SALT LAKE CITY FIRE DRUG CARDS

- Acetaminophen
- Adenosine
- Albuterol
- Amiodarone
- Aspirin
- Atropine
- Buprenorphine
- Dextrose 10%
- Diphenhydramine
- EPI 1:1,000
- EPI 1:10,000
- EPI Drip
- EPI Push Dose
- Fentanyl
- Glucagon
- Ibuprofen
- Ipatropium Bromide/ Albuterol(DuoNeb)
- Ketamine-Pain
- Ketamine-Sedation
- Lidocaine
- Midazolam-Sedation
- Midazolam-Seizures
- Morphine
- Naloxone
- Nitroglycerin
- Normal Saline
- Ondansetron
- Oral Glucose
- Oxygen
- Sodium Bicarbonate
- Tranexamic Acid (TXA)

*Click on drug name to be taken to the drug card.

Acetaminophen
(Tylenol®)

Onset: ~ 30 Minutes
Peak: 30-60 Minutes
Duration: 4-6 Hours

SUPPLIED: 160 mg / 5 mL bottle

Adult Dose

Route	Dose
PO	500-1,000 mg (max 1,000 mg)

Pediatric Dose

Route	Dose
PO	15 mg/kg (max 650 mg)

Indications
- For temporary relief and management of mild to moderate pain and fever.

Contraindications
- Hypersensitivity to acetaminophen.
- Known liver disease.
- Severe hepatic impairment.

Precautions
- To avoid overdose: Do not administer if used within the last 4 hours.
- Do not exceed the maximum recommended daily dose: 1,000 mg daily in adults and >75 mg/kg daily in pediatric patients.

*Maximum recommended daily dose of acetaminophen includes all routes of administration and all acetaminophen-containing products administered, including combination products.

Adverse Effects
- Gastric irritation (rare).
- Overdose can lead to liver failure, which can be fatal. Symptoms of overdose may include: nausea, vomiting, confusion, and abdominal pain.

Notes
- Acetaminophen is used as a first-line treatment for mild to moderate pain and fever. It has a wide margin of safety when dosed properly but can cause liver damage in overdose or in patients with existing liver dysfunction.

Pharmacology and Actions
Class: Non-narcotic Antipyretic and Analgesic (Not NSAID).
- Acts on the hypothalamic heat-regulating center to reduce fever and elevates the pain threshold, causing analgesia.
- Inhibits prostaglandin synthesis and has a central mechanism possibly involving indirect inhibition of COX-2.

Adenosine
(Adenocard®)

Onset: Seconds
Peak: 5-10 Seconds
Duration: <10 seconds

SUPPLIED: 6mg/2mL (1 Vial)

Adult Dose

Route	Dose
IV/IO	6 mg rapid push followed immediately by a rapid flush of 20 mL of NS. Repeat: after 1-2 min. give 12 mg if 1st dose is ineffective

Pediatric Dose

Route	Dose
IV/IO	0.1 mg/kg (max 6 mg) rapid push followed immediately by a rapid flush of 10 mL of NS. Repeat: after 1-2 min. give 0.2 mg/kg (max total 12 mg) if 1st dose is ineffective

Indications
- Used to convert hemodynamically stable, narrow complex, regular tachycardia with a pulse.

Contraindications
- Heart transplant patients.
- Acute bronchospasm.
- Atrial fibrillation with underlying Wolff-Parkinson-White (WPW) Syndrome.
- Second or third degree heart block sick sinus syndrome or symptomatic bradycardia.
- Unstable patient with SVT should be treated with synchronized cardioversion.

Precautions
- Could produce bronchoconstriction in patients with asthma.
- Patients who develop high-level heart block after a single dose should not receive additional doses.
- Use with caution in patients receiving digoxin and verapamil in combination.
- Therapeutic levels of theophylline and methylxanthines affect the response of adenosine, Dipyridamole potentiates its effect.

Adverse Effects
- Chest pain, hypotension, bradycardia, asystole, palpitations, dyspnea, lightheadedness, blurred vision, metallic taste, headache, PVCs.
- Paresthesia, diaphoresis, flushing, shortness of breath, transient periods of sinus bradycardia, sinus pause or asystole, ventricular ectopy, chest pressure, and nausea.

Notes
- Monitor cardiac rhythm continuously during administration.
- Due to its short duration of action, be prepared for rapid changes in heart rate and have resuscitation equipment ready.

Pharmacology and Actions
Class: Antiarrhythmic
- Adenosine is a naturally occurring nucleoside that acts on the AV node to slow conduction and inhibit reentry pathways, which is useful in paroxysmal supraventricular tachycardia (PSVT). It is rapidly metabolized with a half-life of less than 5 seconds.
- Slows conduction through the AV node. Most cases of PSVT involve AV nodal reentry, and adenosine is capable of interrupting the AV nodal circuit and stopping the tachycardia, restoring normal sinus rhythm.

Albuterol
(Ventolin®)

Onset: 5-15 Minutes
Peak: 1-1.5 Hours
Duration: 3-6 Hours

SUPPLIED: 2.5 mg in bullets or multi-dose bottles.

Adult Dose

Route	Dose
Neb	2.5 mg/3 mL NS Repeat: q 10 min. as needed

Pediatric Dose

Route	Dose
Neb	2.5 mg/3 mL NS

Indications
- Respiratory distress due to asthma, COPD, and bronchial spasm in patients with reversible obstructive airway disease.

Contraindications
- Hypersensitivity to albuterol.
- Symptomatic tachycardia, hypertension.
- Acute myocardial infarction/angina.

Precautions
- May not reach bronchioles in severe bronchial spasm: consider IM epinephrine.
- Observe for arrhythmias. Stop treatment if frequent PVCs develop or if tachyarrhythmias other than sinus tachycardia appear or if heart rate increases by more than 20 bpm.
- Paradoxical bronchial spasm may occur with excessive administration.
- A decrease in oxygen saturation often occurs following administration due to V/Q mismatch. However, consider pneumothorax or worsening bronchospasm if accompanied by an increase in work of breathing.
- Interactions with MAO inhibitors and tricyclic antidepressants may potentiate the action on the cardiovascular system. Propranolol and other beta-blockers can inhibit the effect of albuterol.

Adverse Effects
- Common side effects include: restlessness, apprehension, dizziness, palpitations, tachycardia, and dysrhythmias.
- Albuterol should be used cautiously in patients with cardiovascular disorders due to the potential for significant arrhythmias.

Notes
- Overuse of albuterol may lead to decreased effectiveness and an increase in side effects, including potential worsening of asthma symptoms.

Pharmacology and Actions
Class: Bronchodilator
- Albuterol is a relatively selective beta-2 adrenergic bronchodilator that relaxes bronchial smooth muscle, resulting in bronchial dilation. It has some beta-1 overlap with clinically significant cardiac effects such as tachycardia.

Amiodarone
(Cordarone®)

Onset: 1-2 Minutes
Peak: 10 Minutes
Duration: Varies

SUPPLIED: 150 mg/ 3mL (1 vial)

Adult Dose

Route	Dose
IV/IO	300 mg Repeat: after 5 min at 150 mg (max total 450 mg)

Pediatric Dose

Route	Dose
IV/IO	5 mg/kg (max single dose 300 mg) Repeat: q 5 min. up to 2x to max dose (max total 450 mg)

Indications
- Used in cases of ventricular fibrillation or pulseless ventricular tachycardia not responsive or recurrent after third shock.
- Also indicated for regular and irregular wide complex tachycardia with a pulse.

Contraindications
- Amiodarone allergy.
- Second or third degree AV blocks.
- No contraindications in cardiac arrest.
- Severe Hypotension/Cardiogenic Shock

Precautions
- May cause hypotension and bradycardia.
- Use with caution in patients with thyroid disorders due to iodine content.
- Amiodarone will precipitate if administered in the same IV line as sodium bicarbonate.
- Non-cardiac toxicities are usually related to chronic administration and include pulmonary infiltrates, hepatic and/or thyroid dysfunction, and peripheral neuropathy.

Adverse Effects
- In perfusing patients, Amiodarone may cause hypotension, prolonged QT interval, proarrhythmic effects (Torsades and ventricular fibrillation), severe bradycardia, and atrioventricular block.
- Visual distrubances
- Skin discoloration (blue-gray tint, particularly in areas exposed to sunlight)

Notes

Pharmacology and Actions
Class: Antiarrhythmic Agent
- Amiodarone has multiple effects on sodium, potassium, and calcium channels. It prolongs action potential and repolarization, decreases AV conduction and sinus node function, and has some alpha- and beta-adrenergic blocking properties.
- Amiodarone prolongs the phase 3 of the cardiac action potential, thereby prolonging the cardiac refractory period without significantly affecting resting membrane potential.

Aspirin
(Acetylsalicylic Acid, ASA)

Onset: 15-30 Minutes
Peak: 1-2 Hours
Duration: 4-6 Hours

SUPPLIED: 81 mg chewable tablets

Adult Dose

Route	Dose	Notes
PO	324 mg (4 x 81 mg tablets) - chewed	Give full dose even if pt has taken a regularly prescribed dose of aspirin.

Pediatric Dose

Route	Dose	Notes
	*Not for use in pediatric patients.	

Indications
- Adult patients with suspected acute coronary syndrome (ACS).
- Acute coronary syndrome/cardiac chest pain.

Contraindications
- Active gastrointestinal (GI) bleeding.
- Known allergy to aspirin (salicylates).
- Pregnant or having bleeding disorders.
- Current ulcer or GI bleeding.
- Suspected aortic dissection.
- Not to be used in children due to the risk of Reye's Syndrome.

Precautions
- Patients with a history of bleeding disorders.
- Patients currently taking Coumadin (Warfarin sodium).

Adverse Effects
- May cause heartburn, gastrointestinal discomfort, nausea, and vomiting.
- May induce wheezing in sensitive individuals.
- In overdose, aspirin can cause tinnitus (ringing in the ears), respiratory alkalosis, metabolic acidosis, and cardiovascular collapse.

Notes
- Delays clotting mechanism, increasing the risk of bleeding, especially when used with other anticoagulants.

Pharmacology and Actions
Class: Antiplatelet, Non-Steroidal Anti-Inflammatory Drug (NSAID)
- Aspirin inhibits cyclooxygenase-1 and -2 (COX-1 and COX-2) enzymes, which results in decreased formation of prostaglandins and thromboxanes (particularly A2). This action provides anti-inflammatory, analgesic, antipyretic, and antiplatelet effects.

Atropine Sulfate

Onset: Immediate
Peak: 2-4 Minutes
Duration: ~ 4 Hours

SUPPLIED: 1 mg/ 10 mL pre-filled syringe

Adult Dose

Route	Dose
IV/IO	**Bradycardia:** 1 mg Repeat: q 3-5 min. as needed (max total 3 mg)
IV/IM	**Organophosphate Poisoning:** 2 mg (rapid IV preferred) Repeat: q 10 min. until symptoms stabilize: Bronchorrhea, bronchoconstriction, and bradyarrhythmias

Pediatric Dose

Route	Dose	Notes
IV/IO	**Bradycardia:** 0.02 mg/kg (max single dose 0.5 mg) Repeat: q 3-5 min. as needed until max dose. (max total: 1 mg for child & 2 mg for adolescent)	If infant HR drops below 60 & poor perfusion, start CPR.
IV/IM	**Organophosphate Poisoning:** Contact OLMC	

Indications

- Symptomatic bradycardia.
- Nerve agent/organophosphate and carbamate insecticide toxicity.

Contraindications

- Tachycardia, glaucoma, Masthenia Gravis.
- Not indicated in neonatal resuscitation.
- Atrial fibrillation and atrial flutter because increased conduction may speed ventricular rate excessively.
- Hypothermic bradycardia.

Precautions

- Increases myocardial oxygen demand.
- Do not use pupil dilation as an indicator of response to treatment.
- Bradycardia in the setting of an acute myocardial infarction is common and probably beneficial. Do not treat unless there are signs of poor perfusion (low blood pressure and mental confusion).
- Paradoxical bradycardia may result from doses less than 0.5 mg; use caution in pediatric patients.

Adverse Effects

- Increased heart rate, increased blood pressure, ventricular tachycardia, ventricular fibrillation, headache, dry mouth, dilated pupils, blurred vision, constipation, urinary retention.

Notes

- Atropine blocks cholinergic (vagal) influences already present. If there is little cholinergic stimulation present (i.e., high-grade conduction block due to age-related fibrosis of the conduction system), effects will be minimal.

Pharmacology and Actions

Class: Vagolytic/Parasympatholytic.

- Blocks action of acetylcholine as a competitive antagonist at muscarinic receptor sites in smooth muscle, secretory glands, and the CNS.
- Increases heart rate, enhances conduction through AV node, and decreases motility and tone of the GI tract.

Buprenorphine
(Suboxone®)

Onset: Variable
Peak: 1 hr 40 min
Duration: 28-37 Hours

SUPPLIED: 8mg buprenorphine/2mg naloxone sublingual strip

Adult Dose

Route	Dose
PO	2 strips (16 mg buprenorphine/4mg naloxone) - Sublingual Repeat: after 10-15 min. if still symptomatic, give 1 strip (8mg buprenorphine/2mg nalaxone) (max total 3 strips)

Pediatric Dose

Route	Dose
	*Not for use in pediatric patients.

Indications
- Experiencing acute withdrawal symptoms.
- 18 years or older with Glascow coma score of 15.
- Has Clinical Opiate Withdrawal Score (COWS) of 5 or higher.

Contraindications
- Methadone use within 72 hours.
- Obvious evidence of intoxication with other substaces such as benzodiazepines or alchohol; which may defeat the purpose of buprenorphine use.

Precautions
- Caution should be exercised in patients with respiratory depression and gastrointestinal obstruction.

Adverse Effects
- Can worsen withdrawal symptoms if patients last dose of methodone was taken within 72 hours. (Tachycardia, sweating, restlessness, dilated pupils, joint aches, runny nose, gooseflesh, tremors, yawning, anxiety)
- Exerts some anticholinergic-like effects and may cause CNS depression, hypotension, QT prolongation, and lower seizure threshold.

Notes
- Patients may receive opiod pain medications for painful conditions if taking buprenorphine. May require increased dosing or switching to pain dose ketamine.
- COWS worksheet can be found in the run form.

Pharmacology and Actions
Class: Buprenorphine is a parital opiod agonist & naloxone is a full opiod antagonist.
- Buprenorphine exhibits high-affinity binding to the mu-opioid receptors and slow-dissociation kinetics, which results in milder and less uncomfortable withdrawal symptoms for the patient.
- When compounded with naloxone in sublingual formulations it prevents dissolution and injection.

Dextrose 10%
(D10)

Onset: < 1 Minute
Peak: Variable
Duration: Variable

SUPPLIED: 25 grams/ 250 mL bag

Adult Dose

Route	Dose	Notes
IV/IO	125 mL - Retest BG after 3-5 min. Repeat: 125 mL If retested BG <70 up to 1x	125 mL initial dose is shown to bring most pts to normal BG range.

Pediatric Dose

Route	Dose	Notes
IV/IO	5 mL/kg (max 125 mL) Repeat: as needed up to max dose	

Indications
- Hypoglycemia (blood glucose <60 mg/dL for adults, pediatrics, and <40 mg/dL for infants).
- Provision of carbohydrate calories in patient with adequate fluid intake but requiring additional calories.

Contraindications
- Intracerebral hemorrhage (hemorrhagic CVA).
- Hypersensitivity to corn or corn products (as dextrose is derived from corn).

Precautions
- Monitor for signs of fluid overload during administration, especially in patients with renal impairment or heart failure.
- If extravasation occurs, immediately stop administration to prevent tissue necrosis.
- Use with caution in patients with known or suspected hyperglycemia-related conditions such as stroke or myocardial infarction.

Adverse Effects
- Possible local venous irritation at the infusion site.
- Excessive administration can lead to significant hypokalemia.
- Hyperglycemia from excessive doses can complicate or exacerbate certain medical conditions.

Notes
- Should be administered slowly to prevent potential complications such as osmotic diuresis.

Pharmacology and Actions
Class: Carbohydrate
- Dextrose is the principle form of glucose used in the body for energy production. It increases blood glucose levels and is utilized quickly by tissues.

Diphenhydramine
(Benadryl®)

Onset: Immediate
Peak: 1-3 Hours
Duration: 4-6 Hours

SUPPLIED: 50 mg/ 2 mL (1 vial)

Adult Dose

Route	Dose
IV/IM/IO	50 mg (max 50 mg)

Pediatric Dose

Route	Dose
IV/IM/IO	6+ Months: 1 mg/kg (max 50 mg) *Do not use for patients <6 months

Indications
- Treatment of allergic reactions.
- Treatment or prevention of acute dystonic reactions to antipsychotic drugs.
- Second-line drug in anaphylaxis and severe allergic reactions (after epinephrine).
- Mild allergic skin reactions (without epinephrine).

Contraindications
- Known hypersensitivity to diphenhydramine or any component of the formulation.
- Newborns and nursing mothers due to presence of benzyl alcohol in some formulas.
- Patients taking Monoamine Oxidase Inhibitors (MAOI).

Precautions
- May have additive sedation effect with alcohol or other CNS depressants.
- Use with caution in patients with a history of bronchial asthma.
- Can cause hypotension, especially when given IV.
- IV administration should be secure to prevent infiltration, which causes tissue necrosis.
- Use with caution in elderly patients and those with conditions like glaucoma, hyperthyroidism, cardiovascular disease, and hypertension.

Adverse Effects
- Local venous irritation at the injection site.
- May cause thickened bronchial secretions and wheezing.

Notes
- May cause paradoxical excitement in children.

Pharmacology and Actions
Class: Antihistamine, anticholinergic agent.
- Blocks the effects of histamine at the H1 receptor sites in the respiratory tract, blood vessels, and gastrointestinal (GI) smooth muscle, reducing muscle spasms in the bronchi and GI tract as well as salivation and other secretions.
- Has anticholinergic actions which make it useful in treating or preventing acute dystonic reactions to antipsychotic drugs (e.g. Haldol®, Thorazine®, Compazine®, Inapsine®), which include oculogyric crisis, acute torticollis, and facial grimacing.

Epinephrine
(Epi 1:1,000)

Onset: Rapid
Peak: 5-10 Minutes
Duration: 20-30 Min.

SUPPLIED: Multi-dose Vial

Adult Dose

Route	Dose
IM Anaphylaxis	0.5 mg (0.5 mL) Repeat: q 5 min. as needed.
IM Cardiac	5 mg (5 mL)
IM/Neb Respiratory	**IM:** 0.5 mg (0.5 mL) Repeat: q 20 min. as needed. **Neb:** 2 mg/3 mL NS (use for stridor)

Pediatric Dose

Route	Dose
IM Anaphylaxis	0.01 mg/kg (0.01 mL/kg, max 0.3 mg) Repeat: q 5 min. as needed.
IM Cardiac	0.1 mg/kg (0.1 mg/mL, max 5 mg)
IM/Neb Respiratory	**IM:** 0.01 mg/kg (0.01 mL/kg, max 0.3 mg) Repeat: q 20 min. as needed. **Neb:** 2 mg/3 mL NS (use for stridor)

Indications
- Severe allergic reaction/anaphylaxis.
- Severe asthma or respiratory distress due to bronchoconstriction.
- Used for cardiac arrest for non-shockable rhythms or after first shock if it failed to produce a pulse. *Epi 1:10,000 concentration should be used if IV/IO is already established.

Contraindications
- Ventricular tachycardia.
- Severe hypertension.
- None for cardiac arrest or life threatening anaphylaxis

Precautions
- Pregnant females, cardiovascular disease, hyperthyroid disease.
- Inactivated by alkaline solutions (e.g. sodium bicarbonate).

Adverse Effects
- Can cause tachycardia, peripheral vasoconstriction, palpitations, hypertension, and increased myocardial oxygen demand.
- CNS effects include anxiety.
- May have additive effects with alcohol or other CNS depressants.

Notes
- Ensure appropriate injection technique to avoid injection into a blood vessel.

Pharmacology and Actions
Class: Sympathomimetic catecholamine
- Increases peripheral vascular resistance via alpha-1 receptors, cardiac rate, and output via beta-1 receptors; induces bronchodilation via beta-2 receptors.
- Epinephrine stimulates alpha, beta-1, and beta-2 adrenergic receptors, leading to bronchodilation, increased heart rate, stroke volume, cardiac output, and vasoconstriction, which elevates blood pressure and reduces airway swelling.

Epinephrine
(Epi 1:10,000)

Onset: Immediate
Peak: Rapid
Duration: Variable

SUPPLIED: 1 mg/ 10 mL pre-filled syringe

Adult Dose

Route	Dose	Notes
IV/IO	1 mg (max 3 doses) Repeat: q 3-5 min. as needed up to the max dose	Avoid using same access as sodium bicarbonate.

Pediatric Dose

Route	Dose	Notes
IV/IO	0.01 mg/kg (max 3 doses) **Newborn:** 0.01-0.03 mg/kg Repeat: q 3-5 min as needed up to the max dose	Avoid using same access as sodium bicarbonate.

Indications
- Cardiac arrest (asystole, pulseless electrical activity, ventricular fibrillation, pulseless ventricular tachycardia).

Contraindications
- None in cardiac arrest settings.

Precautions
- Can increase cardiac workload and oxygen demand.
- Avoid mixing with alkaline solutions such as sodium bicarbonate as it can be inactivated.

Adverse Effects
- Cardiovascular: Hypertension, tachycardia, palpitations, potential for arrhythmias.
- Central nervous system: Anxiety, tremulousness, headaches.

Notes
- Monitor for rhythm changes.

Pharmacology and Actions
Class: Sympathomimetic catecholamine
- Increases peripheral vascular resistance via alpha-1 receptors, cardiac rate, and output via beta-1 receptors; induces bronchodilation via beta-2 receptors.
- Epinephrine acts on both alpha and beta-adrenergic receptors, resulting in increased cardiac contractility, vasoconstriction, and relaxation of the bronchial smooth muscle. It is crucial for reversing the effects of cardiac arrest.

Epinephrine Drip

Onset: Immediate
Peak: Variable
Duration: Infusion Time

How To Mix: 4 mg (mL) of Epi 1:1 in 1000 mL bag NS

Alternative: 0.4 mg (mL) of Epi 1:1 in 100 mL bag NS

Adult Dose

Route	Dose	Notes
IV/IO	2-10 mcg/min. Bag concentration is 4 mcg/mL. Titrate to effect, SBP of >90 or MAP >65.	Using a 60 GTTS drip set, 1 drop per second equals 4 mcg/min.

Pediatric Dose

Pediatric Alternative: 0.6 mg (mL) of Epi 1:1 in 100 mL bag NS = (6 mcg/mL)

Route	Dose	Notes
IV/IO	0.1-1 mcg/kg/min. Titrate to effect.	Using a 60 GTTS drip set with bag concentration of 6 mcg/mL, you will give 1 drop per minute per kilogram. 0.1 mcg/drop.

Indications

- Bradycardia after atropine and transcutaneous pacing (TCP) are ineffective.
- Persistent hypotension after fluid rehydration.
- Cardiogenic shock, septic shock, and other forms of shock.

Contraindications

- Tachydysrhythmias
- Hypovolemia

Precautions

- Correct hypovolemia with adequate volume replacement before administering epinephrine drip.
- Epinephrine is inactivated by alkaline solutions (e.g. sodium bicarbonate) when used in the same IV line.
- Use in pregnant females, those with cardiovascular disease, or hyperthyroid disease should be carefully considered.

Adverse Effects

- Central Nervous System: Anxiety.
- Cardiovascular: Peripheral vasoconstriction, hypertension, tachycardia, arrhythmias, increased myocardial oxygen consumption.

Notes

- Dosage adjustments may be necessary based on the patient's response and tolerance.
- Epinephrine infusion requires precise control and monitoring equipment to avoid rapid dose changes that could be harmful.

Pharmacology and Actions

Class: Sympathomimetic catecholamine

- Increases peripheral vascular resistance via alpha-1 receptors, cardiac rate, and output via beta-1 receptors; induces bronchodilation via beta-2 receptors.
- Epinephrine acts on both alpha and beta-adrenergic receptors, causing increased cardiac output, heart rate, and myocardial oxygen consumption. It also induces peripheral vasoconstriction which elevates systemic vascular resistance and blood pressure, making it crucial for managing severe hypotension and shock.

Epinephrine Push Dose

Onset: Immediate
Peak: Variable
Duration: Short

How To Mix: Expel 9 mL of Epi 1:10 and fill to 10 mL with NS. 10 mcg/mL.

Adult Dose

Route	Dose
IV/IO	2-10 mcg Repeat: as needed to maintain a SBP >90 mmHg or MAP >65

Pediatric Dose

Route	Dose
IV/IO	1 mcg/kg (max 10 mcg) Repeat: as needed to maintain a SBP >70 + (age in years x 2) mmHg

Indications

- Bradycardia after atropine and transcutaneous pacing (TCP) are ineffective.
- Persistent hypotension after fluid rehydration.

Contraindications

- Tachydysrhythmias
- Hypovolemia

Precautions

- Correct hypovolemia with adequate volume replacement before administering epinephrine drip.
- Epinephrine is inactivated by alkaline solutions (e.g. sodium bicarbonate) when used in the same IV line.
- Use in pregnant females, those with cardiovascular disease, or hyperthyroid disease should be carefully considered.

Adverse Effects

- Central Nervous System: Anxiety.
- Cardiovascular: Peripheral vasoconstriction, hypertension, tachycardia, arrhythmias, increased myocardial oxygen consumption.

Notes

- Dosage adjustments may be necessary based on the patient's response and tolerance.
- Titrate dosing to maintain a systolic BP of at least 90 mmHg and a MAP of at least 65.

Pharmacology and Actions

Class: Sympathomimetic catecholamine

- Increases peripheral vascular resistance via alpha-1 receptors, cardiac rate, and output via beta-1 receptors; induces bronchodilation via beta-2 receptors.
- Epinephrine acts on both alpha and beta-adrenergic receptors, causing increased cardiac output, heart rate, and myocardial oxygen consumption. It also induces peripheral vasoconstriction which elevates systemic vascular resistance and blood pressure, making it crucial for managing severe hypotension and shock.

Fentanyl
(Sublimaze®)

Onset: Immediate
Peak: Rapid
Duration: 30-60 Min.

SUPPLIED: 100 mcg/ 2 mL (1 vial)

Adult Dose

Route	Dose	Notes
IV/IO IM/IN	25-100 mcg/kg (1 mcg/kg) Repeat: q 10 min. (max 200 mcg)	Administer slowly over 2-3 min.

Pediatric Dose

Route	Dose	Notes
IV/IM/IO	1 mcg/kg (max 50 mcg) Repeat: after 10-15 min. up to 1x	Administer slowly over 2-3 min.
IN	2 mcg/kg (max 100 mcg) Repeat: after 10-15 min. up to 1x	

Indications
- Management of severe pain from trauma, surgical procedures, myocardial infarction, and cancer.
- Used as part of anesthesia for invasive procedures.

Contraindications
- Hypersensitivity to fentanyl or any components of the formulation.
- Significant respiratory depression.
- Severe obstructive lung conditions.
- Use with caution in patients with bradycardia or severe hypotension.

Precautions
- Can cause respiratory depression, particularly when given rapidly or in large doses.
- Use with caution in patients taking other central nervous system depressants, such as alcohol, benzodiazepines, or antipsychotic medications.
- Naloxone (Narcan) should be available as an antidote for overdose situations.

Adverse Effects
- Common side effects include nausea, vomiting, bradycardia, confusion, and diaphoresis.
- Serious side effects may include severe respiratory depression, apnea, muscle rigidity, and bradycardia.

Notes

Pharmacology and Actions
Class: Opioid agonist-analgesic.
- Acts primarily by binding to the mu-opioid receptors in the central nervous system, altering the response to and perception of pain. It produces profound analgesia, sedation, and a sense of well-being.
- **Potency**: 50 to 100 times more potent than morphine.

Glucagon

Onset: 5-20 Minutes
Peak: ~ 30 Minutes
Duration: 1-2 Hours

SUPPLIED: 1 mg in a vial with a mixing solution either in vial or prefilled syringe

Adult Dose

Route	Dose	Notes
IM	1 mg (full dose of mixture).	

Pediatric Dose

Route	Dose	Notes
IM	1+ Year: 0.01 mg/kg (max 1 mg). *Do not use for patients <1 year	

Indications

- Known hypoglycemia when IV access is unavailable or in cases where a quick increase in blood sugar is needed.
- May be used in cases of beta blocker or calcium channel blocker overdose if symptoms of hypoglycemia and bradycardia are present.

Contraindications

- Hypersensitivity to glucagon or any component of the formulation.
- Ineffective in patients without adequate glycogen stores, such as those with chronic hypoglycemia, malnutrition, or adrenal insufficiency.
- Pheochromocytoma, as glucagon can stimulate the release of catecholamines from the tumor.

Precautions

- Use immediately after reconstitution and only if the solution is clear and free of particles.
- Not as effective as IV dextrose in raising blood glucose levels quickly; however, it is used when IV access cannot be established.
- Effectiveness may be reduced in patients with depleted glycogen stores such as those with prolonged fasting or adrenal insufficiency.

Adverse Effects

- Nausea, vomiting, and possible allergic reactions (rare).
- Rebound hypoglycemia can occur as the glycogen stores are depleted.

Notes

- To prevent recurrence of hypoglycemia: Patients should be instructed to consume carbohydrates as soon as they regain consciousness and are able to swallow.

Pharmacology and Actions

Class: Hormone, Antihypoglycemic

- Glucagon is a naturally occurring hormone that raises blood glucose levels by stimulating the conversion of glycogen to glucose in the liver (glycogenolysis). It is typically released naturally in response to low glucose levels.

Ibuprofen
(Advil, Motrin®)

Onset: 30-60 Minutes
Peak: ~ 2 Hours
Duration: 4-6 Hours

SUPPLIED: 120 mL bottle with 100 mg in 5 mL

Adult Dose

Route	Dose
PO	600 mg Repeat: q 6-8 hours

Pediatric Dose

Route	Dose
PO	6+ months: 10 mg/kg (max 600 mg) *Do not use for patients <6 months.

Indications
- Pain management, including that from inflammation, cramps, and injuries.
- Fever reduction in both adults and children.
- Management of inflammatory conditions such as arthritis.

Contraindications
- Should not be administered to patients with known allergies to ibuprofen or other NSAIDs, including aspirin.
- Contraindicated in patients with active gastrointestinal bleeding, significant renal impairment, or recent coronary artery bypass graft surgery.
- Not recommended for use in patients with aspirin-sensitive asthma.
- Severe heart failure, hepatic failure, or renal failure.

Precautions
- Ibuprofen should be used with caution in patients with a history of gastrointestinal issues, cardiovascular disease, or hepatic impairment.
- The safety and efficacy of oral ibuprofen are not established in infants <6 months of age. Contact OLMC for advice if a high-grade fever is present.

Adverse Effects
- Common side effects include gastrointestinal intolerance, potential nephrotoxicity, headache, and dizziness.
- May cause peripheral edema and platelet dysfunction.
- Extended use or overdosing can lead to gastrointestinal complications, renal damage, and other systemic effects.

Notes
- Patients should be advised to take ibuprofen with food or milk to minimize gastrointestinal side effects.
- Avoid use in the third trimester of pregnancy due to potential risk of fetal cardiovascular complications.

Pharmacology and Actions
Class: Non-Steroidal Anti-Inflammatory Drug (NSAID)
- Ibuprofen blocks the enzyme cyclooxygenase (COX), which is involved in the production of prostaglandins. It is effective in reducing inflammation, pain, and fever.
- Also it has antipyretic effects.

Ipatropium Bromide/Albuterol (DuoNeb®)

Onset: Minutes
Peak: 30-60 Minutes
Duration: 4-6 Hours

SUPPLIED: 2.5 mg Albuterol & 0.5 mg of Ipatropium Bromide in 3 ml solution.

Adult Dose

Route	Dose
NEB	3 mL bullet (max 1 bullet)

Pediatric Dose

Route	Dose
NEB	1+ year: 3 mL bullet (max 1 bullet) *Do not use for patients <1 year. *See*: *Albuterol*

Indications

- Symptomatic relief and prevention of bronchospasm associated with reversible obstructive airway diseases, such as asthma and COPD.

Contraindications

- Hypersensitivity to ipratropium bromide, albuterol sulfate, or any component of the formulation.
- Hypersensitivity to atropine or its derivatives.
- Congestive Heart Failure (CHF).

Precautions

- Use with caution in patients with cardiovascular disorders, hypertension, hyperthyroidism, or diabetes mellitus.
- Monitor for paradoxical bronchospasm.
- Caution in patients with narrow-angle glaucoma or prostatic hyperplasia.

Adverse Effects

- Common: Dry mouth, throat irritation, cough, tremor, headache, palpitations.
- Less common: Tachycardia, palpitations, urinary retention, blurred vision, dizziness.

Notes

Pharmacology and Actions

Class: Bronchodialator

- Ipratropium bromide: Anticholinergic agent that inhibits the action of acetylcholine on airway smooth muscle, leading to bronchodilation.
- Albuterol sulfate: Beta-adrenergic agonist that stimulates beta-2 receptors in the lungs, resulting in relaxation of bronchial smooth muscle and bronchodilation.

Ketamine - Pain
(Ketalar®)

Onset: < 1 Minute
Peak: 30 Sec-5 Min.
Duration: 10-45 Min.

SUPPLIED: 500 mg/ 5 mL

Adult Dose

Route	Dose	Notes
IV/IO	10-20 mg (max 40 mg) Titrate to effect. Infuse over 5 min. Repeat: q 5 min. as needed to max dose (max 40 mg)	Use 0.4 mL (40 mg) in a 100 mL bag of NS to ensure you don't exceed max IV/IO dose. *Use ideal body weight.
IN	50 mg	

Pediatric Dose

Route	Dose	Notes
IV/IO	2+ years: 0.15-0.3 mg/kg (max 40 mg) infuse over 15 min. *Do not use for patient <2 years	Use pediatric situation tools to use correct dose in 100 mL bag.

Indications
- Pain control, especially for significant pain from injuries, burns, or medical conditions.

Contraindications
- Known hypersensitivity to ketamine.
- Conditions where significant elevation of blood pressure would be hazardous.
- Severe cardiac disease (angina, heart failure).
- Pregnancy (relative contraindication depending on situation).

Precautions
- Use with caution in patients with hypertension or those at risk for tachyarrhythmias.
- Psychomimetic effects (including hallucinations and nightmares) can occur with higher doses.
- May increase cerebral blood flow, intracranial and intraocular pressures.
- Reduce dose by 50% if pt is under the influence of drugs or alcohol.

Adverse Effects
- Laryngospasm (rare), can occur, necessitating readiness for airway intervention.
- Hypersalivation may be managed with atropine if it poses an airway challenge.
- Psychomimetic effects with ketamine should warrant caution in patients with a history of psychiatric disorders.
- Transient periods of apnea (1-2 min.) have occurred with IV ketamine administration, especially with rapid infusion.

Notes
- Patient must be monitored with pulse oximetry, capnography (ETCO2), and ECG during administration.

Pharmacology and Actions
Class: General Anesthetic, Dissociative Anesthetic
- Ketamine is a non-competitive NMDA receptor antagonist that provides analgesic, amnestic, and sedative effects without significant depression of respiratory or cardiovascular systems. It creates a dissociative state characterized by profound analgesia and amnesia.
- Unique among sedative agents, it preserves airway reflexes, stimulates heart rate and blood pressure, and has bronchodilatory properties.

Ketamine - Sedation
(Ketalar®)

Onset: < 1 Minute
Peak: 30 Sec-5 Min.
Duration: 10-30 Min.

SUPPLIED: 500 mg/ 5 mL

Adult Dose

Route	Dose	Notes
IM	4 mg/kg (max 400 mg). Repeat: Contact OLMC for additional doses.	*Use Ideal body weight Reduce dose by 50% if pt is under the influence of drugs or alcohol.
IV/IO	1 mg/kg (max 1 dose)	

Pediatric Dose

Route	Dose	Notes
	*Must contact OLMC for use in pediatric patients. Consider other options (*e.g. midazolam*)	

Indications
- Individuals posing a risk of harm to themselves or others.
- Patients presenting with various psychiatric concerns (e.g. auditory hallucinations, paranoia, depressive symptoms, anxiety disorders, substance misuse, detoxification requirements, or exacerbation of pre-existing psychiatric conditions).

Contraindications
- Known hypersensitivity to ketamine.
- Conditions where significant elevation of blood pressure would be hazardous.
- Severe cardiac disease (angina, heart failure).
- Pregnancy (relative contraindication depending on situation).

Precautions
- Rapid push doses of Ketamine can cause airway complications. Be prepared to manage.
- Patients with hypertension or those at risk for tachyarrhythmias.
- Emergence reactions (including hallucinations and nightmares) can occur upon recovery.
- May increase cerebral blood flow, intracranial and intraocular pressures.
- Ensure patient dose not have the right to refuse care before using as a chemical restraint.

Adverse Effects
- Laryngospasm (rare) can occur, necessitating readiness for airway intervention.
- Hypersalivation may be managed with atropine if it poses an airway challenge.
- Psychomimetic effects with ketamine should warrant caution in patients with a history of psychiatric disorders.
- Transient periods of apnea (1-2 min.) have occurred with IV ketamine administration, especially with rapid infusion.

Notes
- Patient must be monitored with pulse oximetry, capnography (ETCO2), and ECG during administration.

Pharmacology and Actions
Class: General Anesthetic, Dissociative Anesthetic
- Ketamine is a non-competitive NMDA receptor antagonist that provides analgesic, amnestic, and sedative effects without significant depression of respiratory or cardiovascular systems. It creates a dissociative state characterized by profound analgesia and amnesia.
- Unique among sedative agents, it preserves airway reflexes, stimulates heart rate and blood pressure, and has bronchodilatory properties.

Lidocaine
(Xylocaine®)

Onset: 45-90 Seconds
Peak: 5-10 Minutes
Duration: 10-20 Min.

SUPPLIED: 100 mg/ 5 mL of 2% solution in pre-filled syringe

Adult Dose

Route	Dose	Notes
IO	**Conscious IO:** 20-50 mg	**Conscious IO:** Should be given SLOWLY through IO before fluid bolus.
Neb	**Respiratory:** 40-60 mg (2-3 mL) may be added to albuterol as needed for "cough variant asthma"	

Pediatric Dose

Route	Dose	Notes
IO	**Conscious IO:** 0.5 mg/kg (max 50 mg)	Should be given SLOWLY through IO before fluid bolus.

Indications
- Local anesthesia for conscious IO use on critical patient's requiring access.
- Ventricular arrhythmias as an antiarrhythmic, especially post-myocardial infarction.

Contraindications
- Known hypersensitivity to lidocaine or amide-type local anesthetics.
- Severe SA, AV, or intraventricular heart block in the absence of a pacemaker.
- Stokes-Adams syndrome.

Precautions
- Patients with hepatic impairment as lidocaine metabolism is heavily dependent on liver function.
- Patients with heart failure or electrolyte imbalances.
- Care must be taken to avoid high plasma concentrations due to excessive dosage or rapid absorption, which can lead to CNS toxicity.

Adverse Effects
- CNS effects: Dizziness, blurred vision, tremors, and, in severe cases, seizures or CNS depression.
- Cardiovascular: Hypotension, bradycardia, cardiac arrest (especially with excessive dosing).
- Local: Possible allergic reactions, and in rare cases, necrosis at the injection site.

Notes
- SLCFD does not use lidocain in full arrests. However, it is an ACLS/2B protocol. The dosing is listed below for v-fib/v-tach(arrest).
- Adults: 1 mg/kg q 3-5 min. up to 3x
- Pediatrics: 1 mg/kg q 3-5 min. up to 3x

Pharmacology and Actions
Class: Local Anesthetic, Antiarrhythmic (Class 1B)
- Lidocaine blocks sodium channels required for the initiation and conduction of neuronal impulses, reducing the membrane permeability to sodium ions. This results in analgesia, anticonvulsant effects, and cardiac antiarrhythmic effects.

Midazolam
Procedural/Behavioral Sedation (Versed®)

Onset: 1-5 Minutes
Peak: 3-5 Minutes
Duration: 2-6 Hours

SUPPLIED: 10 mg/ 2 mL

Adult Dose

Route	Dose	Notes
IM	**Pacing/Cardioversion/Return of gag reflex:** 2.5 mg **Behavioral Emergencies:** 10 mg	Must contact OLMC for additional doses for pacing, cardioversion, and return of gag reflex.
IV/IN/IO	**Pacing/Cardioversion/Return of gag reflex:** 2.5 mg **Behavioral Emergencies:** 5 mg. Repeat: after 10 min. up to 1x	

Pediatric Dose

Route	Dose	Notes
IN/IM	**Pacing/Cardioversion/Return of gag reflex:** 0.1 mg/kg **Behavioral Emergencies:** 0.2 mg/kg max 5 mg Repeat: after 10 min. up to 1x (max total 10 mg)	Must contact OLMC for additional doses for pacing, cardioversion, and return of gag reflex.
IV/IO	**Pacing/Cardioversion/Return of gag reflex:** 0.1 mg/kg **Behavioral Emergencies:** 0.1 mg/kg (max 5 mg) Repeat: after 10 min. up to 1x (max total 10 mg)	

Indications
- Sedation for transcutaneous pacing, cardioversion, and return of gag reflex with secured ET tube in place.
- Behavioral emergencies requiring patient sedation for safety.

Contraindications
- Known hypersensitivity to midazolam or other benzodiazepines.
- Acute narrow-angle glaucoma.
- Severe respiratory insufficiency (relative contraindication).

Precautions
- Use with caution in patients with chronic respiratory diseases like COPD, or sleep apnea.
- Reduce dose by 50% if pt is under the influence of drugs or alcohol.

Adverse Effects
- Respiratory depression, especially when administered rapidly or in high doses.
- Hypotension, especially in the elderly or debilitated patients.
- Paradoxical reactions such as agitation or excitement may occur, particularly in children and the elderly.

Notes
- Monitor respiratory and cardiovascular status closely in all patients.
- Fast acting with a short half-life, making it suitable for procedures requiring sedation and quick recovery.

Pharmacology and Actions
Class: Benzodiazepine
- Midazolam enhances the effect of the neurotransmitter gamma-aminobutyric acid (GABA) at the GABA receptor, resulting in sedative, anxiolytic, amnesia, and hypnotic effects. It also exhibits muscle relaxant and anticonvulsant activities.

Midazolam - Seizures
(Versed®)

Onset: 1-5 Minutes
Peak: 3-5 Minutes
Duration: 2-6 Hours

SUPPLIED: 10 mg/ 2 mL

Adult Dose

Route	Dose	Notes
IM/IN IV/IO	5 mg (max 10 mg) Repeat: after 5 min. up to 1x	Consider an initial dose of 10 mg for refractory or status epilepticus seizures.

Pediatric Dose

Route	Dose	Notes
IN/IM	0.2 mg/kg (max 5 mg) Repeat: after 5 min. up to 1x (max total 10 mg)	
IV/IO	0.1 mg/kg (max 5 mg) Repeat: after 5 min. up to 1x (max total 10 mg)	

Indications
- Status epilepticus and severe recurrent seizures.

Contraindications
- Known hypersensitivity to midazolam or other benzodiazepines.
- Acute narrow-angle glaucoma.
- Severe respiratory insufficiency (relative contraindication).

Precautions
- Patients with chronic respiratory diseases like COPD, or sleep apnea.
- Reduce dose by 50% if pt is under the influence of drugs or alcohol.

Adverse Effects
- Respiratory depression, especially when administered rapidly or in high doses.
- Hypotension, especially in the elderly or debilitated patients.
- Paradoxical reactions such as agitation or excitement may occur, particularly in children and the elderly.

Notes
- Monitor respiratory and cardiovascular status closely in all patients.
- Fast acting with a short half-life, making it suitable for procedures requiring sedation and quick recovery.

Pharmacology and Actions
Class: Benzodiazepine
- Midazolam enhances the effect of the neurotransmitter gamma-aminobutyric acid (GABA) at the GABA receptor, resulting in sedative, anxiolytic, amnesia, and hypnotic effects. It also exhibits muscle relaxant and anticonvulsant activities.

Morphine Sulfate

Onset: 5-10 Minutes
Peak: 20 Minutes
Duration: 4 Hours

SUPPLIED: 10 mg/mL

Adult Dose

Route	Dose
IV/IM/IO	2-10 mg. Titrate to effect Repeat: q 5 min. (max total 10 mg)

Pediatric Dose

Route	Dose
IV/IM/IO	0.1 mg/kg (max 4 mg per dose & max total 10 mg) Titrate to effect.

Indications

- Management of severe acute and chronic pain where the use of an opioid analgesic is appropriate.
- Pain associated with myocardial infarction.

Contraindications

- Acute or severe bronchial asthma or hypercarbia.
- Known or suspected gastrointestinal obstruction, including paralytic ileus.
- Known hypersensitivity to morphine.

Precautions

- Patients with decreased respiratory reserve, hypotension, or those with a head injury or increased intracranial pressure.
- Adjust dosage in patients with severe renal or hepatic impairment.
- Avoid abrupt discontinuation in physically dependent patients to prevent withdrawal symptoms.

Adverse Effects

- Respiratory depression, which could be life-threatening if not recognized and treated.
- Hypotension, bradycardia.
- Common opioid-induced side effects such as nausea, vomiting, constipation.
- Potential for drug abuse and addiction.

Notes

- Naloxone (Narcan) should be available as a reversal agent in cases of opioid overdose.

Pharmacology and Actions

Class: Opioid agonist

- Morphine acts primarily on the central nervous system and smooth muscle. It binds to and activates the mu-opioid receptor, producing analgesia, sedation, and a sense of euphoria.

Naloxone
(Narcan®)

Onset: 1-2 Minutes
Peak: Minutes
Duration: 30-90 Min.

SUPPLIED: 2 mg/ 2 mL

Adult Dose

Route	Dose	Notes
IV/IM IN/IO	0.4-2.0 mg Repeat: q 2-3 min. as needed to maintain adequate respirations.	If no response after 10 mg consider alt. etiology.

Pediatric Dose

Route	Dose	Notes
IV/IM IN/IO	0.1 mg/kg (max 2 mg per dose) Repeat: q 2-3 min. as needed to maintain adequate respirations.	

Indications
- Reversal of opioid overdose, characterized by respiratory and central nervous system depression.
- Diagnostic tool in suspected acute opioid overdose.

Contraindications
- Known hypersensitivity to naloxone.

Precautions
- Administering to neonates of mothers suspected to be opioid-dependent due to the risk of opioid withdrawal syndrome.
- Patients treated for opioid dependence or chronic opioid use may suffer severe withdrawal symptoms following naloxone administration.
- Monitor for recurrence of symptoms as naloxone may wear off before the opioids, and further treatment may be necessary.

Adverse Effects
- Withdrawal symptoms in opioid-dependent patients: vomiting, sweating, agitation, and tachycardia.
- Hypertension, tachycardia, and pulmonary edema have also been reported.

Notes
- Ensure respiratory support is available when administering naloxone as reversal of opioid effects may lead to acute withdrawal syndromes.
- Educate non-medical responders and family members in the proper use of naloxone for emergency home or community use, particularly in settings with high opioid overdose risks.
- Consider intranasal Narcan as a final resort due to potential interference from nasal secretions, impacting its effectiveness.

Pharmacology and Actions
Class: Opiate Antagonist
- Naloxone reverses the effects of opioid drugs by competitively binding to the opioid receptors, particularly the mu-receptor, without activating them. This action displaces opioids from their receptor sites and rapidly reverses the effects of opioid overdose.

Nitroglycerin
(Nitrostat®)

Onset: 1-3 Minutes
Peak: 5-10 Minutes
Duration: 30-60 Min.

SUPPLIED: 0.4 mg sublingual tablet

Adult Dose

Route	Dose
PO	0.4 mg (1 tablet) - sublingual. Repeat: q 5 min. if symptoms persist and SBP >90 mmHg up to 3x.

Pediatric Dose

Route	Dose
	*Not for use in pediatric patients.

Indications
- Angina
- Suspeted or confimed Myocardial Infarction.
- Dyspnea associated with diagnosed CHF.

Contraindications
- Severe anemia.
- Closed-angle glaucoma.
- Hypotension.

Precautions
- Monitor blood pressure closely as severe hypotension can occur, especially with the sublingual form.
- Use with sildenafil or other phosphodiesterase type 5 inhibitors (Viagra/Cialis) as it can lead to severe hypotension.

Adverse Effects
- Headache (very common), dizziness, hypotension, tachycardia, and flushing.

Notes
- Patients should be instructed on the correct administration of the sublingual tablets; and have patient sit or lie down while taking it due to the risk of dizziness and fainting.

Pharmacology and Actions
Class: Vasodilator
- Nitroglycerin acts primarily as a vasodilator on venous smooth muscle, reducing preload (venous return) and, to a lesser extent, afterload on the heart. It also dilates coronary arteries and improves blood flow to the myocardium, which can relieve ischemic pain.

0.9 % Sodium Chloride Solution (Normal Saline, NS)

SUPPLIED: 1000 mL and 100 mL bags

Adult Dose

IV/IO	Dose	Notes
Trauma	500 mL bolus, reassess and administer to SBP of >90 mmHG	Systolic Blood Pressure (SBP) should be maintained at 110-120 mmHg for closed head injuries.
Non-T	500 mL bolus, reassess and administer to SBP of >90 (Max 1 L)	
Burn	Use WRBDC if time since burn <30 min. Otherwise use Parkland	

Pediatric Dose

IV/IO	Dose	Notes
Trauma	10 mL/kg bolus, reasses & administer to age appropriate SBP. (Max 20 mL/kg, 500 ML).	See notes below for WRBDC and Parkland formula information.
Non-T	20 mL/kg bolus, reasses and administer up to 60 mL/kg	
Burn	Use WRBDC if time since burn <30 min. Otherwise use Parkland	

Indications
- Symptomatic hypovolemia and hypotension
- Hyperglycemia
- Map <65

Contraindications
- Patient's with CHF, pulmonary edema, and signs of cardiogenic shock.

Precautions
- Kidney failure can cause exacerbation of fluid build up in the system due to impared renal function. Consider using smaller doses and frequently assess for third spacing of fluids and fluid build up, espcially in the lungs.
- Monitor for signs of fluid overload, electorlyte imbalances, and pulmonary edema.

Adverse Effects
- Fluid overload
- Hypernatremia (electrolyte imbalances)

Notes
Patients with Electrical burns or greater than 10% BSA 2nd and 3rd degree burns

Western Region Burn Disaster Consortium (WRBDC) - No bolus
- 5 years old or younger: 125 mL/hr (1 drip every 3 seconds using 10 GTTS drip set)
- 6-12 years old: 250 mL/hr (7 drips every 10 seconds using a 10 GTTS drip set)
- 13+ years old: 500 mL/hr (~3 drips every 2 seconds using a 10 GTTS drip set)

Parkland Formula - No bolus
- 4 mL/kg x % of Body Surface Area burned. Half should be administered in the first 8 hours.

**Not all information is listed on this card. Please refer to 2B protocols or contact OLMC for further information or to exceed the doses listed.*

Pharmacology and Actions
Class: Isotonic Cystalloid Solution
- Sodium chloride solution restores extracellular fluid volume and electrolyte balance.
- It helps maintain proper hydration, blood pressure, and osmotic equilibrium.

Ondansetron
(Zofran®)

Onset: IV: Immediate
Peak: 10 Minutes
Duration: 4-8 Hours

SUPPLIED: 8mg tablet or 4 mg/ 2 mL

Adult Dose

Route	Dose
IV/IM/IO	4 mg
PO	1/2-1 tablet (4-8 mg) - dissolvable

Pediatric Dose

Route	Dose	
IV/IM/IO	2+ Year: 0.1 mg/kg (max 4 mg)	*Contact OLMC to use for patients <2 year.
PO	1/2-1 tablet (4-8 mg) - dissolvable	*Do not use for patients <1 year.

Indications
- Prevention and treatment of nausea and vomiting

Contraindications
- Known hypersensitivity to ondansetron or any component of the formulation.
- Concurrent use of apomorphine.

Precautions
- Use with caution in patients with hepatic impairment.
- Monitor for QT prolongation, especially in patients with electrolyte abnormalities, congestive heart failure, bradyarrhythmias, or patients taking other medications that prolong the QT interval.

Adverse Effects
- Headache, fatigue.
- Constipation or diarrhea.
- Dizziness.
- Transient changes in ECG, including QT interval prolongation.

Notes
- Ondansetron has been found to be very effective in reducing the frequency of vomiting, but less effective in reducing nausea severity.
- Relatively ineffective at treating motion sickness due to mechanism of action.

Pharmacology and Actions
Class: Antiemetic
- Ondansetron selectively blocks serotonin 5-HT3 receptors, which are involved in triggering nausea and vomiting reflexes primarily within the chemoreceptor trigger zone and the gastrointestinal tract.

Oral Glucose
(Gluctose 15®)

Onset: 5-10 Minutes
Peak: Varies
Duration: Varies

SUPPLIED: 15 grams glucose in 37.5 grams of gel tube

Adult Dose

Route	Dose	Notes
PO	15 grams (Full tube) Repeat: after 15 min. as needed	Patient must be able to protect their own airway.

Pediatric Dose

Route	Dose	Notes
PO	7.5 grams (Half a tube) Repeat: after 15 min. as needed	Patient must be able to protect their own airway.

Indications
- A conscious patient where a suspicion of hypoglycemia exists or a blood glucose measurement indicates a low blood glucose level.

Contraindications
- Patients who are unconscious, cannot swallow, whose gag reflex is diminished, or otherwise cannot protect their own airway.
- Allergic or hypersensitivity to glucose or corn products (as dextrose is commonly derived from corn).

Precautions
- Continually assess patient for the ability to protect their own airway, as it may change.
- Monitor blood glucose levels post-administration to avoid hyperglycemia.
- Effects will be delayed in the elderly and people with poor circulation.

Adverse Effects
- Hyperglycemia if overdosed.

Notes
- Research suggests that hyperglycemia may complicate or worsen a number of medical conditions (i.e., myocardial infarction and stroke).
- Oral glucose should be given to a conscious patient whenever hypoglycemia is documented by a blood glucose meter. If these objective findings are not available, the EMT should use judgment based on signs and history.
- May be more tolerable if administered with liquid between dosages.
- A patient's condition may require more than one dose of oral glucose.
- Patients should be instructed to consume complex carbohydrates to prevent recurrence of hypoglycemia.

Pharmacology and Actions
Class: Monosaccharide Carbohydrate.
- After absorption from the gastrointestinal tract, glucose is distributed in the tissues and provides a prompt increase in circulating blood sugar levels. It is the body's primary fuel and produces most of the body's quick energy. Its use is regulated by insulin that stimulates storage of excess glucose from the bloodstream and glucagon that mobilizes stored glucose into the bloodstream.

Oxygen

SUPPLIED: Various Cylinders

Route	Dose	Notes
CPAP	Adults only. Use threaded attachment (automatically supplied).	
NEB	6-8 L/min (8 L recommended by manufacturer).	Titrate to maintain SPO2 >90% general & >95% for head injuries
Nasal	0.5-6 L/min	
NRB	10-15 L/min	

Indications
- Hypoxemia or suspected hypoxemia.
- Acute respiratory distress.
- Chronic conditions requiring supplemental oxygen (e.g. COPD).
- Carbon monoxide poisoning.
- Cluster headaches and other conditions as a palliative or supportive treatment.

Contraindications
- None

Precautions
- Patients with certain types of chronic obstructive pulmonary diseases where high levels of oxygen may suppress respiratory drive.
- Patients with risk of hypercapnic respiratory failure.
- Monitor oxygen saturation continuously to avoid hyperoxia, especially in neonates and those with pre-existing lung conditions.
- Avoid supplemental oxygen when treating patients with suspected myocardial infarctions as higher oxygen levels may decrease coronary artery blood flow and increase coronary vascular resistance resulting in worse outcomes. Only use oxygen to titrate and maintain SPO2 above 90%.

Adverse Effects
- Monitor oxygen saturation continuously to avoid hyperoxia, especially in neonates and those with pre-existing lung conditions.
- High concentrations of oxygen over a prolonged period can lead to oxygen toxicity, manifesting as damage to the lungs and respiratory distress.
- Dry or sticky mouth, if using dry oxygen for long periods.

Notes
- Oxygen therapy should be monitored with pulse oximetry or arterial blood gases to ensure therapeutic levels are maintained and to avoid toxicity.
- Oxygen is a fire hazard; smoking and open flames must be strictly avoided near oxygen delivery systems.

Pharmacology and Actions
Class: Medical Gas
- Oxygen is absorbed primarily through the lungs via the process of diffusion. Oxygen diffuses from the alveoli into the bloodstream, where it binds to hemoglobin in red blood cells for transport to tissues throughout the body.
- Oxygen therapy aims to increase the partial pressure of oxygen in arterial blood, thereby improving tissue oxygenation. This is crucial for patients with respiratory insufficiency, hypoxemia, or conditions causing tissue hypoxia.

Sodium Bicarbonate

Onset: Immediate
Peak: Rapid
Duration: Varies

SUPPLIED: 50 mEq/ 50 mL

Adult Dose

Route	Dose	Notes
IV/IO	1 mEq/kg Repeat: after 5 min. up to 1x	May be given for certain drug overdoses. *See: Indications*

Pediatric Dose

Route	Dose	Notes
IV/IO	1 mEq/kg. (max 50 mEq.) Children <2 years should get 4.2% sodium bicarbonate or dilute 1:1 with NS.	*Contact OLMC for use in overdoses

Indications

- Cardiac arrest where acidosis is known or suspected.
- Certain drug intoxications (e.g. tricyclic antidepressants, methanol, or aspirin).
  *Adults Only. Contact OLMC for pediatric overdose.

Contraindications

- Metabolic or respiratory alkalosis.
- Hypocalcemia, as it can cause tetany by reducing ionized calcium.
- Patients with severe renal impairment due to the risk of fluid overload and worsening of alkalosis.

Precautions

- Sodium Bicarbonate should be used judiciously, balancing the need to correct acidosis against the risks of causing alkalosis and other electrolyte imbalances.
- Ensure proper vascular access and correct dilution prior to IV administration to minimize venous irritation.

Adverse Effects

- Hypernatremia, which can lead to fluid retention and edema.
- Alkalosis, if overcorrected.
- Hypocalcemia, which can cause muscle spasms or tetany.

Notes

Pharmacology and Actions

Class: Alkalizing Agent

- Sodium bicarbonate acts as a buffer in the body, helping to maintain the pH of bodily fluids within a narrow range. It does this by neutralizing excess acids or bases, helping to keep the blood pH around 7.4, which is essential for proper physiological function.
- Sodium bicarbonate combines with hydrogen ions (H^+) to form water (H_2O) and carbon dioxide (CO_2), which can then be eliminated through the lungs.

Tranexamic Acid
(TXA®)

Onset: Minutes
Peak: 30 Minutes
Duration: 7-8 Hours

SUPPLIED: 1 gram/10 mL

Adult Dose

Route	Dose	Notes
IV/IO	**Trauma:** 2 g infused over 10 min. (max rate 100 ml/min) **Postpartum:** 1 g infused over 10 min. (max rate 100 ml/min)	100 mL bag of NS with a 10 GTTS drip set would be 5 drips q 3 seconds.

Pediatric Dose

Route	Dose	Notes
	*Contact OLMC	

Indications
- Prevention and treatment of uncontrollable hemorrhage in trauma patients.
  *Should be administered within 1 hour.
- Treatment for postpartum bleeding.
  *Should be administered within 3 hours.

Contraindications
- >1 hour from onset of injury or >3 hours from delivery to medication delivery
- Active thromboembolic disease, such as deep vein thrombosis, pulmonary embolism, or cerebral thrombosis (including possible stroke).
- Isolated traumatic brain injury without external uncontrollable hemorrhage.
- History of convulsions.
- Hypersensitivity to tranexamic acid or any of its components.

Precautions
- Use with caution in patients with a history of thromboembolic disease.
- Hypotension may be seen with rapid infusion and may not respond to fulid bolus.

Adverse Effects
- Nausea, vomiting, diarrhea.
- Dizziness, fatigue.
- Hypotension or bradycardia if infused too rapidly.
- Rare cases of thrombotic events.

Notes
- TXA should be administered as soon as possible after trauma. The risks of TXA administration likely outweigh any positive effects if administered more than 1 hour after injury, after full activation of endogenous fibrinolysis begins

Pharmacology and Actions
Class: Antifibrinolytic
- Tranexamic Acid inhibits plasminogen activation and plasmin activity, stabilizing fibrin and preventing fibrinolysis. This mechanism helps reduce blood loss by promoting clot stability.