

2007 ADVANCED LIFE SUPPORT DRUG FORMULARY

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ACTIVATED CHARCOAL
(Base Physician Order Only)

Classification: Chemical Absorbent

Actions: Absorbs drugs and chemicals in the gastrointestinal tract.

Indications: **ORAL** poisoning/overdose of drugs or chemicals, with time of ingestion at or under one hour.

Contraindications:

- 1. Ingestion of caustics or corrosives**
- 2. Ingestion of cyanide, heavy metals (i.e. iron, arsenic, mercury) petroleum distillates and tricyclic ingestions or any other caustic substance.**
- 3. Altered LOC/lack of gag reflex**

Adverse Effects:	Gastrointestinal Nausea/vomiting	Respiratory Aspiration
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Administration: **ADULT DOSE**
1Gm/kg, not to exceed 50 Gm

PEDIATRIC DOSE
1Gm/kg, not to exceed 30 Gm

Onset: Immediate

Duration: 12-24 Hours

Notes:

- Activated Charcoal commonly comes in two preparation forms: with Sorbitol and Aqueous (without Sorbitol). Only the Aqueous form of charcoal is permitted for prehospital use in San Luis Obispo County. Sorbitol is a cathartic and a sweetener that will speed elimination of ingested drugs or chemicals via a profound osmotic diarrhea and adds taste to the Charcoal for oral administration.
- Do not use in a patient with potential airway compromise. Activated Charcoals should only be administered to patients who can hold the bottle and drink without assistance.
- In acetaminophen ingestion it may interfere with the antidote (Acetylcysteine /Mucomyst) given at the hospital. If given make sure to notify receiving MD so initial Mucomyst dose can be modified.
- Activated Charcoal is commonly packaged in 50 gram/8 ounce preparations and must be shaken vigorously prior to administration.

ADENOSINE (Adenocard®)

Classification: Antidysrhythmic Agent

Actions:

1. Depresses automaticity in the sinus node
2. Suppresses AV conduction
3. Interrupts re-entry pathways through the AV node

Indications: Patient in moderate distress due to narrow complex SVT refractory to Valsalva Maneuver.

Contraindications:

1. **Second or third degree AV heart block**
2. **Poison or drug-induced tachycardia**
3. **Sick sinus syndrome**
4. **Known hypersensitivity to Adenosine**

Adverse Effects:

Cardiovascular

Chest pain/pressure
Transient PAC's, PVC's
Asystole (transient)
Hypotension
Bradycardia

Respiratory

Dyspnea
Bronchoconstriction in
Patients with asthma/COPD

Metabolic

Flushed skin

Neurological

Headache/blurred vision
Tingling/numbness
Lightheadedness/dizziness
Seizures

Gastrointestinal

Nausea
Metallic taste
Throat tightness

Administration:

ADULT DOSE

1. Place patient in mild reverse Trendelenberg position, if possible
2. First dose: 6mg rapid IVP followed immediately by a 20 cc NS bolus
3. If no conversion: 12 mg rapid IVP followed immediately by a 20 cc NS bolus, may repeat once
4. Record rhythm strip during administration

PEDIATRIC DOSE

1. Place patient in mild reverse Trendelenberg position, if possible
2. First dose: 0.1 mg/kg rapid IVP, followed immediately with a 20 cc NS bolus, not to exceed 6 mg
3. Second dose: 0.2 mg/kg rapid IVP, followed immediately with a 20 cc NS bolus, not to exceed 12 mg

Do not repeat again

ADENOSINE (Adenocard®)—continued

Onset: Immediate

Duration: Less than 10 seconds

Notes:

- Theophylline may require larger doses or may actually render Adenosine ineffective.
- Adverse effects usually resolve spontaneously within 1-2 minutes.
- Adenosine will not be effective on A-fib or A-flutter because it only operates on the AV node, not on the internodal pathways. If given for WPW with wide complex (irregular) atrial fibrillation, it may result in VF. Though not recommended for ventricular tachycardia, it is generally safe. However, Adenosine may cause 2° and 3° blocks.
- Adenosine may produce transient blocks for diagnosis of rapid tachydysrhythmias that are not easily distinguishable as A-fib or A-flutter.
- Adenosine is naturally occurring and is found in all body cells as adenosine triphosphate (ATP).
- In infants and children sinus tachycardia is usually associated with a HR < 200, SVT will usually manifest with a HR > 230.
- Persantine® (dipyridamole) inhibits the transport and potentiates the effects of Adenosine. Tegretol® (carbamazepine) may potentiate the degree of AV block caused by Adenosine.

ALBUTEROL (Proventil®, Ventolin®)

Classification: Bronchodilator (Beta 2 specific)

Actions:

1. Relaxes bronchial smooth muscle
2. Decreases airway resistance

Indications:

1. Respiratory distress with wheezes/bronchospasm
2. Anaphylaxis with or without shock
3. SOB due to COPD or asthma

Contraindications: **Known hypersensitivity to Albuterol**

Adverse Effects:

Neurological

Tremors
Headache/dizziness
Sweating
Anxiety

Cardiovascular

Tachycardia
Hypertension
Dysrhythmias
Palpitations

Gastrointestinal

Nausea/vomiting

Administration:

ADULT DOSE

2.5-5 mg via HHN/mask/BVM with adjunct over 5-10 minutes, repeat as needed

PEDIATRIC DOSE

2.5-5 mg via HHN/mask/BVM with adjunct over 5-10 minutes, repeat as needed.

Onset: 5-15 minutes

Duration: 4-6 hours

Notes:

- Beta blocking agents inhibit the effects of Albuterol.
- Albuterol should be administered with oxygen, and be sure to closely monitor the patient's vital signs and cardiac status.

ASPIRIN

Classification: Nonsteroidal anti-inflammatory (anti-thrombotic, analgesic, antipyretic, anti-inflammatory).

Action:

1. Inhibits prostaglandin synthesis
2. Irreversibly inactivates the enzyme cyclooxygenase in circulating platelets

Indications: Adult patient believed to be experiencing cardiac chest pain with symptoms such as “pressure”, “heavy weight”, squeezing” or “crushing” pain.

Contraindications:

1. **Anaphylaxis to aspirin or other salicylates**
2. **Patients who have a known hypersensitivity/prior allergic reaction to Aspirin, Ibuprofen, Naproxen, or other non-steroidal anti-inflammatory drugs.**

Adverse Effects:

Respiratory

Bronchospasm
Asthma like symptoms

Other

Skin rash
Anaphylaxis
Prolonged bleeding

Gastrointestinal

Nausea/vomiting
Gastric upset
GI bleeding
Potentiation of peptic ulcer

Administration:

ADULT DOSE

162 mg of non-enteric coated tablets chewed and swallowed

Notes:

- The patient should be advised to chew the tablets prior to swallowing.
- Aspirin may increase the risk of bleeding especially when combined with anticoagulants and thrombolytic therapy.

ATROPINE SULFATE

Classification: Parasympathetic blocker

Actions:

1. Inhibits parasympathetic stimulation by blocking acetylcholine at the muscarinic receptors.
2. Decreases vagal tone resulting in increased heart rate at the AV conduction.
3. Dilates bronchioles and decreases respiratory tract secretions.
4. Decreases gastrointestinal secretions.

Indications:

1. Bradycardia
2. Asystole and PEA
3. Organophosphate poisoning
4. Exposure to nerve agents

Contraindications: **None significant in the above indications.**

Adverse Effects:

Neurological

Restlessness
Seizures
Pupillary dilation
Blurred vision
Dizziness
Confusion

Other

Hot, dry skin
Worsens glaucoma

Cardiovascular

Tachycardia
Greater oxygen demand

Respiratory

Mucous plugs

Gastrointestinal

Dry mouth
Difficulty swallowing

Administration:

ADULT DOSE

1. **Bradycardia:** 0.5 mg IVP, repeat every 3-5 minutes, not to exceed 3 mg
2. **Asystole and PEA:** 1 mg IVP/IO, repeat every 3-5 minutes, not to exceed 3 mg
3. **Organophosphate poisoning:** 2 mg IVP/IO, repeat as needed, per physician order
4. **Exposure to nerve Agents:** (self-administration)
 - a. Mild Signs: MARK I autoinjector antidote kit, 1 dose initially, may repeat once in 10 minutes, not to exceed 2 doses
 - b. Moderate Signs: MARK I autoinjector antidote kit, 1 dose initially, may repeat once in 10 minutes, not to exceed 2 doses
 - c. Severe Signs: MARK I autoinjector antidote kit, 3 doses initially

ATROPINE SULFATE— continued

PEDIATRIC DOSE

1. **Bradycardia:** 0.02 mg/kg [Updated 12/12/07] IVP/IO, minimum dose of 0.1 mg and a maximum dose of 0.5 mg, may repeat once in 3-5 minutes, not to exceed 1 mg
2. **Asystole and PEA:** 0.02 mg/kg [Updated 12/12/07] IVP/IO, minimum dose of 0.1 mg and a maximum dose of 0.5 mg, may repeat once in 3-5 minutes, not to exceed 1 mg

Remember that Epi. 1:10,000 IVP/IO is the recommended initial medication for the pediatric patient with bradycardia.

Onset: 2-5 minutes

Duration: 20 minutes

Notes:

- See Weapons of Mass Destruction Guidelines for complete instructions for nerve agent exposure.
- Place patient on oxygen and cardiac monitor during administration, as Atropine increases oxygen demands by increasing the heart rate.
- Use with caution in a patient with suspected myocardial ischemia
- The acronym “SLUDGE” is used to represent the various signs/symptoms of an organophosphate poisoning. These signs/symptoms include increased salivation, lacrimation, urination, defecation, gastrointestinal cramping, and emesis. Some common organophosphates include bug bombs, roach/ant sprays, flea and tick collars, and common garden sprays. Atropine is the medication of choice in this situation since it prevents the over-stimulation of the muscarinic receptors.

CALCIUM CHLORIDE (CaCl₂)
(Base Physician Order Only)

Classification: Electrolyte

Actions:

1. Acts as an activator in transmission of nerve impulses and contraction of cardiac, skeletal, and smooth muscles.
2. Maintains cell membrane and capillary permeability.

Indications:

1. Cardiac arrest or significant instability associated with hyperkalemia (suspect in renal failure) or Ca channel blocker toxicity.
2. Overdose on Calcium Channel Blocker medications.

Contraindications: **Hypercalcemia**

Adverse Effects:

Cardiovascular
Cardiac arrest

Metabolic
Hypercalcemia

Administration: **ADULT DOSE**
250-500 mg slow IVP

PEDIATRIC DOSE
20 mg/kg maximum IVP

Onset: Immediate

Duration: 30 minutes - 2 hours

Notes:

- Calcium Chloride will precipitate if in a solution with Sodium Bicarbonate.

DEXTROSE 25%

Classification: Hyperglycemic Agent

Action: Increases blood sugar

Indications:

1. Blood glucose level < 60mg/dl with:
 - a. Altered LOC
 - b. Apnea / agonal respirations
 - c. Non-traumatic focal neurological changes
 - d. Seizures

Contraindications: **For patients with the signs or symptoms of a CVA, do not administer dextrose unless the Glucoscan/glucose test strip reading is < 60 mg/dl. If equipment is not available to test the blood glucose level, base physician approval must precede any administration of dextrose.**

Adverse Effects: **Metabolic**
Pain/burning at injection site
Tissue necrosis
Hyperkalemia

Preparation:

1. Use a 250 ml bag NS
2. Remove and discard 200 ml of NS
3. Add 50 ml of Dextrose 50%
4. Verify total volume of 100 ml of Dextrose 25%
5. This concentration is now approximately ~~0.5~~ 0.25 Gm/ml [\[Updated 9/11/07\]](#)

Administration: **PEDIATRIC DOSE (< 34 KG)**
0.5 Gm/kg (~~2-4 ml/kg~~) (2 ml/kg) [Updated 9/11/07] slow IVP over 5 minutes

Onset: Immediate

Duration: Brief

Notes:

- Dextrose 25% in water is a concentrated solution and is very irritating to the venous tissue. Cannulate as large a vein as possible and aspirate prior to administration.

DEXTROSE 50%

Classification: Hyperglycemic Agent

Action: Increases blood sugar

Indications:

1. Blood glucose level < 60mg/dl with:
 - a. Altered LOC
 - b. Apnea / agonal respirations
 - c. Non-traumatic focal neurological changes
 - d. Seizures

Contraindications: **For patients with the signs or symptoms of a CVA, do not administer dextrose unless the Glucoscan/glucose test strip reading is < 60 mg/dl. If equipment is not available to test the blood glucose level, base physician approval must precede any administration of dextrose.**

Adverse Effects: **Metabolic**
Pain/burning at injection site
Tissue necrosis
Hyperkalemia

Administration: **ADULT DOSE**
25 Gm (50 ml) slow IVP

Onset: Immediate

Duration: Brief

Notes:

- Dextrose 50% in water is a concentrated solution and is very irritating to the venous tissue. Cannulate as large a vein as possible and aspirate prior to administration.

DIAZEPAM (Valium®)

Classification: Anticonvulsant/Tranquilizer

Actions:

1. Promotes muscle relaxation through inhibition of spinal motor reflex pathways.
2. Suppresses seizure activity through suppression of the motor cortex of the brain.
3. Produces amnesic effect
4. Skeletal muscle relaxant

Indications:

1. Active, continuous seizure
2. Status epilepticus
3. Sedation prior to cardioversion
4. Acute behavior disorder (base physician order only)
5. Severe muscle spasms (base physician order only)
6. Assess for eclampsia in pregnancy

Contraindications:

1. **History of hypersensitivity to the drug**
2. **Hold for CNS depression, respiratory depression and hypotension**
3. **ALOC of unknown etiology**

Adverse Effects:

Cardiovascular
Hypotension

Respiratory
Depression

Neurological

Dizziness

Ataxia

Fatigue

Pain/burning at injection site

Administration:

ADULT DOSE

1. **Seizure:** 0.3mg/kg slow IVP, titrated to terminate seizure activity, not to exceed 20 mg. If unable to establish an IV, administer 0.3 mg/kg per rectum (PR) via a lubricated 3 ml syringe without a needle, titrated to terminate seizure activity, not to exceed 20 mg
2. **Pre-cardioversion:** 2.5-10 mg IVP

PEDIATRIC DOSE

1. **Seizure:** administer 0.3 mg/kg slow IVP, titrated to terminate seizure activity, not to exceed 10 mg. If unable to establish an IV, administer 0.3 mg/kg per rectum (PR) via a lubricated 3 ml syringe without a needle, titrated to terminate seizure activity, not to exceed 10 mg
2. **Pre-cardioversion:** administer 0.3 mg/kg slow IVP, not to exceed 10 mg

Onset:

1-5 minutes, may be longer for PR dosing

Duration:

15 minutes to 1 hour

DIPHENHYDRAMINE (Benadryl®)

Classification: Antihistamine

Actions:

1. Reverses histamine induced bronchospasm, vasodilation, and increased capillary membrane permeability.
2. Relaxes smooth muscle.
3. Binds to the histamine receptor sites, thus suppressing the allergic reaction.
4. Has an associated sedative effect.

Indications:

1. Anaphylaxis
2. Acute allergic reaction
3. Extrapramidal/dystonic reactions due to phenothiazines

Contraindications:

- 1. Narrow angle glaucoma**
- 2. Pregnancy**
- 3. Acute asthma**

Adverse Effects:

Cardiovascular

Hypotension
Palpitations
Tachycardia

Neurological

Drowsiness/confusion
Decreased coordination
Blurred vision

Gastrointestinal

Dry mouth

Other

Urinary retention

Respiratory

Mucous plugs

Administration:

ADULT DOSE

2 mg/kg slow IVP/IM, not to exceed 50 mg.

PEDIATRIC DOSE

2 mg/kg slow IVP/IM, not to exceed 50 mg.

Onset: 15-30 minutes

Duration: 4-8 hours

DIPHENHYDRAMINE (Benadryl®)—continued

Notes:

- Closely monitor blood pressure and cardiac status before and after administration of Diphenhydramine. Reassess respiratory status and lung sounds after administration.
- Histamines are found in nearly all tissues of the body and are released after skin damage or inflammation. Histamines cause vasodilation and contraction of smooth muscle, which may induce severe hypotension.
- Histamine release can lead to increased capillary permeability and leaking. The intravascular fluid leaks through dilated capillary pores and may result in pulmonary or laryngeal edema. This leaking fluid also leads to edema of the skin (hives/urticaria). Diphenhydramine works by blocking further release of histamines.
- Dystonic reaction signs and symptoms include eye deviation, head jerking, dysphasia, involuntary arm/leg twitching and hypotension.

DOPAMINE (Intropin®)
(Base Physician Order Only)

Classification: Sympathomimetic agent (catecholamine)

Actions:

Moderate Dose: (5-10 mcg/kg/min) (β receptors)

1. Increases inotropy and may increase chronotropy
2. Increases BP by stimulating β 1 receptors increasing cardiac output with small increase in peripheral vascular resistance.

High Dose: (Over 10-20 mcg/kg/min) (primarily α receptors, some β)

1. Causes vasoconstriction
2. Increases inotropy and chronotropy
3. Increases BP by stimulating α and β 1 receptors

Indications:

1. Symptomatic bradycardia persisting after prior therapies
2. Cardiogenic shock with signs/symptoms of CHF or not responding to fluid challenge
3. Hypotension

Contraindications:

1. **Hypovolemia**
2. **Tachydysrhythmias**

Adverse Effects:

Cardiovascular Respiratory
Tachycardia dyspnea
Hypertension increase O2 demand
Ventricular irritability
Chest pain

Gastrointestinal
Nausea/vomiting

Administration: **ADULT DOSE**
400 mg in 250 ml NS (1600 mcg/ml) IV drip, by base physician order: 5-20 mcg/kg/min, titrated to blood pressure.

PEDIATRIC DOSE
400 mg in 250 ml NS (1600 mcg/ml) IV drip, by base physician order: 5-20 mcg/kg/min, titrated to blood pressure.

Onset: 5 minutes

Duration: 5-10 minutes

DOPAMINE (Intropin®) - continued
(Base Physician Order Only)

Notes:

- Consider expediting transport in cases requiring Dopamine administration.
- Dopamine may be inactivated by alkaline solutions such as Sodium Bicarbonate.
- Start in the largest possible vein and ensure patency prior to administration, as Dopamine is likely to cause tissue necrosis upon entering the interstitial space.
- Establish a second IV line for other medications, as the Dopamine infusion should not be interrupted.
- In the upper end of the moderate dosage range, α receptors are stimulated and peripheral vasoconstriction occurs.
- In the high dose range, α receptors override the dopaminergic receptors, resulting in decreased renal and mesenteric perfusion.

<u>BODY WEIGHT</u>		<u>DOSE RANGES</u>	
		Beta Predominates	Alpha Predominates
100 lbs.	45 kg	8 mcgtts/min	32 mcgtts/min
124 lbs.	55 kg	10 mcgtts/min	40 mcgtts/min
143 lbs.	65 kg	12 mcgtts/min	48 mcgtts/min
165 lbs.	75 kg	14 mcgtts/min	56 mcgtts/min
187 lbs.	85 kg	16 mcgtts/min	64 mcgtts/min
210 lbs.	95 kg.	19 mcgtts/min	76 mcgtts/min
240 lbs.	109 kg	22 mcgtts/min	88 mcgtts/min
260 lbs.	118 kg	24 mcgtts/min	96 mcgtts/min

EPINEPHRINE 1:1,000 (Adrenalin®)

Classification: Sympathomimetic agent (catecholamine)

Actions:

1. Increases cardiac output due to increased inotropy, chronotropy, dromotropy, and AV conduction (*b1* effect)
2. Relaxes smooth muscles of the respiratory tract (*b2* effect)
3. Increases systolic blood pressure due to increased cardiac output (*b1* effect) and vasoconstriction (*a* effect)
4. Increases coronary perfusion during CPR by increasing aortic diastolic pressure

Indications:

1. Cardiopulmonary arrest
2. Anaphylaxis
3. Respiratory distress with wheezing
4. Pediatric symptomatic bradycardia
5. Neonatal resuscitation
6. Suspected croup or epiglottitis

Contraindications:

1. **Use with caution in pregnancy.**
2. **Consider base physician consultation if possible if the patient has history of MI, angina or hypertension.**

Adverse Effects:

Cardiovascular	Neurological
Tachycardia	Anxiety
Hypertension	Dizziness
Chest pain	Headache
Palpitations	Tremors
Ventricular fibrillation	Seizures

Gastrointestinal

Nausea/vomiting

Administration:

ADULT DOSE

1. **Asthma:** 0.01 mg/kg IM, not to exceed 0.5 mg, may repeat every 5 minutes, not to exceed 3 doses
2. **Allergic reaction/anaphylaxis:** 0.01 mg/kg **IM**, not to exceed 0.5 mg, may repeat every 5 minutes, not to exceed 3 doses
3. If the patient is in extremis: 0.01 mg/kg **SL** injection, not to exceed 0.5 mg, may repeat every 5 minutes, not to exceed 3 doses

PEDIATRIC DOSE

1. **Asthma:** 0.01 mg/kg, IM, not to exceed 0.3 mg, may repeat every 5 minutes, not to exceed 3 doses
2. **Allergic reaction/anaphylaxis:** 0.01 mg/kg, **IM**, not to exceed 0.3 mg, may repeat every 5 minutes, not to exceed 3 doses

EPINEPHRINE 1:1,000 (Adrenalin®)—continued

3. If the patient is in extremis: 0.01 mg/kg **SL** injection, not to exceed 0.3 mg, may repeat every 5 minutes, not to exceed 3 doses
4. **Bradycardia:** The first line drug in pediatric bradycardia is epinephrine 1:10,000

Notes:

- IM administration is with 1-1½" needle in anterior/lateral thigh or deltoid.
- SL injection is with a small 25 gauge ¼" TB syringe.
- Tachycardia is not a contraindication to Epinephrine.

EPINEPHRINE 1:10,000 (Adrenalin®)

Classification: Sympathomimetic agent (catecholamine)

Actions:

1. Increases cardiac output due to increased inotropy, chronotropy, dromotropy, and AV conduction (b1 effect)
2. Relaxes smooth muscles of the respiratory tract (b2 effect)
3. Increases systolic blood pressure due to increased cardiac output (b1 effect) and vasoconstriction (a effect)
4. Increases coronary perfusion during CPR by increasing aortic diastolic pressure

Indications:

1. Cardiopulmonary arrest
2. Anaphylaxis
3. Respiratory distress with wheezing
4. Pediatric symptomatic bradycardia
5. Neonatal resuscitation
6. Suspected croup or epiglottitis

Contraindications:

1. **Use with caution in pregnancy.**
2. **Consider base physician consultation if possible if the patient has a history of MI, angina or hypertension.**

Adverse Effects:

Cardiovascular	Neurological
Tachycardia	Anxiety
Hypertension	Dizziness
Chest pain	Headache
Palpitations	Tremors
Ventricular fibrillation	Seizures

Gastrointestinal

Nausea/vomiting

Administration:

ADULT DOSE

1. **Cardiac Arrest:** 1 mg IVP/IO, may repeat every 3-5 minutes
2. **Anaphylaxis:** 0.01 mg/kg, slow IVP titrated, not to exceed 0.5 mg without base physician order
3. **Asthma:** 0.01 mg/kg, slow IVP titrated, not to exceed 0.5 mg without base physician order

PEDIATRIC DOSE

1. **Cardiac Arrest:** 0.01 mg/kg (0.1 ml/kg) slow IVP/IO, repeat every 3-5 minutes
2. **Anaphylaxis:** 0.01 mg/kg (0.1 ml/kg) slow IVP titrated, not to exceed 0.3 mg without base physician order

EPINEPHRINE 1:10,000 (Adrenalin®)—continued

3. **Respiratory Distress:** 0.01 mg/kg (0.1 ml/kg) slow IVP titrated, not to exceed 0.3 mg without base physician order
4. **Symptomatic Bradycardia:** 0.01 mg/kg (0.1 ml/kg) slow IVP/IO, not to exceed 0.3 mg per dose, repeat every 3-5 minutes

Notes:

- Use Epinephrine with caution in older patients. If a patient is clearly in anaphylaxis, this is the drug of choice, even in older patients. If doubt exists, initiate early base hospital contact, prior to drug therapy.
- Tachycardia is not a contraindication to Epinephrine.
- Base physician consultation for Epinephrine 1:10,000, 0.01mg/kg titrated IV not to exceed 0.5mg for circulatory collapse from anaphylaxis.
- IM administration is with 1-1½" needle in anterior/lateral thigh or deltoid.

FUROSEMIDE (Lasix®)

Classification: Diuretic

Action:

1. Increases urinary output by inhibiting the reabsorption of sodium in the renal tubules and the Loop of Henle.
2. Causes vasodilation and venous pooling.

Indications : Pulmonary edema / Congestive heart failure

Contraindications: **Pregnancy**

Adverse Effects:

Cardiovascular
Postural hypotension
Syncope/dehydration

Neurological
Confusion/headache
Blurred vision
Tinnitus/hearing loss

Gastrointestinal
Nausea/vomiting

Administration:

ADULT DOSE
0.5-1 mg/kg slow IVP

Onset: 5-10 minutes

Duration: 2-3 hours

Notes:

- Rapid administration may result in permanent hearing loss due to cranial nerve damage.
- Check to see if the patient is on diuretics - a larger dose may be required to reach the desired effect.
- Drug should be protected from light.
- Caution with long transport – may cause over distention of the bladder and cause rupture.
- Acts on the kidneys to excrete water, sodium chloride, and potassium, which leads to decreased circulatory blood volume.
- Check lung sounds before and after administration to determine effectiveness of Lasix.

GLUCAGON HYDROCHLORIDE (Glucogan®)

Classification: Hyperglycemic agent /Pancreatic hormone

Actions:

1. Stimulates breakdown of glycogen in the liver to increase blood sugar.
2. Increases inotropy and chronotropy.

Indications:

1. Known or suspected hypoglycemia when unable to administer Dextrose IVP x two attempts or Oral Glucose.
2. Cardiac arrest with suspected Beta Blocker or Calcium Channel Blocker overdose (base physician order only).
3. Beta Blocker overdose (base physician order only).
4. Consider for esophageal foreign body obstruction (base physician order only).

Contraindications: **For the patient with signs or symptoms of a CVA, do not administer unless the Glucoscan/glucose test strip reading is <60 mg/dl. If the equipment to test blood glucose is not available, base physician approval must be obtained prior to administration.**

Adverse Effects: **Gastrointestinal**
Nausea/vomiting

Administration: **ADULT DOSE**
1 mg IM

PEDIATRIC DOSE
0.1 mg/kg IM, not to exceed 1 mg

Onset: Within 15 minutes

Duration: 15-30 minutes

Notes:

- Caution is advised in administration to a patient with cardiovascular disease due to inotropic and chronotropic effects.
- Glucagon is packaged as a powder that must be reconstituted prior to administration.
- Glucagon takes effect via conversion of stored glycogen in the liver. If the patient is low in stored glycogen due to alcoholism or malnutrition, Glucagon will be less effective.
- Requires EKG monitoring when used in higher doses for esophageal foreign body obstruction.

GLUCOSE (Oral)

Classification: Hyperglycemic agent

Actions: Provides an oral source of glucose rapidly utilized for cellular metabolism

Indications : Conscious patient with signs/symptoms of hypoglycemia

Contraindications:

- 1. Inability to swallow**
- 2. Unconsciousness**

Adverse Effects: **Respiratory** **Gastrointestinal**
Aspiration Nausea/vomiting

Administration: **ADULT DOSE**
15 Gm (1 tube), repeat as needed

PEDIATRIC DOSE
15 Gm (1 tube), repeat as needed

Onset: Rapid

Duration: Brief

Notes:

- Administer ONLY to patients with an intact gag reflex.
- Check blood glucose level prior to and after administration.
- Glucose causes the release of catecholamines, which in turn stimulate both *b* receptors and the vagus nerve. This in turn causes the release of hydrochloric acid into an empty stomach leading to irritation of the stomach lining and nausea/vomiting.

LIDOCAINE (Xylocaine®)

Classification: Antidysrhythmic agent

Action: Suppresses ventricular ectopy by stabilizing the myocardial cell membrane.

Indications:

1. Cardiac arrest with ventricular fibrillation or pulseless ventricular tachycardia
2. Post conversion or defibrillation of ventricular rhythms with base contact.
3. Ventricular tachycardia with pulse present
4. Symptomatic/malignant ventricular ectopy

Contraindications:

1. **2° degree type II heart block**
2. **3° degree heart block**
3. **Junctional bradycardia**
4. **Ventricular ectopy associated with bradycardia**
5. **Idioventricular rhythm**
6. **Known allergy to Lidocaine or sensitivity to other anesthetics (report to base).**

Adverse Effects:

Cardiovascular

Bradycardia
Hypotension
Arrest
Blurred vision

Respiratory

Dyspnea
Depression
Apnea

Gastrointestinal

Nausea/vomiting

Neurological

Dizziness
Drowsiness
Paresthesia
Restlessness
Slurred speech
Disorientation
Seizures
Lightheadedness
Tinnitus
Muscle twitching

Administration:

ADULT DOSE

1. **V-Fib/pulseless V-Tach:** 1.5 mg/kg IVP/IO, repeat every 3-5 minutes, not to exceed 3 mg/kg
2. **V-Tach with a pulse:** 1.5 mg/kg IVP, may repeat with 0.75 mg/kg IVP every 5-10 minutes, not to exceed 3 mg/kg

PEDIATRIC DOSE

1. **V-Fib/pulseless V-Tach:** 1 mg/kg IVP/IO. May repeat in 10-15 minutes, not to exceed 100 mg
2. **V-Tach with a pulse:** 1 mg/kg IVP/IO, may repeat with 0.5 mg/kg IVP/IO every 5-10 minutes, not to exceed 100 mg

LIDOCAINE (Xylocaine®)—continued

Onset: 30 - 90 seconds

Duration: 10 - 20 minutes

Notes:

- In cases of premature ventricular contractions, assess need and treat underlying cause. Needs include: chest pain, syncope, R on T situations, multifocal and paired PVCs, bigeminy and trigeminy, and PVCs at 6-12 per minute. See appropriate protocols as needed.
- Lidocaine is to be administered no faster than 50mg/min, except in patients in cardiac arrest.

MORPHINE SULFATE

Classification: Narcotic analgesic

Actions:

1. Acts directly on the CNS at the opiate receptor sites to relieve pain
2. Decreases myocardial oxygen demand
3. Causes venous pooling due to peripheral vasodilation
4. Reduces preload and afterload by decreasing venous return and systemic vascular resistance
5. Helps alleviate anxiety

Indications:

1. Chest pain associated with suspected MI
2. CHF/pulmonary edema
3. Pain associated with marine animal stings or spider/insect bites.
4. Situations in which pain control is a significant factor in transport of patient, such as a large area burn or an isolated fracture.

Contraindications:

1. **Altered LOC**
2. **Head injury and multisystem trauma**
3. **Pain of unknown etiology**
4. **Abdominal pain**
5. **A base physician order must be obtained if the BP is less than 100 systolic.**

Adverse Effects:

Cardiovascular

Tachycardia
Bradycardia
Cardiac arrest
Hypotension

Neurological

Headache
Hallucinations
Dizziness
Tremors/seizures
Altered LOC/agitation

Gastrointestinal

Nausea/vomiting

Respiratory

Depression/arrest

Administration:

ADULT DOSE

1. **Cardiac chest pain:** 2-10 mg slow IVP titrated to pain improvement
2. **Pulmonary edema:** 1-3 mg slow IVP
3. **Pain management:** 5 mg slow IVP titrated, not to exceed 10 mg
Notify base physician of Morphine administration

PEDIATRIC DOSE

1. **Pain management:** 0.1 mg/kg slow IVP/IM, may repeat once, not to exceed 5 mg. Notify base physician of Morphine administration

MORPHINE SULFATE—continued

Onset: Immediate

Duration: 3-5 hours

Notes:

- Have Naloxone ready in the event of opiate-induced respiratory depression or arrest.
- Place patient on Oxygen and ECG prior to administration of Morphine Sulfate.
- Hypotension caused by Morphine Sulfate can be treated by shock position and/or fluid challenge.
- Morphine should not be given for the purpose of pain control in patients with significant abdomen, chest, or head trauma, or a patient in shock, unless ordered by the base physician.

NARCAN (Naloxone®)

Classification: Narcotic antagonist

Actions:

1. Displaces narcotics from opiate receptor sites
2. Reverses respiratory depression, sedation, and pupillary effects of narcotics.

Indications: Respiratory depression and/or altered LOC associated with suspected narcotic overdose

Contraindications: **None**

Adverse Effects: **Cardiovascular** **Neurological**
Tachycardia Pupillary dilation
Hypertension

Gastrointestinal
Nausea/vomiting

Administration: **ADULT DOSE**
1. Not to exceed 2 mg initial dose IVP/IM titrated to maintain adequate respirations
2. If the patient is in extremis and no IV access, administer 0.4 mg **SL** injection, titrated to maintain adequate respirations

PEDIATRIC DOSE
1. Not to exceed 2 mg initial dose IVP/IM titrated to maintain adequate respirations
2. If the patient is in extremis and no IV access, administer 0.4 mg **SL** injection, titrated to maintain adequate respirations

Onset: 1-2 minutes

Duration: 45 minutes

Notes:

- Administer Narcan prior to intubation in a patient with severe respiratory depression when narcotic induced coma is suspected.
- If there is no response to IV Narcan after 1-2 minutes, the etiology of the altered level of consciousness should be questioned (5 minutes for IM).
- IM administration is with 1 1/2 " needle in anterior/lateral thigh or deltoid.
- SL injection is with a small 25 gauge 1/4" TB syringe.

NITROGLYCERIN (Nitrostat®)

Classification: Vasodilator

Actions:

1. Dilates coronary vessels enhancing coronary perfusion
2. Reduces coronary vasospasm
3. Decreases myocardial workload and oxygen demand
4. Relaxes vascular smooth muscle, resulting in peripheral vasodilation
5. Produces venous pooling due to vasodilation
6. Reduces preload and afterload

Indications:

1. Chest pain of suspected myocardial origin
2. Acute pulmonary edema

Contraindications: **Blood pressure less than 100 systolic**

Adverse Effects:

Cardiovascular

Orthostatic hypotension
Tachycardia
Palpitations

Neurological

Throbbing headache
Increased ICP
Dizziness/syncope

Other

Flushed skin
Sublingual burning

Administration:

ADULT DOSE

Persistent cardiac chest pain or pulmonary edema: 0.4 mg SL tablets or spray, may repeat every 5 minutes, not to exceed 3 doses. Do not administer if BP drops < 100 systolic

Onset: 1-3 minutes

Duration: 20-30 minutes

Notes:

- Patients can develop a tolerance to Nitroglycerin.
- If administered via spray, hold can upright and do not shake can.
- Administering personnel must wear gloves to avoid inadvertent skin absorption.
- Nitroglycerin must be stored in a glass vial away from light, and tends to lose potency once exposed to air. The possibility that a patient's personal Nitroglycerin may have lost potency must be kept in mind when a patient takes Nitroglycerin for symptoms without relief.

NITROGLYCERIN (Nitrostat®)—continued

- Use caution when administering Nitroglycerin for patients with rales due to circumstances other than pulmonary edema/congestive heart failure (e.g. pneumonia).
- The impotence treatment drugs may have a cumulative vasodilatory effect when used in conjunction with Nitroglycerin. Pre-hospital providers should ask if the patient has taken any Viagra-like medications in the last 24 hours. The base hospital physician may still order Nitroglycerin if he/she feels that enough time has passed for the patient to have safely metabolized the drug.

OXYGEN

Classification: Elemental gas (room air contains 21% oxygen)

Actions:

1. Oxidizes glucose to provide cellular energy
2. Essential for normal aerobic metabolism

Indications: Whenever oxygen demands are increased

Contraindications: **No absolute contraindications exist in the field**

Administration: Cannula: 2 to 6 L/min (25-40% concentration)
Mask: 10 to 15 L/min (50-60% concentration)
NRB Mask: 10 to 15 L/min (90-95% concentration)
BVM with reservoir: 15 L/min (40-90% concentration)
ET with BVM: 15 L/min (100% concentration)
Nebulizer: 10 L/min

Onset: 1-2 minutes

Duration: Up to 30 minutes

Notes:

- **Never use an oxygen-powered ventilation device with an ET tube or with pediatric patients.** This produces high pressure, which may result in a pneumothorax and/or gastric distension.
- Never withhold oxygen from a patient in respiratory distress. Use caution with COPD patients who have a chief complaint other than respiratory distress. In the COPD patient, hypoxic drive may be their stimulus to breathe. If respiratory depression occurs, support ventilations with 100% oxygen via BVM.

POTASSIUM CHLORIDE (KCL)
(For Monitoring Purposes Only)

Classification: Electrolyte

Action: Regulates nerve conduction and muscle contraction

Indication: Potassium deficiency

Contraindications:

- 1. Hyperkalemia**
- 2. Severe renal impairment**
- 3. Acute dehydration**
- 4. Use with caution in patients with cardiac disease**

Adverse Effects:	Cardiovascular	Neurological
	Dysrhythmias	Paresthesia
	Arrest	Muscular paralysis
	Confusion	
	Respiratory	General
	Depression	Hyperkalemia
	Arrest	Venous thrombosis
	Gastrointestinal	
	Nausea/vomiting	
	Abdominal pain	

Administration: Not applicable. For monitoring purposes only.

Notes:

- San Luis Obispo County providers are not allowed to add Potassium Chloride to any IV solution. San Luis Obispo County policy allows only monitoring of Potassium Chloride solutions at a TKO rate; any other rate needs a transport RN with an infusion pump.
- San Luis Obispo County policy allows paramedics to monitor up to 20 mEq/L for transport.
- Potassium Chloride may precipitate dysrhythmias. Patients with Potassium Chloride drips need to be on a cardiac monitor during transport.
- Potassium Chloride causes tissue necrosis if infused into interstitial space. Check IV for patency and infiltration during transport.

PRALIDOXIME (2-PAM Chloride)
(For Prehospital Personnel Use Only)

Classification: Nerve agent antidote

Actions:

1. Antidote to cholinesterase inhibitors
2. Antidote to organophosphate nerve agents or pesticides

Indications: In the event of exposure or suspected exposure to (base on symptomatology) to nerve agents.

Contraindications: **No symptoms present**

Adverse Effects:	Neurological Blurred or double vision Difficulty speaking Rapid breathing Muscle stiffness or weakness Headache Nausea	Cardiac Tachycardia
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Administration: **ADULT DOSE (self administration)**

1. Mild Signs: MARK I autoinjector antidote kit, 1 dose initially, may repeat once in 10 minutes, not to exceed 2 doses
2. Moderate Signs: MARK I autoinjector antidote kit, 1 dose initially, may repeat once in 10 minutes, not to exceed 2 doses
3. Severe Signs: MARK I autoinjector antidote kit, 3 doses initially

Onset: Variable

Duration: Variable

Notes:

- See Weapons of Mass Destruction Section for complete instructions for nerve agent exposure.
- Monitor for signs and symptoms of exposure that include; salivation, lacrimation, urination, defecation, GI irritation, eye constriction, bradycardia and hypotension.
- Further treatment based on base station orders.

SODIUM BICARBONATE
(Base Physician Order Only)

Classification: Alkalinizing agent

Actions:

1. Combines with hydrogen ions to form carbonic acid (H_2CO_3) which breaks down into H_2O+CO_2
2. Increases blood pH

Indications:

1. Prolonged resuscitation not responding to hyperventilation, oxygenation, defibrillation, and first-line medications.
2. If used for cardiac arrest, Sodium Bicarbonate should not be given until all other more effective interventions, such as defibrillation, effective cardiac compressions, positive pressure ventilation via the ET tube, and pharmacological therapies, including Epinephrine and anti-arrhythmic have been employed.
3. Consider in suspected tricyclic overdoses with signs of QRS widening and bradycardia on the EKG.
4. Consider in hyperkalemia with EKG changes refractory to Calcium Chloride.

Contraindications: **Metabolic and/or respiratory alkalosis**

Adverse Effects: **Metabolic**
Hypernatremia
Hyperosmolarity
Hyperkalemia
Metabolic alkalosis

Administration: **ADULT DOSE**
1 meq/kg IVP, may repeat every 10 minutes at ½ the initial dose

PEDIATRIC DOSE
1 meq/kg IVP/IO

Onset: Immediate

Duration: Dependent upon the degree of acid-base imbalance

Notes:

- Causes Calcium Chloride to precipitate and inactivates catecholamines. Flush IV tubing before and after administration.
- Adequate alveolar ventilation is the mainstay in the control of acid-base balance in cardiac arrest.