergic reaction.
2. CNS effects, generally sedating in action (CNS depressant) except in **children** under six years of age in whom it is a CNS stimulant.
3. Anticholinergic, anti-parkinsonism effect, which is used to treat acute dystonic reactions to antipsychotic medications (e.g., Haldol, Thorazine, Compazine). These reactions include: oculogyric crisis, acute torticollis, and facial grimacing.
4. Antiemetic effect.

Indications:

1. The second-line medication in anaphylaxis and severe allergic reactions (after epinephrine).
2. To counteract acute dystonic reactions to antipsychotic medications.
3. To treat nausea or vomiting.

Contraindications:

Allergy to Diphenhydramine.

Not for newborns.

Nursing mothers (relative contraindication).

Precautions:

1. May have additive effect with alcohol or other CNS depressants.
2. Although useful in acute dystonic reactions it is not an antidote to phenothiazine toxicity or overdose.
3. May cause hypotension when given IV.

Administration (CAT A, CAT B for Pediatric Vomiting):

Allergic Reaction and acute dystonic reactions

Pediatrics (CAT A): 1 mg/kg IV, IM (not to exceed adult dose)

Vomiting

Pediatrics (CAT B): 1 mg/kg IV, IM (not to exceed adult dose)

Side Effects and Special Notes:

1. Diphenhydramine's antihistaminic reaction is effective in preventing and blocking the effects of histamine some time after its administration. However, since it is not immediately effective in the reversal of anaphylaxis, epinephrine is the medication of choice.
2. Diphenhydramine is the medication of choice in acute dystonic reactions.
3. May cause excitation in young **children**.

Section 2.11: Dopamine

Pharmacology and Actions:

Chemical precursor of nor-epinephrine which occurs naturally in man and which has both alpha- and beta-receptor and dopaminergic stimulating actions. Its actions differ with dosage given:

1. 1-5 mcg/kg/min - dilates renal and mesenteric blood vessels (no effect on heart rate or blood pressure).
2. 2-10 mcg/kg/min - beta effects on heart which usually increases cardiac output without greatly increasing heart rate or blood pressure.
3. 10-20 mcg/kg/min - alpha peripheral effects cause peripheral vasoconstriction and increased blood pressure.
4. 20-40 mcg/kg/min - alpha effects reverse dilatation of renal and mesenteric vessels with resultant decreased flow.

Indications:

1. Primary indication is cardiogenic shock.
2. Occasionally helpful in distributive shock (septic) except hypovolemic shock.

Contraindications:

Dopamine is contraindicated for hypovolemic shock, especially with hypotension.

Precautions:

1. May induce tachyarrhythmias, in which case infusion should be decreased or stopped.
2. High doses (10mcg/kg) may cause extreme peripheral vasoconstriction (increase BP and work load on heart).
3. MAO Inhibitors potentiate the effects of this medication. Check for medications and contact OLMD if other medications are being used. Examples include Nardil, Parnate, Eutonyl, Marplan, etc.
4. Should not be added to sodium bicarbonate or other alkaline solutions since dopamine will be inactivated in alkaline solutions.

Administration (CAT B):

Pediatric: Usually mix 200 mg in 500 ml NS to produce concentration of 400 mcg/ml. Rate starts 2-5 mcg/kg/min IV. Titrate to effect.

Section 2.11: Dopamine (continued)

Intropin® (Dopamine HCl) Dosage Chart

For a Concentration of 1600 mcg Dopamine HCl/ml
(800 mg Intropin per 500 ml or 400 mg Intropin per 250 ml)

Gtts/ Min.	Body Weight																lbs
	77 35	88 40	99 45	110 50	121 55	132 60	143 65	154 70	165 75	176 80	187 85	198 90	220 100	220 100	231 105	242 110	kgs
5	3.8	3.4	2.9	2.6	2.4	2.2	2.0	1.9	1.8	1.6	1.55	1.5	1.3	1.3	1.25	1.2	
10	7.6	6.7	5.9	5.3	4.9	4.5	4.1	3.8	3.6	3.3	3.1	3.0	2.7	2.7	2.5	2.4	
15	11	10	8.9	8.0	7.3	6.6	6.1	5.7	5.3	5.0	4.7	4.4	4.0	4.0	3.8	3.6	
20	15	13	12	11	9.7	8.9	8.2	7.6	7.1	6.7	6.3	5.9	5.3	5.3	5.1	4.9	
25	19	17	15	13	12	11	10	9.5	8.9	8.4	7.8	7.4	6.6	6.6	6.3	6.0	
30	23	20	18	16	15	13	12	11	11	10	9.4	8.9	8.0	8.0	7.6	7.3	
35	27	23	21	19	17	16	14	13	12	12	11	10	9.3	9.3	8.9	8.5	
40	31	27	24	21	19	18	17	16	15	14	13	13	11	11	10	9.7	
45	34	30	27	24	22	20	18	17	16	15	14	13	12	12	11	11	
50	38	33	30	27	24	22	21	19	18	17	16	15	13	13	13	12	
55	42	37	33	29	27	24	23	21	20	18	17	16	15	15	14	13	
60	46	40	36	32	29	27	25	25	21	20	19	18	16	16	15	15	
70	53	47	42	37	34	31	29	27	25	23	22	21	19	19	18	17	
80	61	53	47	43	39	36	33	31	28	27	25	24	21	21	20	19	
90	69	60	53	48	44	40	37	34	32	30	28	27	24	24	23	22	
100	76	67	59	53	49	45	41	38	36	33	31	30	28	27	25	24	

Flow Rate in Drops per Minute Based on a microdrip set with 60 drops per 1.0 mL.

Dosage = mcg Dopamine HCl/kg/min

Note: All dosages of 10 mcg/kg/min and above are rounded off to the nearest mcg/kg/min.

SIDE EFFECTS AND SPECIAL NOTES:

1. The most common side effects include ectopic beats, nausea and vomiting. Angina has been reported following treatment. (Tachycardia and arrhythmias are less likely than with other catecholamines.)
2. Can precipitate hypertensive crisis in susceptible individuals, i.e. patients on MAO inhibitors (parnate, nardil, marplan).
3. Consider hypovolemia and treat this with appropriate fluids before administration of dopamine.
4. Dopamine is best administered by an infusion pump to accurately regulate rate. It may be hazardous when used in the field without an infusion pump. Monitor closely.

Section 2.12: Epinephrine

Pharmacology and Actions:

1. Catecholamine with alpha and beta effects.
2. In general, the following increase in cardiovascular responses can be expected:
Increased heart rate, myocardial contractile force, systemic vascular resistance, arterial blood pressure, myocardial oxygen consumption, and automaticity.
3. Potent bronchodilator.

Indications:

1. Cardiac Arrest (VFib, Pulseless VTach, Asystole, Pulseless Electrical Activity)
2. Systemic allergic reactions.
3. Asthma in patients under 40.

Contraindications:

None.

Precautions:

1. Epinephrine increases cardiac work and can precipitate angina, myocardial infarction or major dysrhythmias in an individual with ischemic heart disease. A patient with wheezing should not always be considered to have asthma.
2. The cause of wheezing in an elderly person must be differentiated. Wheezing in the elderly is most commonly a sign of conditions which do not require epinephrine such as: pneumonia, pulmonary embolism or pulmonary edema.

Administration (CAT A except CAT B as noted below):

Pediatric cardiac arrest (CAT A): 0.01 mg/kg (0.1 ml/kg of 1:10,000) IV/IO every 5 minutes during arrest. (May also be given via endotracheal tube 0.1 mg/kg).

Pediatric Bradycardia (CAT A): 0.01 mg/kg every 3-5 minutes until heart rate 80 or more

Pediatric allergic reaction (anaphylaxis) (CAT A): 0.01 mg/kg to a MAX of 0.3 mg 1:1,000 solution, preferably SQ, or SL, or equivalent of 1:10,000 solution IV.

Pediatric acute asthma (CAT B): 0.01 mg/kg 1:1,000, SQ, MAX of 0.3 mg 1:1000 if under 8 years of age

Side Effects and Special Notes:

1. Epinephrine given to a patient may precipitate an acute myocardial infarction.
2. Anxiety, tremor, headache, angina, hypertension.
3. Supraventricular Tachycardia, palpitations, PVCs.
4. Can be administered as patient assisted medication (Epi-pen).

Section 2.13: Furosemide

Pharmacology and Actions:

Potent diuretic with a rapid onset of action and short duration of effect. It acts primarily by inhibiting sodium re-absorption throughout the kidney. Increase in potassium excretion occurs along with the sodium excretion. As an IV bolus, causes immediate (3-4 min) increase in venous capacitance (dilation). This decreases venous backup and probably accounts for its positive effect in pulmonary edema. Peak effect: ½-1 hours after IV administration: duration about 2 hours. (Duration 6-8 hours if given orally, with a peak in 1-2 hours.)

Indications:

Acute pulmonary edema: To decrease extra cellular volume and reduce venous pressure on the lungs in cardiac failure.

Contraindications:

1. Contraindicated in hypovolemia or hypotension.
2. Should not be used in children or pregnant women.

Precautions:

Monitor closely; can lead to profound diuresis with resultant shock and electrolyte depletion.

Administration (CAT B):

Pediatric (CAT B): 0.5 – 1mg/kg IV given slowly over 2 minutes

Side Effects and Special Notes:

1. Hypovolemia, hypotension, hyponatremia, and hypokalemia are the main toxic effects. Other toxicity is not related to single dose use.
2. The hypokalemia induced is of concern in digitalized patients and particularly those who have digitalis toxicity.

Section 2.14: Glucagon

Pharmacology and Actions:

1. Increases serum glucose by releasing glycogen stores from the liver. Will not work if patient is malnourished (alcoholics, adrenal insufficiency, etc.).
2. Counteracts effects of Beta Blocker or Calcium Channel Blocker overdose.
3. Stimulates release of catecholamines.

Indications:

1. Hypoglycemic states (Glucometer reading <70 adults or <60 in **children**) associated with any focal or partial neurologic deficit or altered state of consciousness when an IV cannot be established.
2. The unconscious patient, when a glucometer reading cannot be obtained and an IV cannot be established.
3. Known Beta Blocker or Calcium Channel Blocker overdose with hypotension.

Contraindications:

For hypoglycemia: Patients with established IVs and D50W availability.

Precautions:

1. Can cause tachycardia because of catecholamine release.
2. Can cause nausea and vomiting.
3. Only the diluent supplied by the manufacturer should be used to mix the glucagon.
4. Thiamine (IM) should precede the administration of glucagon in any adult patient when there is evidence of alcoholism or malnutrition.

Administration (CAT B):

Symptomatic hypoglycemia with no IV: **Pediatric:** >44 lbs 1 mg IM
<44 lbs 0.5mg IM

Beta blocker or calcium blocker overdose: **Pediatric:** >44 lbs 1 mg IV
<44 lbs 0.5 mg IV

Side Effects:

Nausea and vomiting.

Note:

Glucagon is not a first line medication and is to be used **ONLY** when you are unable to start an IV on a patient who has symptomatic hypoglycemia (altered mental status).

Section 2.15: Hydroxocobalamin (Cyanokit)

Pharmacology and Actions:

When given IV, hydroxocobalamin binds cyanide ions to form Cyanocobalamin (vitamin B₁₂) which is then excreted in the urine.

Indications:

1. Known cyanide poisoning.
2. Smoke inhalation victims who show clinical evidence of closed-space smoke exposure (soot in mouth or nose, sooty sputum) and are either comatose, in shock, or in cardiac arrest.

Contraindications:

None

Precautions:

Can cause allergic reactions. May cause elevation of blood pressure (≥ 180 mmHg systolic or ≥ 110 mmHg diastolic). The BP elevation is usually transient and returns to baseline within 4 hours. Since most patients with cyanide poisoning are hypotensive this is usually helpful.

Administration (CAT A):

Pediatric: Safety and effectiveness of Cyanokit has not been established in the pediatric population.

Side Effects and Special Notes:

Most patients receiving 5 grams of hydroxocobalamin will have red urine (for up to 5 weeks) and red skin (for up to 2 weeks). The red color of the blood serum and urine will interfere with many colorimetric laboratory tests for several days.

Section 2.16: Lidocaine

Pharmacology and Actions:

1. Depresses automaticity of Purkinje fibers; therefore, raises stimulation threshold in the ventricular muscle fibers (makes ventricles less likely to fibrillate).
2. CNS stimulation: tremor, restlessness and clonic convulsions followed by depression and respiratory failure at higher doses.
3. Cardiovascular effect: decreased conduction rate and force of contraction, mainly at toxic levels.
4. The effect of a single bolus on the heart disappears in 10-20 minutes due to redistribution in the body. Metabolic half-life is about 2 hours and, therefore, toxicity develops with repeated doses.

Indications:

1. PVCs in a suspected ischemic event.
2. Stable ventricular tachycardia or recurrent ventricular tachycardia if clinical condition is not rapidly deteriorating.
3. Ventricular fibrillation or pulseless ventricular tachycardia that persists after defibrillation.
4. Following successful defibrillation or cardioversion from ventricular tachycardia.

Contraindications:

Heart rate less than 60.

Precautions:

1. Advanced AV block unless artificial pacemaker is in place.
2. In atrial fibrillation or flutter, quinidine like effect may cause alarming ventricular acceleration.
3. Diazepam should be available to treat convulsions if they occur.
4. Lidocaine should NOT be given, except in cardiac arrest, without direct physician orders if:
 - a. Heart rate is less than 60/min. OR
 - b. Periods or sinus arrest of any A-V block are present.
5. Medication is metabolized in the liver and, therefore, patients with hepatic disease, shock or congestive heart failure will have impaired metabolism. All Lidocaine doses (excluding loading doses) should be reduced by 50% in presence of decreased cardiac output (congestive heart failure, hypotension), hepatic dysfunction, or age more than 70. This rule does NOT apply to patients in cardiac arrest.

Administration (CAT A for cardiac arrest, CAT B all other administrations):

Pediatric Cardiac Arrest (Vfib or Pulseless Vtach):

1.0 mg/kg, IVP/IO

Section 2.16: Lidocaine (continued)

Side Effects and Special Notes:

1. CNS disturbances: sleepiness, dizziness, disorientation, confusion, convulsions.
2. Hypotension: decreased myocardial contractility and increased A-V block at toxic levels.
3. Rare instances of sudden cardiovascular collapse and death.
4. Toxicity is more likely in elderly patients.
5. As high as 50% of patients who develop ventricular fibrillation in the setting of an acute myocardial infarction may have no warning arrhythmias.

Section 2.17: Lorazepam

Pharmacology and Actions:

Lorazepam (Ativan®) acts as a tranquilizer, an anticonvulsant and a skeletal muscle relaxant. Available in 1 ml vials containing 2 mg/ml. It must be diluted with an equal amount of normal saline before giving IV. It may be used in place of Diazepam.

Indications:

1. Status seizures. In the field, this is a seizure which has lasted longer than 5 minutes, or two consecutive seizures without regaining consciousness. Do not give unless patient is actively seizing.
2. May be given prior to cardioversion.

Contraindications:

Should not be mixed with other agents.

Precautions:

1. Since Lorazepam can cause respiratory depression and/or hypotension, the patient must be monitored closely.
2. Very rarely cardiac arrest may occur.
3. For the above reasons, Lorazepam should not be given without a good IV line in place and a bag valve mask ready.

Administration (CAT A except CAT B for pediatrics and cardioversion):

Lorazepam must be diluted with an equal amount of normal saline before IV administration.

Neonates (CAT B): 0.05 mg/kg slow IV push or until seizure stops.

Infants/Children (CAT B): 0.1 mg/kg slow IV push (Max dose 4 mg) or until seizure stops.

Side Effects and Special Notes:

1. Common side effects include drowsiness, dizziness, fatigue and ataxia. Paradoxical excitement or stimulation sometimes occurs.
2. Most likely to produce respiratory depression in patients who have taken other depressant medications, especially alcohol and barbiturates, or when given rapidly.
3. Unrefrigerated shelf-life is 60 days.

Section 2.18: Magnesium Sulfate

Pharmacology and Actions:

Magnesium sulfate has both antihypertensive and anticonvulsant properties. Magnesium sulfate reduces striated muscle contractions and blocks peripheral neuromuscular transmission by reducing acetylcholine release at the myoneural junction.

Indications:

- A. Eclampsia.
- B. Torsades de pointes.

Contraindications:

None in prehospital setting.

Precautions:

Excessive amounts of magnesium sulfate can lead to hypotension and/or respiratory arrest.

Administration (Cat B):

Pediatric (CAT B)

25-50mg/kg IV/IO Maximum 2 grams

Side Effects and Special Notes:

- A. Hypotension.
- B. Respiratory arrest.

Section 2.19: Morphine Sulfate

Pharmacology and Actions:

1. Morphine Sulfate (MS) is a potent narcotic analgesic that induces drowsiness, mental clouding, and mood changes.
2. MS increases venous capacitance, decreases venous blood return (reduces preload), and reduces systemic vascular resistance at the arteriolar level (reduces afterload) which may lead to decreases in myocardial oxygen demand.
3. Onset of action (IV) is 2-3 minutes; peak effect at 7-10 minutes and lasts 3-5 hours.

Indications:

1. Severe Pain of any etiology (CAT. A for Adults) (CAT. B for Peds)
2. Congestive Heart Failure/Pulmonary Edema (adjunct therapy) (CAT B)

Contraindications:

1. Known allergy to morphine or sulfates (sulfa medications are not sulfates).
2. Blood pressure less than 90 mm/hg systolic in an adult.
3. Respiratory rate less than 14 breaths per minute, oxygen saturation less than 90%, or significant respiratory depression. For **pediatric** patients, vital signs should be maintained within the normal range for appropriate age.

Precautions:

1. Morphine Sulfate causes respiratory depression that is reversible with naloxone. This respiratory depression is exacerbated by underlying lung disease (COPD, etc.) and other depressant medications (Valium, Alcohol, Cyclic Antidepressants, etc). Respiratory support must be available when administering morphine.
2. Check and document vital signs and patient response after each dose. Consult OLMD immediately if there is any deterioration.
3. Morphine may cause nausea and/or vomiting. See Nausea and Vomiting protocol.

Administration (CAT B for Pediatric patients and for pulmonary edema):

Administration is by IV which is also established to allow for fluid bolus therapy if the patient develops hypotension. Each mg ordered should be administered over a one-minute time frame.

Severe Pain – **Pediatrics** (CAT B): 0.1 mg/kg IV not to exceed 5 mg.

Side Effects/Special Notes:

1. If hypotension develops, it is usually responsive to naloxone administration and fluid bolus (200cc). If hypotension persists, follow the Shock Protocol.
2. Follow your agency policy for control and monitoring of use.
3. The goal is not total elimination of pain, but reduction in perception of pain by the patient (patient comfort).
4. Bradycardia, dry eyes, blurred vision, and vomiting are side effects.

Section 2.20: Naloxone

Pharmacology and Actions:

Naloxone (Narcan®) is a narcotic antagonist which competitively binds to narcotic sites but which exhibits almost no pharmacological activity of its own. Duration of action: 1-4 hours.

Indications:

1. Reversal of narcotic effects, particularly respiratory depression, due to narcotic medications, either ingested, injected or administered in the course of treatment. Narcotic medications include morphine, Demerol, heroin, Fentanyl, Dilaudid, Percodan, Codeine, Lomotil, propoxyphene (Darvon), pentazocine (Talwin), Hydrocodone (Lortab, Vicodan).
2. May be used in coma of unknown etiology to rule out (or reverse) narcotic depression.

Contraindications:

None

Precautions:

1. In patients physically dependent on narcotics, frank and occasionally violent withdrawal symptoms may be precipitated.
2. Be prepared to restrain the patient. Patient may become violent as the Naloxone reverses the narcotic effect.

Administration (CAT A):

Pediatrics: 0.1 mg/kg until age 5 or 20 kg then 2 mg.

IV administration is preferred.

If no response is observed, doses may be repeated at 3-5 min intervals up to four times in patients suspected of having narcotic overdose.

Side Effects and Special Notes:

1. This medication is remarkably safe and free from side effects. Do not hesitate to use it if indicated.
2. The duration of some narcotics is longer than Naloxone and the patient must be monitored closely. Repeated doses of Naloxone may be required. Patients who have received this medication must be transported to the hospital because coma may reoccur when Naloxone wears off.
3. May need large doses to reverse propoxyphene (Darvon®), Talwin, and Fentanyl overdoses.

Section 2.21: Nitroglycerin

Pharmacology and Actions:

Cardiovascular effects include:

Reduced venous tone—this causes pooling of blood in peripheral veins and decreased return of blood to the heart.

Decreased peripheral resistance.

Dilatation of coronary arteries (if not already at maximum).

General smooth muscle relaxation.

Indications:

1. Angina.
2. Chest, arm or neck pain thought possible to be related to coronary ischemia; may be used diagnostically as well as therapeutically.
3. Control of hypertension.
4. Pulmonary edema: to increase venous pooling, lowering cardiac preload and afterload.

Contraindications:

Children in the EMS setting.

Precautions:

1. Generalized vasodilatation may cause profound hypotension and reflex tachycardia.
2. Nitroglycerin loses potency easily, should be stored in dark glass container with tight lid and not exposed to heat.
3. Use with caution in hypotensive patients.
4. May cause hypotension in patients taking medication for erectile dysfunction.

Administration (CAT A except CAT B for hypertensive emergency and/or respiratory distress):

Pediatric: Contraindicated in EMS setting

Side Effects and Special Notes:

1. Common side effects include throbbing headache, flushing, dizziness and burning under the tongue (if these side effects are noted, the pills may be assumed potent, not outdated).
2. Less common effect: marked hypotension, particularly orthostatic.
3. Therapeutic effect is enhanced but adverse effects are increased when patient is upright.
4. Because nitroglycerin causes generalized smooth muscle relaxation, it may be effective in relieving chest pain caused by esophageal spasm.

Section 2.22: Nitrous Oxide

Pharmacology and Actions:

1. Nitrous Oxide (Nitronox®) is a blended mixture of 50% nitrous oxide and 50% oxygen
2. Has potent analgesic effects.
3. The high concentration of oxygen delivered with the nitrous oxide will increase the oxygen tension in the blood, thus reducing hypoxia.

Indications:

1. Pain from orthopedic trauma.
2. Pain from burns.
3. Suspected ischemic chest pain.
4. States of severe anxiety.

Contraindications:

Patients who:

- Cannot comprehend verbal instructions.
- Are intoxicated with alcohol or other drugs.
- Have a head injury sufficient to impair their mental status.
- Have thoracic injury suspicious of pneumothorax.
- Have abdominal pain and distention suggestive of bowel obstruction.
- Have COPD where the high oxygen concentration may depress respirations.

Precautions:

It is essential that Nitrous Oxide be self-administered.

Administration (Cat B):

Pediatrics: Use is CAT B

Side Effects and Special Notes:

May cause nausea and vomiting (should be anticipated).

Section 2.23: IV Solution (Normal Saline)

Indications:

Normal Saline is indicated for replacement of fluid volume losses such as in trauma, burns, dehydration, or shock, and is the only IV authorized by these protocols.

Precautions:

Normal Saline should be used with caution in patients with renal impairment (hyperkalemia), cardiac and respiratory disorders (fluid overload), or extremes of age.

Contraindications:

None in prehospital setting

Administration (CAT A):

Rate of administration and amount to be given varies with the specific protocol.

Special Notes:

1. Where IVs are used to maintain venous access, a heparin or saline lock may be substituted. They must be properly maintained to prevent occlusion.
2. Since Normal Saline is compatible with all prehospital medications, including blood products, they offer more than ringers lactate as a trauma resuscitation fluid.
3. In patients in which fluid overload is a problem, Normal Saline may be used with a microdrip, and this microdrip may be used to administer prehospital medications. Also consider the use of a saline lock.

Section 2.24: Ondansetron (Zofran)

Pharmacology and Actions:

Ondansetron acts as an antiemetic by selectively antagonizing serotonin 5-HT₃

Indications:

Nausea and vomiting

Contraindications:

1. Allergy to Ondansetron
2. Age less than one month

Precautions:

1. Can cause allergic reactions.
2. Can cause extrapyramidal reactions

Administration: CAT B for children:

Pediatric: (CAT B): 1 month to 12 years and <40 kg
Administer 0.1mg/kg IV or IM not to exceed 4 mg

Side Effects and Special Notes:

1. Usually not sedating but can cause dizziness and agitation.
2. May cause headache.
3. Can cause urinary retention

Section 2.25: Oxygen

Pharmacology and Actions:

Tissue hypoxia causes cell damage and death. Oxygen added to the inspired air raises the amount of oxygen in the blood and, therefore, the amount delivered to the tissues.

Indications:

1. Suspected hypoxemia or respiratory distress from any cause.
2. Acute chest pain in which a myocardial infarction is suspected.
3. Shock (decreased oxygenation of tissues) from any cause.
4. Major trauma.
5. Carbon monoxide poisoning.

Contraindications:

None in prehospital setting

Precautions:

1. If the patient is not breathing adequately on his/her own, the treatment of choice includes ventilation, not just oxygen.
2. A small percentage of patients with chronic lung disease breathe because they are hypoxic.
Administration of oxygen may shut off their respiratory drive. Do not withhold oxygen because of this possibility, however, be prepared to assist ventilation. Monitor oxygen saturation with a pulse oximeter. Use just enough oxygen to maintain pulse oximeter reading of >95%. Capnography to monitor CO₂ levels is very useful here.

Administration (CAT A):

Dosage	Indications	
Moderate flow (4-6 L/min)	Precautionary use for trauma, chest pain, etc.	
High flow (10-15 L/min)	Respiratory distress (medical or traumatic)	

Method	Flow Rate	O ₂ % Inspired Air
Room air		21%
Nasal Cannula (prongs)	1 L/min	24%
	2 L/min	28%
Face Mask	6 L/min	44%
Oxygen reservoir (mask)	10-12 L/min	90%
Mouth to mask	10 L/min	50%
	15 L/min	80%
	30 L/min	100%
Bag-valve mask	Room air	21%
Bag-valve mask with 100% valve and reservoir	High flow regulate to inflate reservoir at proper rate	90%+

Section 2.25: Oxygen (continued)

Side Effects and Special Notes:

1. Restlessness may be an important sign of hypoxia.
2. Oxygen supports combustion.
3. Most hypoxic patients will feel quite comfortable with an increase of inspired oxygen from 21% to 24%.

Section 2.26: Sodium Bicarbonate

Pharmacology and Actions:

Acids are increased when body tissues become hypoxic due to cardiac or respiratory arrest.

Acidosis depresses cardiac contractility, depresses the cardiac response to catecholamines and makes the heart more likely to fibrillate and less likely to defibrillate. Sodium bicarbonate is an alkaline solution which neutralizes acids found in the blood. It does not cross the cell membrane so can cause a paradoxical worsening of cellular acidosis.

Indications:

To control arrhythmias in Tricyclic Antidepressant overdose see Poisons and Overdose protocol and in certain cardiac arrest situations (see protocol).

Contraindications:

None in prehospital setting.

Precautions:

1. Addition of too much NaHCO_3 may result in alkalosis which is difficult to reverse and can cause as many problems in resuscitation as acidosis.
2. May increase cerebral acidosis, especially in diabetics who are ketotic.

Administration:

Pediatric Cardiac Arrest: 1 mEq/kg initially.

Then 0.5 mEq/kg every 10 min until pulse restored.

For children one month to 8 years of age dilute 50% with NS

Side Effects and Special Notes:

1. Each amp of bicarbonate contains 44 or 50 mEq of Na^{++} . This may increase intravascular volume and hyperosmolarity conditions which result in cerebral impairment.
2. In the presence of a respiratory arrest without cardiac arrest, the treatment of choice is ventilation to correct the respiratory acidosis.

Section 2.27: Thiamine

Pharmacology and Actions:

Thiamine is an important vitamin commonly referred to as Vitamin B1. Thiamine is required for conversion of glucose into energy. Chronic alcohol intake interferes with the absorption, intake, and utilization of thiamine. Patients who are malnourished, or have chronic alcohol abuse, may develop Wernicke's encephalopathy if given IV glucose without concomitant administration of thiamine.

Indications:

Thiamine should precede the administration of D50W or glucagon in any adult patient if there is any evidence of malnutrition or alcohol abuse

Contraindications:

None in prehospital setting.

Precautions:

None in prehospital setting.

Administration:

Pediatric (CAT B) Almost no indication for thiamine in a child

Side Effects and Special Notes:

None in prehospital setting.

Section 2.28: Vasopressin

Pharmacology and Actions:

V1 effects (smooth muscle): causes vasoconstriction and shunts blood to heart and brain (for some reason Vasopressin has an affinity for the internal carotid arteries)

Vasopressin's effect is resistant to acidosis.

Vasopressin causes increased cerebral blood flow/cerebral perfusion pressure due to local nitric oxide release.

V2 effects (antidiuretic) controls the concentration of water in body fluids by controlling the rate of water excretion into the urine.

Indications:

Adult shock-refractory VFib or Pulseless VTach, Asystole, or PEA.

Contraindications:

A. Children.

Precautions:

Potent vasoconstrictor- can precipitate peripheral ischemia, cardiac ischemia, and angina

Administration

Pediatric: Contraindicated

Side Effects and Special Notes:

A. None in the prehospital setting.

B. Optional medication.

PATIENT CARE PROTOCOLS
SECTION 3: PROCEDURES

Section 3.13: Safe Transportation of Pediatric Patients

Definition:

Appropriate restraint of **children** is critical during all transportation in moving vehicles. Ambulances are no exception to this.

Purpose:

To prevent a serious or potentially fatal injury of **pediatric** patients being transported on ambulances. The greatest potential for injury occurs when an unrestrained child becomes a projectile object upon a sudden stop or crash.

Indications:

Any time a child is transported in a prehospital vehicle.

Procedure:

1. Whenever possible, all **pediatric** patients should be safely and appropriately restrained during transport. Safe and appropriate transport does not include having a child held by another person who is riding or strapped to the gurney.
2. Available child restraint systems should be used for all **pediatric** patients. These systems should include those specifically produced for secure transport on an ambulance stretcher that includes an integrated five-point harness. A child's own care seat, appropriately secured to the stretcher, often proves to be an excellent source of a restraint system.
3. **Children** who are not patients should not routinely be transported in the ambulance. There may be extenuating circumstances that require such transport. In those cases, the child should be placed in an appropriate child restraint seat, in the appropriate position, in either the passenger area or patient area of the ambulance.
 - a. < 1 year old and < 20 lbs.: rear facing infant seat.
 - b. < 4 years old and < 40 lbs: forward facing toddler seat.
 - c. 4-8 years old and 40 lbs: booster seats with lap/shoulder belt
 - d. < 12 years old: back seat, restrained.
4. While it is not recommended using a child's own car seat for transportation post accident, such may be better than no restraint during transport. In addition, it is recognized that the very nature of emergency circumstances may require some compromises of best practices. (If a child is found in a child restraint that is still visually intact, it may be better to move the child in that restraint to the ambulance for transport, than to transfer the child to a difference restraint). If there is a question, this should be discussed with the OLMD.

Notes:

1. It is recognized that in certain cases there may be more **children** to be transported than there are restraint devices available in which to place them.
2. If the ambulance is equipped with passenger side airbags, **children** under the age of 12 years should not be transported in the passenger seat.
3. These guidelines are not intended as an endorsement for any child restraint manufacturers.

Section 3.13: Safe Transportation of Pediatric Patients (continued)

4. These guidelines may not be consistent with the official instructions for use of a child restraint in a passenger vehicle.
5. These guidelines assume that the ambulance is equipped with a cot and fastener system that has been successfully tested under vehicle crash conditions.