

**Pharmacology
for the
First Responder,
EMT-Basic,
EMT-Intermediate
Refresher**

**ENMU-Roswell
EMS Education Program**

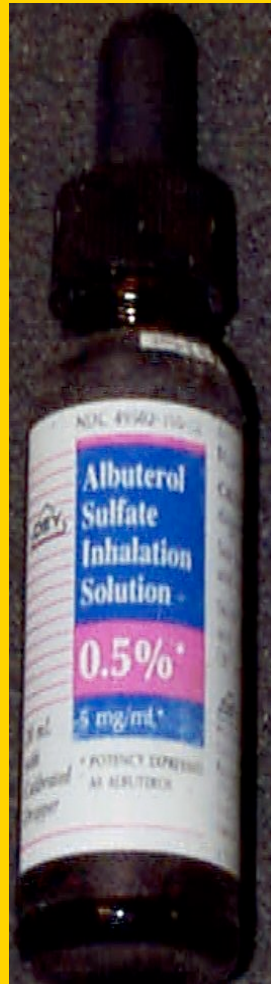


First Responders

- Albuterol
- Aspirin
- Epinephrine
- Ipratroprium
- Oral Glucose
- Oxygen
- Pralidoxime/Atropine (Mark I injector)
- Xopenex



ALBUTEROL



- Proventil ®, Ventolin®
- **Class of Drug**
 - Sympathomimetic, Beta₂ selective adrenergic bronchodilator

ALBUTEROL

- **Pharmacology and Actions:**

- Rapidly absorbed from respiratory tract
- Peak effect occurs in 5-15 mins
- Persists for 1-4 hrs
- Metabolized by lungs and the liver



ALBUTEROL

- **Pharmacology and Actions:**

- **Beta-2**

- Relaxation of bronchial smooth muscle and peripheral vasculature
- Resistance of airways is decreased in patients with chronic airway obstruction



ALBUTEROL

- **Indications:**

- Used to treat reversible airway obstruction caused by:
 - Wheezing in asthma
 - COPD (emphysema)
 - Chronic bronchitis

- **Contraindications:**

- hypersensitivity



ALBUTEROL

- **Precautions:**

- Care should be taken if patient is already using an inhalant due to possible development of severe paradoxical airway resistance with repeated excessive use



ALBUTEROL

- **Drug Interactions:**

- Beta adrenergic agents
 - Potentiates the effects
- MAO inhibitors
 - May lead to hypertensive crisis
- Beta blockers
 - Decreases effectiveness of albuterol



ALBUTEROL

- **Administration:**

- **Adult**

- 0.25 ml.-0.5 ml. of .5% (2.5mg - 5mg) solution diluted in 3 ml N.S., oxygen aerosolization (small volume nebulizer, SVN) over 10-20 minutes
- May be repeated if necessary

- **Pediatric**

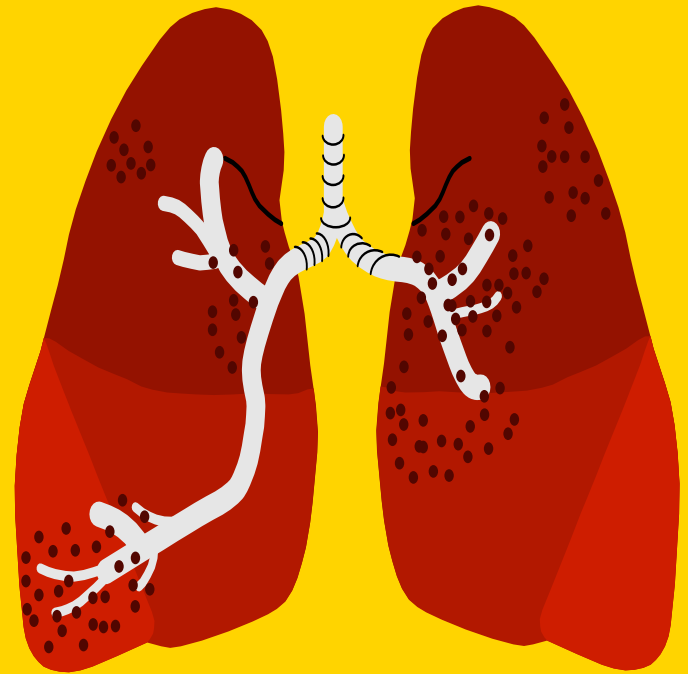
- 1.25-2.5mg in 3 ml NS via SVN
 - May be repeated if necessary



ALBUTEROL

Side Effects and Special Notes:

- Increased heart rate
- Palpitations
- Tremor
- Weakness
- Nausea
- Vomiting
- Anxiety



ALBUTEROL

- **Special Considerations:**
 - When using a metered dose inhaler (MDI), it **MUST** be the patient's own prescription MDI



ASPIRIN

- Acetylsalicylic Acid (ASA)
- Bayer
- Bufferin
- Ecotrin
- Ascriptin



ASPIRIN

- **Pharmacology and Action:**
 - Analgesic
 - Anti-inflammatory
 - Antipyretic effects
 - Through peripheral vasodilation
 - Reduces the cohesion factor of platelets
 - Inhibits platelet aggregation or clumping



ASPIRIN

- **Prehospital Indications:**
 - Recommended by AHA for prehospital treatment of suspected cardiac chest pain.
 - ASA is given as prophylaxis for thrombosis in the setting of AMI or CP suggestive of AMI (in patients eligible for thrombolytic therapy)



ASPIRIN

- **Contraindications:**
 - Known sensitivity/allergy to the drug
 - Hx: GI bleed, ulcers, stroke
 - Patients taking oral blood thinners
 - coumadin
 - Children
 - Reye's Syndrome



ASPIRIN

- **Precautions:**
 - Allergy to ASA is not uncommon; always obtain a thorough history
 - Many asthmatics are allergic to ASA



ASPIRIN

- **Administration:**

- Two to four 81 mg chewable aspirin PO, as early in the course of treatment as possible
 - Protocol dependent

- **Side Effects:**

- Rare with just 2 baby ASA
- Stomach ache, heartburn, nausea



ASPIRIN

- **Toxic Effects in Overdose:**
 - Acidosis
 - Ringing in the ears
 - GI bleeding
 - Fever
 - Lower blood sugar
 - Coma



EPINEPHERINE

- **Pharmacology and Actions:**
 - Catecholamine with alpha and beta effects
 - In general, the following cardiovascular responses can be expected:
 - Increased heart rate and increased myocardial contractile force
 - Increased systemic vascular resistance and arterial blood pressure
 - Increased myocardial O_2 consumption and increased automaticity
 - Potent bronchodilator



EPINEPHERINE:



- **Indications:**
 - Systemic allergic reactions



EPINEPHERINE:

- **Precautions:**
 - increased cardiac work can precipitate angina and/or MI in susceptible individual
 - Due to peripheral vasoconstriction, should be used with caution in patients with peripheral vascular insufficiency



EPINEPHERINE:

- **Precautions:**
 - Wheezing in an elderly person is pulmonary edema or pulmonary embolus until proven otherwise.



EPINEPHERINE:

- **Administration:**
 - Allergic reaction (anaphylactic shock, laryngeal edema)
 - Auto injector **ONLY**



EPINEPHRINE:

- **Side Effects and Special Notes:**
 - Anxiety, tremor, palpitations, tachycardia and headache not uncommon side effects.
 - Relatively contraindicated in patients with hypertension, hyperthyroidism, ischemic heart disease or cerebrovascular insufficiency.
 - Epinephrine has a very short life and may need to be repeated every 5 minutes.



IPRATROPIUM

- **Class of Drug:**
 - anticholinergic
- **Indications:**
 - Bronchial asthma
 - Reversible bronchospasm associated with chronic bronchitis and emphysema



IPRATROPIUM



- **Contraindications:**
 - Hypersensitivity
 - Acute treatment of bronchospasm where rapid response is required
- **Drug Interactions:**
 - very few in pre-hospital setting
 - Oxivent
 - Spiriva

IPRATROPIUM



- **Administration:**
 - **MUST** be administered in conjunction with beta agonist (albuterol)
 - Adult: 1-2 inhalations via MDI
250-500mcg / .25-.5mg via SVN
- **Special Notes:**
 - Monitor vital signs
 - Use with caution in:
 - Elderly
 - History of Cardiovascular disease
 - History of hypertension

OXYGEN

- **Class of drug**
 - Gas
- **Indications**
 - Suspected hypoxia
 - Respiratory distress
 - Chest pain
 - shock



OXYGEN

- **Contraindications**
 - None
- **Drug interactions**
 - None
- **Administration**
 - Low flow
 - Nasal Canula 1-4 lpm
 - Moderate flow
 - Nasal Canula 4-6 lpm
 - High flow
 - NRB 10-15 lpm



OXYGEN

- **Special Notes**

- If patient is not breathing on own, the treatment of choice is assisted ventilations with 100% O₂
 - BVM
- Do not withhold O₂ from patients with COPD
- Oxygen toxicity is NOT a hazard



PRALIDOXIME (2pam)

- **Class of Drug:**
 - Cholinesterase re-activator
- **Indications:**
 - Organophosphate pesticide or nerve agent poisoning AFTER Atropine has been administered
 - Unknown cholinesterase inhibitor poisoning



PRALIDOXIME (2pam)

- **Contraindications:**

- Relative

- Myasthenia gravis
- Renal failure

- Absolute

- Inability to perform endotracheal intubation
 - *So, you NEED ALS!!*

- **Drug Interaction:**

- None



PRALIDOXIME (2pam)

- **Administration:**

- 600mg IM by auto injector (Mark I)
- Repeat in 3-5 minutes if needed

- **Special notes:**

- Neuromuscular blockade, laryngospasm, muscular rigidity, and tachycardia may occur with rapid IV push, or higher doses
- Will not work for pesticides of the carbamate class



PRALIDOXIME (2pam)

- **Special Notes:**

- Morphine, Aminophylline, Succinylcholine and phenothiazine type tranquilizers should be avoided
- Must be given concurrent with Atropine



XOPENEX

- **Class of Drug:**
 - Isomer
 - bronchodilator
- **Indications:**
 - asthma
- **Precautions:**
 - irregular heartbeat/rate
 - high blood pressure
 - other bronchodilators



XOPENEX



- **Contraindications:**
 - hypersensitivity
- **Administration:**
 - Adult
 - 0.63mg-1.25mg diluted in 3 ml NS; oxygen aerosolization (small volume nebulizer, SVN) over 10-20 minutes
 - Peds
 - .31mg in 3 ml NS via SVN

XOPENEX

- **Special Notes:**

- May be administered with Ipratropium
- Monitor vital signs
- Use with caution in:
 - Elderly
 - History of Cardiovascular disease
 - History of hypertension
 - See precautions





- **Stop here if First Responder refresher only**
- **Continue if EMT-Basic, EMT-Intermediate or Combo refresher**

EMT-Basics

- All FR drugs
- Changes/Additions to FR drugs
 - Epinephrine
- Acetaminophen
- Activated Charcoal
- Naloxone



ACETAMINOPHEN

- Tylenol, Anacin Free, Tempra, APAP
- **Pharmacology and Action:**
 - Antipyretic
 - Action on the heat regulating center in the hypothalamus



ACETAMINOPHEN



- **Prehospital Indications:**
 - Fever control in pediatrics
 - Febrile seizure prevention
 - Long distance transport only
- **Precautions:**
 - Allergies are rare
 - Liver or kidney disease

ACETAMINOPHEN

- Administration:
 - Pediatric -
 - 0-6 mos 10 mg/kg
 - 6-12 mos 80 mg
 - 1-2 yrs 120 mg
 - 2-3 yrs 160 mg
 - Not to exceed 50mg/kg/24 hrs



ACETAMINOPHEN

- **Special Notes:**
 - Massive ingestion of acetaminophen can cause hepatic toxicity, and may be fatal
 - Clinical and laboratory evidence of hepatic toxicity may not be apparent until 48 to 72 hours after ingestion



ACETAMINOPHEN

- **Special Notes:**
 - Pre-hospital therapy for overdose may include activated charcoal
 - only under medical control



ACTIVATED CHARCOAL

- Charcola
- Arm-a-Char
- Charcoaid
- Instachar



ACTIVATED CHARCOAL

- **Class of drug:**
 - Gastrointestinal adsorbent
- **Pharmacology and Action:**
 - Adsorbent - adheres to many drugs and chemicals, inhibiting their absorption in the GI tract
 - Forms barrier between substance and gastric mucosa



ACTIVATED CHARCOAL

- **Prehospital Indications:**
 - Used in the treatment of certain cases of poisoning and overdose in the alert patient, especially during long transports
 - Most commonly given in the hospital after gastric lavage
 - Repeat doses aid in elimination



ACTIVATED CHARCOAL

- **Precautions:**
 - Contact MCEP before use in acetaminophen OD. Charcoal interferes with the function of acetylcysteine, an antidote for acetaminophen.



ACTIVATED CHARCOAL

- **Contraindications:**
 - Oral administration to the comatose patient
 - Acids or alkali ingestions, unless other drugs ingested also
 - GI obstruction



ACTIVATED CHARCOAL

- **Administration:**
 - 1 gm/kg PO. If the quantity of the substance is known, give 10x the amount of ingested substance (by weight)
 - **Caution:**
 - Don't give, or mix with milk products



ACTIVATED CHARCOAL

- **Side Effects:**
 - Constipation; diarrhea; black feces
- **Precautions:**
 - Works best if given without Ipecac; if the patient was given ipecac, don't give until vomiting is complete.



ACTIVATED CHARCOAL

- **Precautions:**
 - Patient must be capable of protecting own airway; may be difficult to drink; may cause vomiting; guard against aspiration.



EPINEPHRINE (1:1,000)

- **Class of Drug**
 - sympathomimetic
- **Pharmacological Actions**
 - Catecholamine with alpha and beta effects
 - In general, the following cardiovascular responses can be expected:
 - Increased heart rate and increased myocardial contractile force
 - Increased systemic vascular resistance and arterial blood pressure
 - Increased myocardial O_2 consumption and increased automaticity
 - Potent bronchodilator



EPINEPHRINE (1:1,000)

- **Indications:**
 - Severe bronchospasm
 - Bronchospasm unresponsive to albuterol
 - Anaphylaxis
- **Contraindications:**
 - None when indicated



EPINEPHRINE (1:1,000)

- **Precautions:**
 - increased cardiac work can precipitate angina and/or MI in susceptible individual
 - Due to peripheral vasoconstriction, should be used with caution in patients with peripheral vascular insufficiency
 - **Wheezing in an elderly person is pulmonary edema or pulmonary embolus until proven otherwise.**



EPINEPHRINE (1:1,000)

- **Administration**
 - **Bronchospasm/Anaphylaxis**
 - **Adult**
 - 0.3 - 0.5 mg 1:1,000 SQ
 - **Pediatric**
 - 0.01 mg/kg 1:1,000 SQ
 - » Max of 0.3 mg / dose



EPINEPHRINE (1:1,000)

- **Side Effects and Special Notes:**
 - Anxiety, tremor, palpitations, tachycardia and headache not uncommon side effects.
 - Relatively contraindicated in patients with hypertension, hyperthyroidism, ischemic heart disease or cerebrovascular insufficiency.
 - Epinephrine has a very short life and may need to be repeated every 5 minutes.



NALOXONE (NARCAN®)

- **Class of Drug:**
 - Narcotic antagonist
- **Pharmacology and Actions:**
 - Narcan is a narcotic antagonist which competitively binds to narcotic sites but which exhibits almost no pharmacologic activity of its own.
 - **Duration of action:**
 - 1-4 hours



NALOXONE (NARCAN®)

- **Indications:**
 - Reversal of narcotic effects.
 - Morphine - Demerol
 - Heroin - Dilaudid
 - Percodan - codeine
 - Lomotil - propoxyphene (Darvon), pentazocine(Talwin)
 - For unconsciousness of unknown etiology to rule out (or reverse) narcotic depression



NALOXONE (NARCAN®)

- **Contraindications:**
 - Hypersensitivity
 - Absences of indication
- **Drug Interaction:**
 - May induce narcotic withdrawal



NALOXONE (NARCAN®)

- **Administration:**
 - **Adult:**
 - 0.4 mg SQ, IM, IN - 1mg/nare.
 - Titrate to respiratory effort/rate.
 - May be repeated at 2 - 5 minutes if needed, up to max dose of 2.0 mg.
 - Note: Much higher doses should be given to patients with suspected propoxyphene (Darvon) and pentazocine (Talwin) overdoses



NALOXONE (NARCAN®)



- **Pediatric:**
 - 20kg or less - 0.01 mg/kg IM, SQ
 - May be repeated at 0.1 mg/kg if no response
- **Neonate:**
 - 0.01 mg/kg IM, SQ
 - repeat in 2-3 minutes if needed

NALOXONE (NARCAN®)

- **Special Notes:**

- The duration of some narcotics is longer than Narcan and the patient must be monitored closely. Repeated doses of Narcan may be required. Patients who have received this drug must be transported to the hospital because coma may reoccur when Narcan wears off.



NALOXONE (NARCAN®)

- **Special Notes**

- Consider restraining your patient prior to administration.
- If pushed too fast, patient may become violent, angry, and have severe vomiting.



NITROGLYCERIN

- **Class of drug**
 - Anti-anginal agent
 - Vascular dilating agent
- **Indication**
 - Chest pain
 - Anginal pain



NITROGLYCERIN

- **Contraindications:**
 - Hypersensitivity
 - Severe hypotension
 - BP < 90 systolic
 - Hypovolemia
 - Severe anemia



NITROGLYCERIN

- **Drug Interaction:**
 - Additive hypotension with beta-adrenergic blockers, antihypertensives, calcium channel blockers, phenothiazines
 - Tricyclic antidepressant, and antihistamines may interfere with buccal absorption
 - Nitrates
 - Viagra, Cialis, levitra



NITROGLYCERIN

- EMT-Basics **MUST** have online medical control prior to nitroglycerin administration
- No longer required to use patient's own nitro



NITROGLYCERIN

- **Administration:**

- Sublingual:

- 0.3 - 0.4 mg tablet.
- Repeat at 3 - 5 minutes as needed to a total of three tabs (or more by MCEP order)

- Lingual Spray:

- 0.4 mg/spray, sprayed directly under the tongue;
- additional one or two sprays every 3 - 5 minutes for a total of three sprays

- Pediatric: Not recommended for prehospital use



NITROGLYCERIN

- **Special Notes:**
 - 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)
 - Less common effect: marked hypotension, particularly orthostatic
 - Use with caution with patient not previously receiving nitroglycerin



NITROGLYCERIN

- **Special Notes:**

- Generalized vasodilation may cause profound hypotension and reflex tachycardia
- NTG tablets loose potency easily, should be stored in a dark glass container with a tight lid, and not exposed to heat. NTG spray does not have this problem, although cross contamination must be considered.



ORAL GLUCOSE

- **Class of Drug:**
 - Carbohydrate, nutrient, short acting osmotic diuretic
- **Pharmacology and Action:**
 - 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.



ORAL GLUCOSE

- **Indications:**

- hypoglycemia

- Documented BGL < 60mg/dL - adults/
peds
- Documented BGL < 40 mg/dL -
newborns



ORAL GLUCOSE

- **Contraindications:**
 - Intracranial bleeds UNLESS documented hypoglycemia is confirmed
 - Delirium tremens with dehydration
 - Administration through the same infusion set as blood
 - Unconscious
- **Drug Interaction: None**



ORAL GLUCOSE

- **Administration:**
 - Oral: 12-25 gm of paste, may be spread with a tongue depressor
- **Special Notes:**
 - Attempts at documenting hypoglycemia via glucometry should be made before administration





- **Stop here if EMT-Basic refresher only**
- **Continue if EMT-Intermediate or Combo refresher**

EMT-Intermediates

- All FR and Basic drugs
- Changes/Additions
 - Epinephrine
 - Naloxone
- IV fluids
- Dextrose 50%
- Glucagon
- Morphine Sulfate
- Dilaudid
- Diphenhydramine
- Hydroxocobalamin
- Prednisone
- Promethazine
- Solumedrol



DEXTROSE 50%

- **Class of Drug:**
 - Carbohydrate, nutrient, short acting osmotic diuretic
- **Pharmacology and Action:**
 - 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.



DEXTROSE 50%

- **Indications:**

- hypoglycemia

- Documented BGL < 60mg/dL - adults/
peds

- Documented BGL < 40 mg/dL -
newborns

- Refractory medical cardiac arrest
(especially in neonates)



DEXTROSE 50%

- **Contraindications:**
 - Intracranial bleeds or suspected stroke UNLESS documented hypoglycemia is confirmed
 - Delirium tremens with dehydration
 - Administration through the same infusion set as blood
 - Unconscious (ONLY FOR ORAL DEXTROSE)
- **Drug Interaction: None**



DEXTROSE 50%

- **Administration:**
 - Adults:
 - 25 to 50 gm. Slow IV push into secure vein, if patient is unable to tolerate oral fluids.
 - May be repeated as needed.
 - Be prepared to restrain.



DEXTROSE 50%

- **Administration:**
 - Pediatric (less than 2 years):
 - D₂₅W - Dilute 1:1 with sterile saline to make 25% solution (0.25 mg/ml)
 - Give 1g/kg slow IV push = 2-4 ml/kg
 - Neonates (newborns < 30 days):
 - D₁₀W (Dilute with sterile saline to make 10% solution)
 - Give 0.2g/kg



DEXTROSE 50%

- **Special Notes:**
 - Attempts at documenting hypoglycemia via glucometry should be made before administration
 - Must insure patent IV line, recheck patency during administration



DILAUDID

- **Generic name**
 - hydromorphone
- **Class of Drug**
 - narcotic analgesic
- **Indications**
 - pain management for isolated injuries



DILAUDID

- **Contraindications**
 - hypersensitivity, CNS depressants on board
- **Drug Interactions**
 - Other CNS depressants, anesthesia, hypnotics, MAOIs; tricyclic antidepressants



DILAUDID

- Administration
 - Adults:
 - 1-4 mg slow IVP
 - Pediatrics:
 - controversy
 - (0.08 mg/kg when used)



DILAUDID

- **Special Considerations**
 - Use with caution in elderly, hepatic/renal disease; hypothyroidism, Addison's disease, prostate problems, urethral stricture



DIPHENHYDRAMINE HCL (BENADRYL®)



- **Class of Drug:**
 - Antihistamine, H₁ blocker
- **Indications:**
 - Allergic reactions
 - Anaphylaxis
 - Dystonic reaction to phenothiazines
 - Motion sickness
- **Contraindications:**
 - Acute asthma

DIPHENHYDRAMINE HCL (BENADRYL®)



- **Drug Interaction:**
 - Additive CNS depression with alcohol, sedatives, narcotics
- **Administration:**
 - Adults: 20-50 mg slow IVP at a rate of 1ml/min or deep IM injection
 - Pediatric: 1 - 2 mg/kg slow IVP; deep IM injection with a maximum dose of 50 mg

DIPHENHYDRAMINE HCL (BENADRYL®)

- **Special Notes**
 - May have immediate effect in dystonic reactions
 - No early benefit in allergic reactions



EPINEPHRINE

(1:1,000 and 1:10,000)

- **Class of Drug**
 - sympathomimetic
- **Pharmacological Actions**
 - Catecholamine with alpha and beta effects
 - In general, the following cardiovascular responses can be expected:
 - Increased heart rate and increased myocardial contractile force
 - Increased systemic vascular resistance and arterial blood pressure
 - Increased myocardial O_2 consumption and increased automaticity
 - Potent bronchodilator



EPINEPHRINE

(1:1,000 and 1:10,000)

- **Indications:**
 - Severe bronchospasm
 - Bronchospasm unresponsive to Albuterol
 - Anaphylaxis
 - Cardiac arrest
- **Contraindications:**
 - None when indicated



EPINEPHRINE

(1:1,000 and 1:10,000)

- **Precautions:**

- increased cardiac work can precipitate angina and/or MI in susceptible individual
- Due to peripheral vasoconstriction, should be used with caution in patients with peripheral vascular insufficiency
- **Wheezing in an elderly person is pulmonary edema or pulmonary embolus until proven otherwise.**



EPINEPHRINE

(1:1,000 and 1:10,000)

- Administration

- Cardiac arrest

- Adult

- 1mg 1:10,000 IV/IO every 3-5 minutes
- ET 2-2 ½ times IV/IO dose

- Pediatric

- Initial: 0.01mg/kg 1:10,000 IV/IO
- ET: 0.1mg 1:1,000
- Subsequent: 0.1mg 1:1,000 IV/IO/ET



EPINEPHRINE

(1:1,000 and 1:10,000)

- **Administration**
 - **Bronchospasm/Anaphylaxis**
 - **Adult**
 - 0.3 - 0.5 mg 1:1,000 SQ
 - **Pediatric**
 - 0.01 mg/kg 1:1,000 SQ
 - » Max of 0.3 mg / dose



EPINEPHRINE

(1:1,000 and 1:10,000)

- **Side Effects and Special Notes:**
 - Anxiety, tremor, palpitations, tachycardia and headache not uncommon side effects.
 - Relatively contraindicated in patients with hypertension, hyperthyroidism, ischemic heart disease or cerebrovascular insufficiency.
 - Epinephrine has a very short life and may need to be repeated every 5 minutes.



FENTANYL (SUBLIMAZE®)

- **Class of Drug:**
 - Narcotic analgesic
- **Indications:**
 - Analgesia for patients with moderate to severe pain
- **Contraindications:**
 - Hypersensitivity
 - known intolerance
 - Patients particularly sensitive to respiratory depression
 - Myasthenia Gravis
 - Pregnancy



FENTANYL (SUBLIMAZE®)

- **Drug Interactions:**

- Benzodiazepines, Diazepam
 - increased risk of CV depression
- Sedatives/Hypnotics, other opioids, CNS depressants and alcohol
 - increased risk of hypotension
- Avoid use in patients who have received MAO inhibitors within the previous 14 days
 - may produce unpredictable, potentially fatal reactions



FENTANYL (SUBLIMAZE®)

- **Administration:**
 - Adult: 25-50mcg IVP
 - with online medical control
 - Pediatric: Under 15kg
 - no approved route or dose for Intermediate level
 - Pediatric: 2-12 yrs of age, > 15kg
 - 1mcg/kg (with online medical control)



FENTANYL (SUBLIMAZE®)

- **Special Notes:**

- Use cautiously in geriatric or debilitated patients (use lower doses), diabetics, patients with pulmonary or hepatic disease, head trauma, increased ICP, undiagnosed abdominal pain and cardiac disease
- Abdominal distension, muscle rigidity, and/or urinary retention may be seen at high doses



GLUCAGON

- **Class of Drug:**
 - Hormone- Hyperglycemic agent
- **Indications:**
 - Documented hypoglycemia (BGL less than 60 mg/dl) when an IV cannot be started



GLUCAGON

- **Contraindications:**

- Won't be able to initiate IV and long transport (greater than 30 minutes)
- Hypersensitivity to pork and/or beef
- Use with caution in patients with phaeochromocytoma

- **Drug Interaction:**

- Hyperglycemic effects intensified and prolong by epinephrine
- Will precipitate when mixed with calcium preparation



GLUCAGON

- **Administration:**
 - 1 mg = 1 unit
 - **Adult:**
 - 0.5 - 1 mg IM, SQ, IVP
 - may repeat in 10 - 20 minutes if no response
 - **Pediatric:**
 - 25 mcg/kg IM, SQ, IVP
 - may repeat in 10 - 20 minutes if no response



GLUCAGON

- **Special Notes:**

- The Patient Must Be Given Supplemental Glucose ASAP; PO, IV, or Rectal. If this is not possible, the patient may be better off without glucagon. Glucagon will release all of the patient's available glycogen. If the patient is not provided with glucose the subsequent hypoglycemia will be greater than before glucagon.
- Glucagon is supplied in a powder and must be reconstituted by sterile water or saline. 1 ml of NS for each 1 mg of powder, shake well.



HYDROXOCOBALAMIN

- **Class of Drug:**
 - Antidote
- **Indications:**
 - Treatment of cyanide poisoning
- **Contraindications:**
 - Rare anaphylactic reactions



HYDROXOCOBALAMIN

- **Drug interactions:**
 - Used in combination with sodium thiosulfates to treat methemoglobinemia. No more effective than sodium nitrite.
- **Administration:**
 - Adult:
 - 5 grams IV over 30 minutes
 - Pediatrics:
 - (<70kg) 70 mg/kg IV



HYDROXOCOBALAMIN

- **Special Notes:**
 - Transient hypertension
 - Reddish discoloration of skin and mucous membranes



MORPHINE SULFATE



- **Class of Drug:**
 - Narcotic analgesic
- **Indications:**
 - Analgesia for patients with major pain such as burns, and isolated fractures
 - Cardiac Chest Pain
 - ACS

MORPHINE SULFATE

- **Contraindications:**
 - Hypersensitivity
 - Head or abdominal injury
 - Respiratory depression
 - Hypovolemia
 - Hypotension
 - BP < 100 systolic



MORPHINE SULFATE

- **Drug Interaction:**
 - Additive effects with other CNS depressants
 - MAO inhibitors may cause unpredictable and severe reactions. Reduce dose to 25% of a usual dose



MORPHINE SULFATE



- **Administration:**
 - **Adult**
 - 2-20mg slow IV/IO push
 - Use lowest effective dose
 - **Pediatric**
 - .05 - .2 mg/kg slow IV/IO push
 - Titrate to effect
 - Max dose 15mg

MORPHINE SULFATE



- **Special Notes:**

- Take vital signs before and 2 minutes after administration
- Slow IV/IO push only
 - unless you cannot start an IV and/or are directly ordered to administer IM
- Often causes vomiting; administer slowly
- May want to mix with or follow up with phenergan

NALOXONE (NARCAN®)



- **Class of Drug:**
 - Narcotic antagonist
- **Pharmacology and Actions:**
 - Narcan is a narcotic antagonist which competitively binds to narcotic sites but which exhibits almost no pharmacologic activity of its own.
 - **Duration of action:**
 - 1-4 hours

NALOXONE (NARCAN®)

- **Indications:**
 - Reversal of narcotic effects.
 - Morphine - Demerol
 - Heroin - Dilaudid
 - Percodan - codeine
 - Lomotil - propoxyphene (Darvon), pentazocine(Talwin)
 - For unconsciousness of unknown etiology to rule out (or reverse) narcotic depression



NALOXONE (NARCAN®)

- **Contraindications:**
 - Hypersensitivity
 - Absences of indication
- **Drug Interaction:**
 - May induce narcotic withdrawal



NALOXONE (NARCAN®)

- **Administration:**
 - **Adult:**
 - 0.4 mg IV/IO/IM/SQ/IN
 - Intranasal - 1mg/nare.
 - Titrate to respiratory effort/rate.
 - May be repeated at 2 - 5 minutes if needed, up to max dose of 2.0 mg.



NALOXONE (NARCAN®)



- **Pediatric:**
 - 20kg or less
 - 0.01 mg/kg IV/IO/IM/SQ
 - May be repeated at 0.1 mg/kg if no response
- **Neonate:**
 - 0.01 mg/kg IV/IO/IM/SQ
 - repeat in 2-3 minutes if needed

NALOXONE (NARCAN®)

- **NOTE:**
 - Much higher doses should be given to patients with suspected propoxyphene (Darvon®), pentazocine (Talwin®), and fentanyl overdoses.



NALOXONE (NARCAN®)

- **Special Notes:**

- The duration of some narcotics is longer than Narcan and the patient must be monitored closely. Repeated doses of Narcan may be required. Patients who have received this drug must be transported to the hospital because coma may reoccur when Narcan wears off.



NALOXONE (NARCAN®)

- **Special Notes**

- Consider restraining your patient prior to administration.
- If pushed too fast, patient may become violent, angry, and have severe vomiting.
 - They might any way!



NITROGLYCERIN

- **Class of Drug:**
 - Antianginal agent/Vascular dilating agent
- **Indications:**
 - Chest pain, anginal pain
- **Contraindications:**
 - Hypersensitivity
 - Hypotension (<100 systolic)
 - Pericardial tamponade
 - Increased intracranial pressure
 - Hypovolemia/severe anemia



NITROGLYCERIN

- **Drug Interaction:**
 - Additive hypotension with beta-adrenergic blockers, antihypertensives, calcium channel blockers, phenothiazines
 - Tricyclic antidepressant, and antihistamines may interfere with buccal absorption



NITROGLYCERIN

- **Administration:**
 - Sublingual
 - 0.3 - 0.4 mg tablet
 - Repeat at 3 - 5 minutes as needed to a total of three tabs (or more by MCEP order)
 - Lingual Spray
 - 0.4 mg/spray
 - additional one or two sprays every 3 - 5 minutes for a total of three sprays
 - Pediatric: Not recommended for prehospital use



NITROGLYCERIN

- **Special Notes:**

- 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)
- Less common effect: marked hypotension, particularly orthostatic
- EMTs should use their supply of nitroglycerin, not the patient's
- Use with caution with patient not previously receiving nitroglycerin



NITROGLYCERIN

- **Special Notes:**

- Generalized vasodilation may cause profound hypotension and reflex tachycardia
- NTG tablets lose potency easily, should be stored in a dark glass container with a tight lid, and not exposed to heat. NTG spray does not have this problem, although cross contamination must be considered.



NITROGLYCERIN

- **Special Notes**

- Must have online Medical Control in patients with systolic BP below 100 mm Hg
- At the ILS level you must have an IV in place BEFORE the administration of Nitro!!!



POTASSIUM

- **Class of Drug:**
 - Electrolyte
- **Indications:**
 - **Interfacility transport drug only!!**
 - Used for treatment or prophylaxis of hypokalemia.



POTASSIUM

- **Contraindications:**
 - Severe renal impairment
 - Hyperkalemia
- **Drug Interaction:**
 - None relevant

Administration:

- **Must not run faster than 10mEq/hour**
- **Cannot transport concentrations of greater than 20mEq/1000ml**



PREDNISONE

- **Class of Drug:**
 - Synthetic corticosteroid
- **Indications:**
 - Exacerbated Asthma
- **Contraindications:**
 - Systemic Fungal Infections



PREDNISONE

- **DRUG INTERACTION:**
 - Additive hypokalemia with thiazides and loop diuretics
 - May increase requirements for insulin or oral hypoglycemic agents in diabetics
 - Phenyton, Phenobarbital and Rifampin may decrease effectiveness



PREDNISONE



- **ADMINISTRATION:**
 - Adult: PO. [40-60 mg] (1mg/kg)
- **SPECIAL NOTES:**
 - Prednisone suppresses the immune system
 - Prednisone causes retention of sodium and fluids

PROMETHAZINE (PHENERGAN®)

- **Class of drug:**
 - Antiemetic
- **Indications:**
 - Treatment and prevention of nausea and vomiting



PROMETHAZINE (PHENERGAN®)

- **Contraindications:**
 - Hypersensitivity to phenothiazines
 - Comatose patients
 - CNS depression due to drugs
 - **Children < 2yrs old, or critically ill or dehydrated**
 - Lactation



PROMETHAZINE (PHENERGAN®)

- **Drug Interactions:**
 - CNS depressants - may increase, prolong or intensify the sedative action
 - Anticholinergics - use caution
 - MAO inhibitors - use caution



PROMETHAZINE (PHENERGAN®)

- **ADMINISTRATION:**

- Adults:

- [12.5-25 mg] PO/IV/IO/IM/Rectal every 4 hours as needed

- Children > 2yrs

- [0.25-0.5 mg/kg] PO/IV/IO/IM/Rectal every 4 hours as needed
- (Use should be limited to prolonged vomiting of known etiology in children).



PROMETHAZINE (PHENERGAN®)

- **SPECIAL NOTES:**

- Use cautiously in patients with hypertension, epilepsy, sleep apnea, cardiovascular disease, impairment of the liver, and pregnancy
- May caused marked drowsiness
- If using with Morphine or Fentanyl, use 12.5 mg or less and mix in same syringe with narcotic pain reliever to ward off nausea caused by narcotic agents. Cannot be mixed with Dilaudid!!



SOLU-MEDROL



- **Generic name:**
 - methylprednisolone sodium succinate
- **Class of Drug**
 - corticosteroid
- **Indications**
 - Anaphylaxis
 - Exacerbated asthma, COPD

SOLU-MEDROL



- **Contraindications**

- Use with caution in patients with:
 - Diabetes
 - GI bleeds
 - infection

- **Drug Interactions**

- Insulin
- PO diabetic meds

SOLU-MEDROL



- **Administration**
 - Adult:
 - 125mg IVP
 - peds:
 - 1-2 mg/kg
- **Special Notes**
 - May cause hypertension (rarely), headache, alkalosis

Finally Done! Any Questions?

