**2018 REMSA Paramedic Program Drug List**

**Acetaminophen (APAP)**

**Class:** Analgesic, antipyretic

**Action:** Increases pain threshold and reduces fever by acting on the hypothalamus.

**Indications:** Fever, pain relief

**Contraindications:** Hypersensitivity and use caution in patients with liver disease.

**Onset/Duration:** Onset: Rapid and Duration: 3-4 hours

**Dose/route:**

- Adult: 325-650 mg PO every 4-6 hr
- Peds: 15 mg/kg PO/PR every 4-6 hr

**Side Effects:** Nausea/vomiting, hepatotoxicity

**Activated Charcoal**

**Class:** Antidote, Adsorbant

**Action:** Binds to and absorbs ingested toxins thereby inhibiting their GI adsorption. Once the drug binds to the charcoal the combined complex is excreted.

**Indications:** Acute ingested poisonings that were ingested within the last hour

**Contraindications:** Cyanide, mineral acids, caustic alkalis, iron, ethanol, methanol, corrosives, petroleum distillates

**Onset/Duration:** Onset: Immediate and Duration: Continual while in GI tract and reaches equilibrium once saturated

**Dose/Route:**

- Adult: 1 g/kg PO
- Peds: 1-2 g/kg PO
**Adenosine (Adenocard)**

**Class:** Misc. Antidysrhythmic, Endogenous Nucleoside

**Action:** Decreases electrical conduction through the AV node without causing negative inotropic effects

**Indications:** Supraventricular tachycardia’s (SVT/PSVT)

**Contraindications:** Hypersensitivity, bradycardia, drug induced tachycardia, 2\textsuperscript{nd} or 3\textsuperscript{rd} degree heart blocks, A-Fib, A-Flutter, V-Tach, WPW with A-Fib/flutter

**Onset/Duration:** Onset immediate and Duration/half-life: 10 seconds

**Dose/Route:**

- Adult: 6mg rapid IV/IO push followed by 20cc saline flush, may repeat at 12mg rapid IV push followed by 20cc saline flush.

- Peds: 0.1mg/kg (max 6mg) IV/IO followed by 5-10cc saline flush. May repeat at 0.2mg/kg (max 12mg) IV/IO followed by 5-10cc saline flush

**Side Effects:** dizziness, headache, shortness of breath, hypotension, flushing, palpitations, chest pain, nausea/vomiting

**Note:** Methylxanthine classified stimulants (caffeine & theophylline) usage will antagonize adenosine

**Albuterol (Proventil)**

**Class:** Sympathomimetic, bronchodilator, beta 2 agonist

**Action:** Sympathomimetic that is selective for Beta 2 adrenergic receptors and relaxes smooth muscles of the bronchial tree and peripheral vasculature by stimulating adrenergic receptors of sympathetic nervous system

**Indications:** Asthma, bronchospasms, reactive airway disease

**Contraindications:** Hypersensitivity, caution with pt’s with cardiac dysrhythmias
**Onset/Duration:** Onset: 5-8 min with peak effect in 1-1.5 hours and Duration: 2 – 6 hours

**Dose/Route:**

- Adult: 2.5mg diluted in 3mL of Normal Saline
- Peds: 2.5mg diluted in 3mL of Normal Saline

**Side Effects:** Tremors, tachycardia, hypertension, anxiety, nausea, headache, palpitations, cough, dizziness

**Note:** Albuterol may precipitate angina & cardiac dysrhythmias. Use with caution in pt’s with cardiovascular disorder, diabetes, seizure disorder, hyperthyroidism.

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**Amiodarone (Cordarone)**

**Class:** Class III Antidysrhythmic

**Action:** Prolongs duration of the action potential and prolongs the refractory period, also has beta adrenergic receptor and calcium channel blocking activity. Works on both the ventricles and the atria

**Indications:** V-Fib, hemodynamically unstable V-Tach, treatment for some stable atrial rhythms

**Contraindications:** CHF, cardiogenic shock, bradycardia, 2nd or 3rd degree heart blocks ith no pacemaker present, hypersensitivity to amiodarone or iodine

**Onset/Duration:** Onset: within minutes and Duration: Variable but considered 30 – 45 days

**Dose/Route:**

- Adult: Pulseless V-Tach/V-Fib arrest - 300mg IV/IO may repeat once at 150mg IV/IO. V-Tach with a pulse 150mg IV drip over 10 minutes up to max of 2.2g in 24 hours
- Peds: Pulseless V-Tach/V-Fib arrest - 5mg/kg IV/IO. V-Tach with a pulse 5mg/kg IV drip over 20-60 minutes with a max of 15mg/kg/day.

**Side Effects:** Bradycardia, hypotension, headache, CHF, abnormal liver/thyroid functions. In rare cases can cause pulmonary fibrosis
**Amyl Nitrite**

**Class:** Coronary vasodilator

**Action:** Smooth muscle relaxant that converts hemoglobin to methemoglobin which attracts cyanide thus allowing oxygen to bind to hemoglobin

**Indications:** Cyanide poisoning (should be given in conjunction with sodium nitrate IV)

**Contraindications:** None when used for cyanide poisoning

**Onset/Duration:** Onset: 30 sec and Duration: 3 – 20 min

**Dose/Route:**

- Adult: One ampule crushed and inhaled for 30-60 seconds
- Peds: Same as adult

**Side Effects:** Hypotension, tachycardia, palpitations, syncope, headache, nausea

**Note:** Amyl nitrite is frequently abused as it is known to be an aphrodisiac

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**Aspirin (Salicylate)**

**Class:** Analgesic, nonsteroidal anti-inflammatory drug (NSAID), antipyretic, and antiplatelet

**Action:** Inhibits prostaglandins involved in the production of inflammation, pain and fever. Dilates peripheral vessels and also inhibits platelet aggregation by blocking the formation of thromboxane A2.

**Indications:** Acute coronary syndrome (ACS) such as myocardial infarction, ischemic chest pain or angina, plus given for mild to moderate fever and pain

**Contraindications:** GI bleeding, hemorrhagic stroke, active gastric ulcers, bleeding disorders, asthma, hypersensitivity to salicylates, children

**Onset/Duration:** Onset: 15-30 min and Duration: 4-6 hours

**Dose/Route:**

- Adult: Mild pain/fever – 325-650 mg PO every 4 hours. ACS – 2 to 4 baby chewable aspirin 162-324mg OR 1 adult aspiring 325mg PO.
Peds: Not indicated in pre-hospital setting

**Side Effects:** Stomach irritation, GI bleeding, Nausea/vomit

**Note:** Children under 12 should not be given Aspirin as they may develop Reyes syndrome.

**Atropine Sulfate**

**Class:** Anticholinergic; Parasympatholytic

**Action:** Inhibits actions of acetylcholine (mostly at muscarinic receptor sites) causing decreasing salivation and bronchial secretions, increased heart rate, decreased gastric motility.

**Indications:** Hemodynamically unstable bradycardia, Organophosphate or nerve gas poisoning

**Contraindications:** Tachycardia, hypersensitivity, avoid use with hypothermic pt’s, caution in pt’s with an active MI and hypoxia

**Onset/Duration:** Onset: Rapid and Duration: 2-6 hours

**Dose/Route:**

- Adult: Bradycardia – 0.5 mg IV/IO q 3-5 min up to max total of 3mg or 0.04mg/kg.
  Organophosphate poisoning – 1 to 5mg IV/IM/IO repeated 3-5 min until cessation of bronchial secretions

- Peds: Bradycardia NOT responding to Epi- 0.02mg/kg IV/IO (min dose of 0.1mg and max single dose 0.5mg) with maximum total of 1 mg for a child and 3 mg for an adolescent.
  Organophosphate peds < 12 yrs old - 0.02 - 0.05mg/kg IV/IM/IO may be repeated every 20-30 mins until cessation of bronchial secretions.

**Side Effects:** Tachycardia, paradoxical bradycardia if given too slow or too small of dose, mydriasis (dilated pupils), dysrhythmias, headache, nausea/vomit, headache, dizziness, flushed, anticholinergic effects (dry mouth/nose/skin, blurred vision, urinary retention, constipation)

**Note:** Effects of atropine may be potentiated by antihistamines, procainamide, quinidine, antipsychotics, antidepressants, and thiazides
Calcium Chloride

**Class:** Electrolyte, hypertonic solution

**Action:** It is an essential element for regulating the excitation threshold of nerves and muscles, normal cardiac contractility, and blood coagulation.

**Indications:** Hyperkalemia, hypocalcemia, hypermagnesemia, calcium channel blocker overdose

**Contraindications:** V-Fib during cardiac resuscitation, digitalis toxicity, hypercalcemia

**Onset/Duration:** Onset: 5-15 min and Duration is dose dependant but may last up to 4 hours

**Dose/Route:**

- Adult: 500-1000 mg slow IV of 10% solution
- Peds: 20 mg/kg slow IV of 10% solution

**Side Effects:** Bradycardia, hypotension, Metallic taste in mouth, local necrosis if given IM or IV infiltration

Dextrose 50% (D50)

**Class:** Carbohydrate, hypertonic solution

**Action:** Dextrose increases available blood sugar to be used as energy by the body

**Indications:** Hypoglycemia. If protocol allows also for altered LOC, coma, and seizure of unknown origin

**Contraindications:** Intracranial hemorrhage, increased intracranial pressure, known or suspected stroke in the absence of hypoglycemia

**Onset/Duration:** Onset: 1 min and Duration: variable depending on degree or hypoglycemia

**Dose/Route:**

- Adult: 12.5-25 g IV
- Peds: 0.5 – 1 g/kg IV of dextrose 25%
- Neonates: 0.5 – 1 g/kg IV of dextrose 10%
Side Effects: Hyperglycemia

Note: If given through infiltrated IV will cause tissue necrosis so use large vein and flush with saline to ensure IV patency. D50 may cause wernicke’s encephalopathy in thiamine deficient patient (alcoholics and malnourished pt’s) so if these conditions are suspected administer 100 mg Thiamine IV prior to administering D50.

Diazepam (Valium)

Class: Benzodiazepine

Action: Benzodiazepines increase the activity of GABA, thereby producing a sedative effect, relaxing skeletal muscles, and inducing sleep.

Indications: Seizure activity, acute anxiety, skeletal muscle relaxation, sedation for pacing, acute alcohol withdrawal delirium tremors

Contraindications: Hypersensitivity, respiratory depression, shock, coma, head injury, use with caution in pt’s with acute substance abuse

Onset/Duration: Onset: 1-5 min IV and 15-30 min IM with Duration: 15-60 min

Dose/Route:

Adult: Seizures – 5 to 10 mg IV over 2 mins every 10-15 min as needed & a max of 30 mg. Premedication for pacing – 5-15 mg IV

Peds: Ages 30 days to 5 yrs – 0.2 - 0.5-2 mg slow IV push over 2 mins every 2-5 min to a max of 5 mg. Peds 5 yrs or older – 1 mg slow IV push over 2 mins every 2-5 min with a max of 10mg

Side Effects: Respiratory depression, altered LOC, hypotension, amnesia, confusion, nausea, vomiting, blurred vision
**Diltiazem (Cardizem)**

**Class:** Calcium Channel Blocker

**Action:** Inhibits calcium ion influx through slow channels into the cell of myocardial and arterial smooth muscle. Slows SA and AV nodal conduction. Dilates coronary arteries and arterioles thus inhibits coronary artery spasms

**Indications:** A-Fib and A-Flutter. Multifocal atrial tachycardias. SVT/PSVT refractory to Adenosine.

**Contraindications:** Hypersensitivity, 2nd and 3rd degree heart block, hypotension, cardiogenic shock, ventricular rhythms, sick sinus syndrome, Wolf-Parkinson-White syndrome.

**Onset/Duration:** Onset: 2-5 min and Duration: 1-3 hour

**Dose/Route:**
- Adult: 0.25mg/kg IV over 2 min, may be repeated in 15 min at 0.35mg/kg IV over 2 min
- Peds: Not recommended in the prehospital setting

**Side Effects:** Headache, dizziness, hypotension, 1st and 2nd degree heart block, bradycardia, palpitations, CHF, chest pain, ventricular rhythms

**Note:** Use caution with renal/liver impaired pt’s and those taking beta blockers.

**Diphenhydramine (Benadryl)**

**Class:** Antihistamine

**Action:** Blocks H1 and H2 receptors which block histamine release

**Indications:** Allergic reactions, anaphylaxis, acute extrapyramidal reaction (dystonia)

**Contraindications:** Hypersensitivity, pt’s taking MAO inhibitors, newborns/nursing mothers, caution with glaucoma

**Onset/Duration:** Onset: 5-15min with max effects in 1-3 hr and Duration: 6-12 hr

**Dose/Route:**
- Adult: 25-50mg IV/IM with a max of 400 mg/day
Peds: 1mg/kg IV with a max of 300 mg/day

**Side Effects:** Drowsiness, palpitations, hypotension, tachycardia or bradycardia, disturbed coordination, dry mouth/throat

**Note:** Use with caution in CNS depressed pt’s and pt’s with lower respiratory tract diseases such as asthma

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**Dopamine (Inotropin)**

**Class:** Sympathomimetic, vasopressor

**Action:** Acts primarily on alpha 1 and beta 1 adrenergic receptors. At low doses (2-5 mcg/kg/min) may act on dopaminergic receptors causing renal, mesenteric, and cerebral vascular dilation. At moderate doses (5-10 mcg/kg/min) dopamine stimulates mostly beta 1 receptors causing increased cardiac contractility and output. At high doses (10-20 mcg/kg/min) dopamine has mostly alpha 1 stimulation effects causing peripheral arterial and venous constriction.

**Indications:** Hemodynamically significant hypotension in the absence of hypovolemia such as in cardiogenic shock, neurogenic shock, septic shock. Second line pharmacological treatment for bradycardia after atropine

**Contraindications:** Hypovolemia, trauma, tachydysrhythmias, V0Fib, pt’s with pheochromocytoma

**Onset/Duration:** Onset: 2-4 min and Duration: 10-15 min

**Dose/Route:**

- Adult: 2-20 mcg/kg/min IV Drip and titrate to desired effect
- Peds: Same as adult

**Side Effects:** Tachycardia, hypertension, anxiety, headache, nausea/vomiting, increased myocardial oxygen demand, mydriasis, dose-related tachydysrhythmias
**Epinephrine (Adrenalin)**

**Class:** Sympathomimetic

**Action:** Endogenous catecholamine that directly stimulates both alpha and beta 1 & 2 adrenergic receptors. The effects this will have on the heart include increased contractile force, increased rate, and increased cardiac output. Epinephrine is also a potent vasoconstrictor as well as a bronchodilator. Other effects include slowing of gastric motility, miosis, and pale skin.

**Indications:** Anaphylaxis, cardiac arrest, asthma, bradycardia (first line in peds, not adults), shock not caused by hypovolemia, severe hypotension accompanied with bradycardia when pacing and atropine fail.

**Contraindications:** Hypovolemic shock. Caution should be used in patients with known cardiovascular disease or pts >45 yo

**Onset/Duration:** Onset 1-2 min IV and 5-10 mins SQ with Duration: 5-10 min

**Dose/Route:**

- Adult: Cardiac arrest - 1mg 1:10,000 IV/IO every 3-5 min with NO max.
- Anaphylaxis/asthma – 0.3-0.5mg SQ/IM 1:1,000. If no response some protocols give 0.3-0.5mg IV 1:10,000. Post cardiac arrest or for bradycardia with severe hypotension – IV drip infusion 2-10 mcg/min and titrate to effect.

- Peds: Cardiac arrest – 0.01 mg/kg 1:10,000 IV/IO max of 1 mg every 3-5 mins.
- Anaphylaxis/asthma – 0.01 mg/kg 1:1,000 SQ/IM with a max single dose 0.3 mg.

**Side Effects:** Tachycardia, hypertension, anxiety, cardiac dysrhythmias, tremors, dyspnea

**Note:** Always use epinephrine 1:1,000 when given SQ/IM and 1:10,000 when given IV/IO. Due to severe complications associated with Epi IV drip infusion this is not typically done in the prehospital field.
**Racemic Epinephrine (Micronefrin)**

**Class:** Sympathomimetic

**Action:** Racemic Epinephrine is an inhaled version of epinephrine that is used as a bronchodilator and as an anti-inflammatory to treat laryngeal/tracheal swelling and edema. Its actions are the same as epinephrine but since it is inhaled it has both systemic and localized effects.

**Indications:** Laryngeotraceobronchitis (croup), asthma, bronchospasms, laryngeal edema

**Contraindications:** Hypertension, epiglottitis. Use caution in patients with known cardiovascular disease and/or in pt’s > 45 yo.

**Onset/Duration:** Onset: 5 min and Duration: 1-3 hr

**Dose/Route:**

- Adult: Not usually given to adults. Contact medical control
- Peds: All doses given via aerosolized neb. 0.25 ml of 0.1% solution diluted in 2.5 mL saline for pt’s < 20 kg. 0.5ml of 0.1% solution diluted in 2.5 ml saline for pt’s 20-40 kg. 0.75 ml of 0.1% solution diluted in 2.5 ml saline for pt’s >40kg.

**Side Effects:** Tachycardia, hypertension, anxiety, cardiac dysrhythmias, tremors

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**Etomidate (Amidate)**

**Class:** Anesthetic, hypnotic

**Action:** Etomidate is a very potent drug that acts on the central nervous system to produce a short lasting anesthesia with amnesic properties. Etomidate has very little effect on respiratory drive which makes it ideal for certain procedures.

**Indications:** Premedication prior to procedures such as endotracheal intubation, synchronized cardioversion, conscious sedation for bone dislocation relocation.

**Contraindications:** Hypersensitivity, labor/delivery

**Onset/Duration:** Onset: < 1 min and Duration 5-10 min
**Dose/Route:**

Adult: 0.3mg/kg IV over 30-60 secs limited to one dose

Peds: 0.3mg/kg IV over 30-60 secs with a max dose of 20 mg

**Side Effects:** Hypotension, hypertension, dysrhythmias, hypoventilation, nausea/vomiting, cortisol suppression

**Note:** Primarily used for Rapid Sequence Intubation/induction (RSI) in the prehospital setting

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**Fentanyl (Sublimaze)**

**Class:** Synthetic Opiod analgesic

**Action:** Combines with the receptor sites in the brain to produce potent analgesic effects.

**Indications:** Pain and sedation

**Contraindications:** hypersensitivity to opiates, hypotension, head injury, respiratory depression, cardiac dysrhythmias, myasthenia gravis

**Onset/Duration:** Onset 1-2 min IV and Duration 30-60 min

**Dose/Route:**

Adult: 0.5 – 2 mcg/kg IV/IN over 2 mins with a max typically of 100 mcg per dose. Typically total max dose of 300 mcg.

Peds: 0.5 – 1 mcg/kg IV/IN over 2 mins with a max typically of 100 mcg per dose. Max total dose of 3 mcg/kg.

**Side Effects:** Respiratory depression, hypotension or hypertension, bradycardia, nausea/vomiting, and rigidity of chest wall muscles

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**Flumazenil (Romazicon)**

**Class:** Benzodiazepine antagonist, antidote

**Action:** Flumazenil antagonizes the actions of benzodiazepines in the CNS.
Indications: Reversal of respiratory depression and sedation caused from benzodiazepine overdose

Contraindications: Hypersensitivity, Tricyclic antidepressant overdose, chronic benzodiazepine users or alcoholics, cocaine or other stimulant intoxication, and caution with known seizure disorder

Onset/Duration: Onset: 1-2 min and Duration: Related to amount of benzodiazepine absorbed

Dose/Route:

Adult: 0.2mg IV over 15 sec, may repeat at 0.3mg IV over 30 sec, then 0.5mg IV over 30 secs given at 1 min intervals until adequate response or a max dose of 3 mg given

Peds: Not recommended in the pre-hospital setting

Side Effects: Seizures, nausea/vomiting, dizziness, headache, agitation, abnormal vision

**Furosemide (Lasix)**

Class: Loop diuretic

Action: Furosemide is a potent diuretic that inhibits the reabsorption of sodium and chloride in the proximal tubule and loop on Henle. IV doses can also reduce cardiac preload by increasing venous capacitance.

Indications: Pulmonary edema (CHF) with SBP>90, hypertensive emergencies, hyperkalemia

Contraindications: Anuria, hypersensitivity, hypovolemia, hypokalemia

Onset/Duration: Onset: 15-20 min IV and Duration: 2 hrs

Dose/Route:

Adult: 0.5 - 1mg/kg IV over 1-2 min. If no response double dose to 2 mg/kg over 1-2 min. Most services allow up to a max of 40-80 mg IV.

Peds: 1mg/kg/dose IV over 1-2 min with a total max of 6 mg/kg

Side Effects: Tinnitus (if given too quickly), hypotension, hypokalemia, hypernatremia, hypocalcemia, hyperglycemia

Note: MUST GIVE SLOWLY OR MAY CAUSE PERMANENT HEARING PROBLEMS
**Glucagon**

**Class:** Pancreatic hormone

**Action:** Glucagon stimulates the breakdown of glycogen to glucose resulting in an increase in blood glucose.

Glucagon also has a positive inotropic action on the heart even in the presence of beta blockade or calcium channel blockade which makes it useful for beta blocker or calcium channel blocker overdose.

Glucagon also relaxes smooth muscle of the GI tract, primarily the esophagus which makes it useful for esophageal obstruction.

**Indications:** Hypoglycemia (when IV access is not available), beta blocker overdose, calcium channel blocker overdose, esophageal obstruction

**Contraindications:** Hypersensitivity (usually to proteins)

**Onset/Duration:** Onset: 10-20 min IM and 1 min if IV. Duration: 60-90 min

**Dose/Route:**

- Adult: Hypoglycemia – 0.5-1 mg IM may repeat in 10 min if protocol allows. Calcium channel or beta blocker overdose – 3-10 mg IV over 3-5 min followed by an infusion at 3-5 mg/hr

  Peds: Used for peds >20 kg at 0.5-1.0 mg IM.

**Side Effects:** Tachycardia, hypotension, nausea/vomiting, urticaria

**Note:** Glucagon requires glycogen stores in the liver to increase blood glucose. If patient is malnourished glucagon may not work.
**Haloperidol (Haldol)**

**Class:** Antipsychotic/neuroleptic

**Action:** Blocks dopamine type 2 receptors in the brain altering mood and behavior.

**Indications:** Acute psychotic episodes, emergency sedation of severely agitated or delirious pt’s

**Contraindications:** Hypersensitivity, CNS depression, pregnancy, Parkinson’s disease, seizure disorder, liver or cardiac disease

**Onset/Duration:** Onset 30-60 min IM and Duration 12-24 hr

**Dose/Route:**

- Adult: 2-5mg IM/IV every 4-8 hr as needed
- Peds: Not recommended

**Side Effects:** Dystonia or EPS reactions, hypotension, pseudoparkinsonism, nausea/vomiting, akathisia, blurred vision

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**Ipratropium (Atrovent)**

**Class:** Anticholinergic, bronchodilator

**Action:** Ipratropium blocks interaction of acetylcholine at receptor sites on bronchial smooth muscle resulting in bronchodilation, reduced mucus production, decreased levels of cyclic guanosine monophosphate.

**Indications:** Persistent bronchospasms, asthma, COPD exacerbation

**Contraindications:** Hypersensitivity to Ipratropium, atropine, soybean protein, or peanuts

**Onset/Duration:** Onset: 5-15 min and Duration: 4-6 hr

**Dose/Route:**

- Adult: 500 mcg diluted in 3ml saline via nebulizer. May repeat dose once per most protocols
- Peds: Not typically given prehospital. 250-500 mcg diluted in 3ml saline via neb every 20 mins up to 3 doses
**Side Effects**: Mydriasis, tachycardia, blurred vision, nausea/vomiting, headache, anxiety, blurred vision.

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**Ketamine (Ketalar)**

**Class**: Nonbarbituate anesthetic

**Action**: Acts on the limbic system and cortex to block afferent transmission of impulses associated with pain perception. It produces short-acting amnesia without muscular relaxation. A derivative of phencyclidine (PCP).

**Indications**: Pain control and sometimes used as an adjunct to nitrous oxide

**Contraindications**: Stroke, increased intracranial pressure, severe hypertension, cardiac instability

**Onset/Duration**: Onset: 30 sec and Duration: 5-10 min

**Dose/Route**:

- Adult: 1-2 mg/kg IV over 1 min or 4-5 mg/kg IM
- Peds >2yo: 1-2 mg/kg IV over 1 min or 3-5 mg/kg IM

**Side Effects**: Hypertension, increased heart rate, hallucinations, delusions, explicit dreams, respiratory depression

**Note**: Common street use these days in conjunction with narcotics because they potentiate each other for a longer/higher euphoria. Giving Narcan will only affect the narcotic NOT the Ketamine therefore only a minimal short-lasting effect.

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**Lidocaine (Xylocaine)**

**Class**: Class 1B Antidysrhythmic

**Action**: Lidocaine is a sodium channel blocker that acts primarily on the ventricles of the heart during phase 4 diastolic depolarization which decreases automaticity, suppresses premature ventricular complexes, and raises the V-Fib threshold.
**Indications:** Significant ventricular ectopy with ischemia/MI, pulseless V-tach or V-Fib cardiac arrest, stable V-Tach with a pulse

**Contraindications:** Hypersensitivity, prophylactic use in an acute MI, 2nd or 3rd degree heart block in the absence of a pacemaker, Stokes-Adams syndrome

**Onset/Duration:** Onset: 30-90 secs and Duration: 10-20 min

**Dose/Route:**

Adult: Cardiac arrest - 1-1.5mg/kg IV/IO bolus may be repeated in 5-10 mins with a total max of 3mg/kg. Bolus is followed by a maintenance infusion drip of 1-4mg/min post-cardiac arrest. For PVC’s or V-Tach with a pulse – 0.5-0.75 mg/kg IV/IO up to 1-1.5 mg/kg IV/IO and may be repeated with a total max dose of 3 mg/kg

Peds: 1mg/kg IV/IO bolus followed by maintenance infusion drip of 20-50 mcg/kg/min IV/IO post-cardiac arrest. For PVC’s or V-tach with a pulse 1 mg/kg IV/IO.

**Side Effects:** Blurred vision, dizziness, hypotension, bradycardia, seizures, altered LOC

**Note:** Use caution in patients with impaired liver/renal function and the elderly. May half dose initial dose for pts >70 yo

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**Magnesium Sulfate**

**Class:** Electrolyte, anticonvulsant

**Action:** Reduces striated muscle contractions and blocks peripheral neuromuscular transmission by reducing acetylcholine release at the myoneural junction.

**Indications:** Seizures due to eclampsia after seizure activity is stopped, torsades de pointes, unstable V-Tach attributed to digitalis toxicity, hypomagnesemia, status asthmaticus not responsive to beta-adrenergic drugs

**Contraindications:** Any heart block or myocardial damage, hypotension

**Onset/Duration:** Onset: Immediate IV and Duration: 30 min IV
**Dose/Route:**

Adult: Pulseless arrest (hypomagnesemia and torsades de pointes) and status asthmaticus – 1-2 g IV/IO diluted in 10 ml D5W. Torsades de pointes or hypomagnesemia WITH A PULSE – 1-2 g in 100ml D5W over 5-60 min IV. Eclampsia – 1-4 g IV with a max dose of 30-40 g/day

Peds: Pulseless arrest or hypomagnesemia/torsades with a pulse – 25-50 mg/kg IV/IO (max 2 g) over 10-20 mins. Status asthmaticus - 25-50 mg/kg IV/IO (max 2 g) over 15-30 mins

**Side Effects:** Hypotension, facial flushing, hyporeflexia (decreased reflexes), bradycardia, respiratory depression, diaphoresis

**Note:** If overdose is suspected (usually by decreased deep tendon reflexes) may give calcium chloride or calcium gluconate to reverse effects.

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**Methylprednisolone (Solu-Medrol)**

**Class:** Corticosteroid, Glucocorticoid

**Action:** Synthetic steroid that suppresses acute and chronic inflammation. Additionally is also potentiates vascular smooth muscle relaxation by beta-adrenergic agonists and may alter airway hyperactivity.

**Indications:** Anaphylaxis, asthma unresponsive to bronchodilators, acute spinal cord injury, adrenal insufficiency

**Contraindications:** Caution in pt’s with GI bleeding, diabetes, severe infection

**Onset/Duration:** Onset: 1-2 hrs and Duration: 8-24 hours

**Dose/Route:**

Adult: 40-125mg IV (higher doses in spinal injury per medical control)

Peds: 1-2mg/kg IV

**Side Effects:** hypertension, hypokalemia, headache, alkalosis, sodium and water retention

**Note:** Use in spinal injury is controversial
**Metoprolol (Lopressor)**

**Class:** Beta blocker

**Action:** Blocks beta-adrenergic receptor sites in the heart, lungs and blood vessels. The beta 1 blocking action on the heart decreases heart rate, conduction velocity, myocardial contractility, and cardiac output. The beta 2 effects may cause bronchoconstriction.

**Indications:** Supraventricular tachycardia (SVT/PSVT), Atrial Fibrillation, Atrial Flutter, to reduce myocardial ischemia and damage in acute myocardial infarction/Unstable angina

**Contraindications:** Hemodynamically unstable pt’s, CHF, decreased cardiac output, cardiogenic shock. Relative contraindications with 2nd or 3rd degree heart blocks, asthma, RAD, severe bradycardia, and SBP<100

**Onset/Duration:** Onset: 1-2 min and Duration: 3-4 hours

**Dose/Route:**

- Adult: 5 mg slow IV at 5 min intervals and may repeat up to 15mg max.

- Peds: Not recommended in prehospital setting

**Side Effects:** Bradycardia, hypotension, AV conduction delays, palpitations

**Note:** If given concurrently with calcium channel blockers, such as verapamil and cardizem, may cause severe hypotension. Caution in pt’s with liver/renal dysfunction.

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**Midazolam (Versed)**

**Class:** Benzodiazepine

**Action:** A water soluble benzodiazepine that increases the activity of GABA, thereby producing a sedative effect, relaxing skeletal muscles, and inducing sleep plus has amnesic properties.

**Indications:** Seizures, anxiety. Premedication for intubation, cardioversion or conscious sedation procedures
**Contraindications:** Hypersensitivity, hypotension, respiratory depression, alcohol intoxication, depressed VS, use of any CNS depressants to include, but not limited to, barbiturates, alcohol, and narcotics.

**Onset/Duration:** Onset: 1-3 min IV and Duration: 2-6 hours IV

**Dose/Route:**

- Adult: 2-5mg IV over 1-2 mins or 0.07mg/kg IM with a max of 7 mg
- Peds: 0.1-0.2mg/kg IV over 1-2 mins or IM if needed with a max of 5 mg

**Side Effects:** Hypotension, respiratory depression or arrest, CNS depression, hiccups, oversedation, blurred vision

**Note:** May be given IM since Midazolam is water based; should be given with analgesic for painful procedures

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**Morphine Sulfate**

**Class:** Opioid analgesic

**Action:** Morphine is a natural opioid analgesic. Morphine also causes venous dilation and decreased venous return to the heart thus reducing myocardial oxygen demand. Morphine also causes euphoria, central nervous system depression and sedation.

**Indications:** Acute pain, chest pain associated with ACS, pulmonary edema

**Contraindications:** Hypersensitivity to narcotics, CNS depression, respiratory depression, hypotension, hypovolemia, altered mental status, head injury, respiratory depression, pt’s that took MAO inhibitors in last 14 days, and caution with pt’s with RV infraction/MI

**Onset/Duration:** Onset: 1-2 min and Duration: 2-7 hr

**Dose/Route:**

- Adult: 2-5mg IV repeat every 5-10min as needed
- Peds: 0.1-0.2 mg/kg IV max total dose of 15 mg

**Side Effects:** Hypotension, CNS depression, tachycardia, respiratory depression

**Note:** Phenothiazines may potentiate morphine. Narcan for Morphine overdoses.
**Naloxone (Narcan)**

**Class:** Opioid antagonist

**Action:** Narcan is a competitive opiate antagonist used in known or suspected opiate overdose.

**Indications:** Suspected or known opioid overdose with respiratory depression.

**Contraindications:** Hypersensitivity. Caution with narcotic dependent pt’s who may experience withdrawal syndrome to include neonates of narcotic-dependent mothers. Avoid use with Meperidine induced seizures.

**Onset/Duration:** Onset: 2 min and Duration: 30-60 min

**Dose/Route:**

- Adult: 0.4 – 2mg IV/IO/IM/ET may repeat up to 10 mg max
- Peds: 0.1mg/kg IV/IO/ET with a max of 2mg per dose

**Side Effects:** Nausea/vomiting, hypertension, tachycardia, seizures, blurred vision,

**Note:** Titrate to control airway and breathing, should NOT be used to completely reverse narcotic effects due to complications with withdrawal syndrome, combativeness, etc.

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**Nitroglycerin (Nitro-Stat)**

**Class:** Nitrate, Vasodilator

**Action:** Nitroglycerin is an organic nitrate and potent vasodilator. It relaxes vascular smooth muscle resulting in coronary artery dilation while also reducing blood pressure, preload, afterload, and myocardial oxygen demand.

**Indications:** Chest pain, acute coronary syndromes (ACS), pulmonary edema associated with CHF, hypertensive emergencies

**Contraindications:** Hypersensitivity, pt’s that have taken erectile dysfunction drugs (Cialis, Levitra, Viagra, etc.) within the last 24-72 hours, head injury, systolic bp <100, cerebral stroke or hemorrhage, extreme bradycardia or tachycardia, Rt ventricular infarction, volume depletion
**Onset/Duration:** Onset 1-3 min and Duration 30-60 min

**Dose/Route:**

Adult: 0.4 mg SL or spray may administer up to three total doses for 1.2 mg

Peds: Not recommended in prehospital setting

**Side Effects:** Headache, hypotension, palpitations, dizziness, reflex tachycardia, nausea/vomiting, postural syncope, diaphoresis, sublingual burning sensation

**Note:** Ntg must be kept in an airtight container and, if exposed to light, air or heat, it decomposes which is why most pt’s own prescription doesn’t relieve their symptoms since pt’s need to refill every 30 days if opened/used.

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**Nitro-Paste (Nitro-Bid Ointment)**

**Class:** Vasodilator, Nitrate

**Action:** Nitroglycerin is an organic nitrate and potent vasodilator. It relaxes vascular smooth muscle resulting in coronary artery dilation while also reducing blood pressure, preload, afterload, and myocardial oxygen demand.

**Indications:** Typically given for ACS and chest pain with an associated acute myocardial infarction

**Contraindications:** Hypersensitivity, pt’s that have taken erectile dysfunction drugs (Cialis, Levitra, Viagra, etc.) within the last 24-72 hours, head injury, systolic bp <100, cerebral stroke or hemorrhage, extreme bradycardia or tachycardia, Rt ventricular infarction, volume depletion

**Onset/Duration:** Onset 15-60 min and Duration 2-12 hr

**Dose/Route:**

Adult: 1-2 inches applied to skin (usually the chest) that is free of hair. Applied with Nitro-Paste paper or other transdermal application paper/tape

Peds: Not recommended in the prehospital setting

**Side Effects:** Headache, hypotension, palpitations, dizziness, reflex tachycardia, nausea/vomiting, postural syncope, diaphoresis, sublingual burning sensation
**Note:** Nitro-Paste contains 2% nitroglycerin in an absorbent paste and is applied to the pt’s skin to be absorbed through the skin (transdermal). Typically paste is administered in the pre-hospital setting during longer ground transport times.

**Nitrous Oxide (Nitronox)**

**Class:** Gaseous analgesic, anesthetic

**Action:** Nitrous Oxide is a blended mixture of 50% nitrous oxide and 50% oxygen. When inhaled it depresses the CNS causing anesthesia. Due to be administered with high oxygen concentrations it also increases oxygen tension in the blood thereby reducing hypoxia.

**Indications:** Traumatic musculoskeletal injury, burns, moderate to severe pain

**Contraindications:** Altered LOC, hypotension, chest trauma (pneumothorax), COPD, Abdominal pain or injury, head injury, bowel obstruction

**Onset/Duration:** Onset: 2-5 min and Duration: 2-5 min

**Dose/Route:**

- Adult: Self administered by pt via held mask or mouthpiece until effects are felt
- Peds: Same as adult

**Side Effects:** Altered LOC, dizziness, nausea/vomiting, malignant hypertension (rare but serious)

**Note:** Must be mixed 50% Nitrous Oxide and 50% Oxygen, If 100% Nitrous Oxide is administered the patient will become hypoxic and die. Pt MUST be able to hold mask/mouthpiece on their own to administer!

**Ondansetron (Zofran)**

**Class:** Antiemetic

**Action:** First selective serotonin blocking agent to be marketed. Blocks the serotonin 5-HT3 receptors that are found centrally in the chemoreceptor trigger zone and peripherally at the vagal nerve terminals in the intestines which in turn minimizes nausea and vomiting.

**Indications:** Nausea and vomiting
**Contraindications:** Hypersensitivity, GI obstruction, and use caution with liver disease pt’s

**Onset/Duration:** Onset: 15-30 min and Duration: 3-6 hr

**Dose/Route:**

- Adult: 4mg IV/IO/IM
- Peds: 0.15mg/kg IV/IO/IM – use in children still controversial

**Side Effects:** Generally well tolerated but can cause ECG irregularities (rare), dizziness, headache, hiccups, pruritus, chills, drowsiness

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**Oxygen (O2)**

**Class:** Gas

**Action:** Odorless, tasteless, colorless gas that is present in room air at 21% concentration. Oxygen enters the body through the respiratory system and is transported to the body tissues for energy. Emergency use to reverse hypoxemia and, in doing so, helps oxidize glucose to produce adenosine triphosphate (aerobic metabolism).

**Indications:** Hypoxia, hypoperfusion, ischemic chest pain, respiratory insufficiency, suspected stroke, confirmed/suspected carbon monoxide poisoning, cardiac insufficiency or arrest

**Contraindications:** None in the prehospital emergency setting

**Onset/Duration:** Onset: Immediate and Duration: Less than 2 min

**Dose/Route:**

- Adult: 1-4 lpm via nasal cannula and 10-15 lpm via nonrebreather mask
- Peds: Same as adult but using age appropriate sized devices

**Side Effects:** nausea/vomit, irritation to respiratory tract

**Note:** Administer and titrate to maintain a minimum SpO2 of 94%
**Oxytocin (Pitocin)**

**Class:** Hormone

**Action:** Oxytocin is a natural hormone secreted by the posterior pituitary gland. Oxytocin promotes contraction of the uterus and promotes milk ejection.

**Indications:** Post-partum hemorrhage

**Contraindications:** Hypersensitivity, baby hasn’t delivered

**Onset/Duration:** Onset immediate; Duration 1 hour

**Dose/Route:** Adult: 40 units diluted in 1000 mL Normal Saline titrated to control bleeding

Peds: Not recommended

**Side Effects:** Hypotension, tachycardia, chest pain/coronary artery spasm, cardiac dysrhythmias, hypertension

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**Pralidoxime (2-Pam)**

**Class:** Cholinesterase reactivator and antidote

**Action:** Pralidoxime reactivates the enzyme acetylcholinesterase which allows acetylcholinesterase to be degraded, thus relieving the parasympathetic overstimulation caused by excess acetylcholine as seen in organophosphate poisoning.

**Indications:** Organophosphate poisoning

**Contraindications:** Hypersensitivity

**Onset/Duration:** Onset: within minutes and Duration: Variable depending on amount poison exposed to

**Dose/Route:**

Adult: 600mg IM or 1-2 g IV over 15-30 min

Peds: 20-50mg/kg IV over 15-30 min

**Side Effects:** Tachycardia, hypertension, laryngospasm, hyperventilation, nausea, weakness
**Note:** Should be given concurrently with Atropine. Commonly seen in the prehospital setting packaged with atropine in DuoDote or Mark 1 autoinjector kits.

**Procainamide**

**Class:** Antidysrhythmic (Class 1A)

**Action:** Suppresses phase 4 depolarization in normal ventricular muscle and Purkinje fibers, reducing the automaticity of ectopic pacemakers. Suppress reentry dysrhythmias by slowing intraventricular conduction.

**Indications:** Stable V-Tach, reentry SVT not controlled by adenosine/vagal maneuvers, A-Fib with a rapid rate with WPW syndrome

**Contraindications:** 2nd & 3rd degree heart blocks without a functioning artificial pacemaker in place, digitalis toxicity, torsades de pointes, tricyclic antidepressant overdose

**Onset/Duration:** Onset: 10-30 min and Duration: 3-6 hr

**Dose/Route:**

- **Adult:** 20 mg/min slow IV infusion drip with a total dose of 17 mg/kg. Maintenance drip post cardiac arrest of 1 gm in 250 ml D5W or NS and infuse at 1-4 mg/min

- **Peds:** Oading dose 15 mg/kg IV/IO and infuse over 30-60 min

**Side Effects:** Hypotension, bradycardia, reflex tachycardia, AV block, widening QRS complex, prolonged P-R or QT interval, PVC’s, V-Tach/V-Fib/Asystole, seizures, CNS depression

**Note:** Stop use IMMEDIATELY for the following: reached max of 17 mg/kg, QRS widens >50%, dysrhythmia resolves, and pt becomes hypotensive

**Promethazine (Phenergan)**

**Class:** Phenothiazine, antihistamine, antiemetic

**Action:** Promethazine is an H1 receptor antagonist that blocks the actions of histamine by competitive antagonism at the H1 receptor. Promethazine also acts as an antiemetic and sedative agent with some anticholinergic properties.
**Indications:** Nausea and vomiting, motion sickness, to potentiate the effects of analgesics, pre/post Op obstetrical sedative, allergic reactions

**Contraindications:** Hypersensitivity, CNS depression or coma, CNS depression from alcohol, barbiturates, or narcotics, signs associated with Reyes syndrome. Use with caution in pt’s with asthma, peptic ulcer disease, and bone marrow depression.

**Onset/Duration:** Onset: Rapid by IV and Duration 4-6 hr

**Dose/Route:**
- Adult: 12.5 – 25mg IV diluted in 10cc Normal Saline with doses of 25 mg or less given over 10-15 min. IM doses can be given undiluted
- Peds: Not recommended in prehospital setting since can cause hallucinations, seizures, and death in children

**Side Effects:** Sedation, dizziness, hypotension, dystonias/EPS reaction, hallucinations, dysrhythmias, phlebitis, hyperexcitability

**Note:** If dystonias/EPS reaction occurs administer Diphenhydramine.

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**Sodium Bicarbonate**

**Class:** PH buffer, alkalizing agent, electrolyte supplement

**Action:** Sodium bicarbonate is a short acting, potent acid buffer. The bicarbonate (HCO3) binds to hydrogen ions (H+) to make carbonic acid (H2CO3). This is broken down in the lungs and exhaled has water (H2O) and carbon dioxide (CO2). As a plasma hydrogen ion concentration decreases causing blood pH to rise.

**Indications:** Tricyclic antidepressant (TCA) overdose, management of metabolic acidosis, prolonged cardiac arrest down time, known preexisting hyperkalemia, DKA, alkalinization treatment for specific intoxications/rhabdomyolysis

**Contraindications:** Hypokalemia, suspected metabolic and respiratory alkalosis, hypokalemia, hypernatremia, pt’s with chloride loss due to vomiting and GI suction, severe pulmonary edema

**Onset/Duration:** Onset: 2-10 min and Duration 30-60 min
**Dose/Route:**

Adult: 1mEq/kg IV

Peds: Same as adult but infuse slowly and only if ventilations are adequate

**Side Effects:** Metabolic alkalosis, seizures

**Note:** Should not be given at the same time as other electrolytes, be sure to flush IV thoroughly or use separate IV sites. Not recommended for and ineffective in hypercarbic acidosis such as seen in cardiac arrest and CPR without intubation

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**Succinylcholine (Anectine)**

**Class:** Depolarizing neuromuscular blocker

**Action:** Succinylcholine is a short acting, depolarizing neuromuscular blocking agent that binds to acetylcholine receptor sites. This produces complete muscle paralysis but since it is a depolarizing agent it causes fasciculations and muscular contractions making it the drug of choice for rapid sequence induction aka chemically assisted endotracheal intubation.

**Indications:** To facilitate endotracheal intubation, terminate laryngospasm, muscle relaxation

**Contraindications:** Hypersensitivity, burns or trauma in the first 12 hr, skeletal muscle myopathies, inability to control the airway or support ventilations with O2 and positive pressure (BVM), family or personal history of malignant hyperthermia, allergic reaction, rhabdomyolysis, narrow-angle glaucoma or intraocular (global rupture) injuries. Use with caution in pt’s that may have hyperkalemia (renal failure, trauma/burns, crush injury etc.) since use of Succs can exacerbate potassium levels.

**Onset/Duration:** Onset: less than 1min and Duration: 5-10 min

**Dose/Route:**

Adult: 1-1.5 mg/kg IV/IO for RSI

Peds: 1-1.5mg/kg IV/IO for RSI

Infants: 2 mg/kg IV/IO for RSI
**Side Effects:** Fasciculations, bradycardia, hypotension, tachycardia, hypertension, dysrhythmias, malignant hyperthermia, hyperkalemia, respiratory depression, excessive salivation, hyperkalemia

**Note:** Although after administering Succinylcholine it may appear that the patient is not conscious, Succs has NO effect on the central nervous system, so the patient will be completely aware of procedures unless appropriate sedation is also given.

**Thiamine (Betaxin)**

**Class:** Vitamin (B1)

**Action:** Thiamine is also known as vitamin B1. Thiamine combines with adenosine triphosphate to form thiamine pyrophosphate, a coenzyme necessary for carbohydrate metabolism. The brain is especially sensitive to thiamine deficiency.

**Indications:** Hypoglycemia with malnourishment or suspected alcoholism, delirium tremors, Wernicke’s encephalopathy

**Contraindications:** None in the emergency prehospital setting

**Onset/Duration:** Onset: Rapid by IV, 5-15 min if given IM and Duration: variable depending on degree of deficiency

**Dose/Route:**

- Adult: 100mg slow IV or IM
- Peds: Not recommended in the prehospital setting

**Side Effects:** Hypotension (if given rapidly or too large a dose), nausea/vomiting, anxiety, diaphoresis

**Vasopressin (Pitressin)**

**Class:** Naturally occurring antidiuretic hormone, vasopressor

**Action:** Directly stimulates smooth muscle of V1 receptors. When given in high doses it acts as a nonadrenergic peripheral vasoconstrictor.
**Indications:** Cardiac arrest as an alternative to either the 1st or 2nd dose of Epinephrine, vasodilatory shock

**Contraindications:** None for cardiac arrest. Coronary artery disease in responsive pt’s

**Onset/Duration:** Onset: immediate and Duration: variable depending on cause of cardiac arrest

**Dose/Route:**

- Adult: 40 units IV/IO in Cardiac arrest replacing wither the 1st or 2nd dose of Epinephrine
- Peds: Not recommended typically but can be given at 0.4-1.0 unit/kg IV/IO

**Side Effects:** Hypertension, tachycardia, ischemic chest pain, abdominal distress, diaphoresis, nausea and vomiting, bronchial contraction, uterine contractions, tremors

**Note:** May increase peripheral vascular resistance and provoke cardiac ischemia and angina so NOT recommended for pt’s with coronary artery disease (CAD).