

EMS MEDICATIONS GUIDE

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EMS Medications

Contributing Agencies: Missoula Fire Department
Missoula Emergency Services

MEDICATIONS

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EMS Medications

Minimum Procedures for Medication Administration

1. Follow universal precautions
2. Check vitals before administration
3. Confirm lack of contraindications, including allergies
4. Confirm patient (this patient needs this medicine)
5. Confirm medicine (check packaging, expiration, concentration, etc.)
6. Confirm dose
7. Confirm route
8. Prepare/ draw up medicine
9. Contact OLMC if required
10. Administer medication
11. Confirm time of administration
12. Check vitals after administration

Provider Levels Ledger:

All Providers: ECPs with/without endorsements

E: Medication Endorsed EMT

A: Advanced EMT

P: Paramedic

P

ADENOSINE (Adenocard®)

SUPPLIED: 6 mg / 2 ml

PHARMACOLOGY AND ACTIONS:

Adenosine is a naturally occurring nucleoside that has the ability to slow conduction through the AV node. Since most cases of PSVT involve AV nodal re-entry, adenosine is capable of interrupting the AV nodal circuit and stopping the tachycardia, restoring normal sinus rhythm.

It is eliminated from the circulation rapidly and has a half-life in the blood of less than ten seconds.

INDICATIONS:

To convert narrow complex supraventricular tachycardia (SVT).

CONTRAINDICATIONS:

A. WPW with wide-complex tachycardia.
B. Secord or third degree heart block
C. Sick-sinus syndrome
D. Known hypersensitivity

PRECAUTIONS:

A. When doses larger than 12 mg are given by injection there may be a decrease in blood pressure secondary to a decrease in vascular resistance.
B. The effects of Adenosine are antagonized by methylxanthines such as Theophylline and caffeine. Larger doses of Adenosine may be required.
C. Adenosine effects are potentiated by dipyridamole (Persantine) resulting in prolonged asystole.
D. In the presence of carbamazepine (Tegretol), high degree heart block may occur.
E. Adenosine is not effective in converting atrial fibrillation, atrial flutter or ventricular tachycardia.

SIDE EFFECTS AND NOTES:

May cause facial flushing, shortness of breath, chest pressure, nausea, headache and lightheadedness.

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
PSVT/SVT	6mg, follow with 12 mg if needed	Rapid IV	Use a large proximal IV site with fluid bolus flush.

PEDIATRIC DOSING

INDICATION	DOSE	ROUTE	NOTES
PSVT/SVT	0.1 mg/kg. Follow with 0.2 mg/kg if needed. Do not exceed adult dosing.	Rapid IV	Use a large proximal IV site with fluid bolus flush.

All Providers

ALBUTEROL (Ventolin®)

SUPPLIED: 2.5 mg / 3 ml vial.

PHARMACOLOGY AND ACTIONS:
Albuterol is a potent, relatively selective Beta-2 adrenergic bronchodilator and is associated with relaxation of bronchial smooth muscle and inhibition of release of mediators of immediate sensitivity from cells, especially MAST cells. The onset of improvement in pulmonary function is within 2-15 minutes after the initiation of treatment and the duration of action is from 4-6 hours. Albuterol has occasional Beta-1 overlap with clinically significant cardiac effects.

INDICATIONS:

A. To treat known or presumed asthma or presumed COPD
B. Smoke inhalation.
C. To treat respiratory distress and marked wheezing, or very decreased bilateral breath sounds.
D. Anaphylaxis
E. To treat hyperkalemia.

CONTRAINDICATIONS:

None in the prehospital setting.

PRECAUTIONS:

A. The patient's rhythm should be observed for arrhythmias. Stop treatment if frequent PVC's develop or any tachyarrhythmias other than sinus tachycardia appear or if heart rate increases by more than 20 beats/minute.

B. Paradoxical bronchospasm may occur with excessive administration.

SIDE EFFECTS AND NOTES:

Clinically significant arrhythmias may occur, especially in patients with underlying cardiovascular disorders such as coronary insufficiency and hypertension.

ADULT DOSING			
INDICATION	DOSE	ROUTE	NOTES
Respiratory Indications	2.5 mg, repeat as needed.	Nebulized	ECP without medication endorsement may assist with prescribed MDI
Hyperkalemia/post crush	5-10.0 mg	Nebulized	**OLMC Required**
PEDIATRIC DOSING over 1 years old (Same as adult)			
PEDIATRIC DOSING under 1 years old			
All Indications	1.25 mg, repeat as needed.	Nebulized	

P

AMIODARONE (Cordarone®)

SUPPLIED: 150 mg / 3 ml

PHARMACOLOGY AND ACTIONS:

Amiodarone depresses automaticity of the SA node. It slows conduction and increases refractoriness of the AV node. Amiodarone increases atrial and ventricular refractory period and prolongs the QT interval. When given IV it is rapidly distributed. No dosage adjustments are needed for patients with renal, liver or heart failure, or advanced age.

INDICATIONS:

A. Ventricular fibrillation / pulseless Ventricular tachycardia.

B. Ventricular Tachycardia with pulses.

C. A-Fib with RVR

CONTRAINDICATIONS:

None in cardiac arrest.

PRECAUTIONS:

A. In high concentrations (> 3 mg / ml) Amiodarone can cause phlebitis.

B. Amiodarone will precipitate if administered in the same IV line as sodium bicarbonate or heparin.

SIDE EFFECTS AND NOTES:

A. In perfusing patients, Amiodarone may cause hypotension, prolonged QT interval, proarrhythmic effects (Torsades and ventricular fibrillation), severe bradycardia and atrioventricular block.

B. Non-cardiac toxicities are usually related to chronic administration and include pulmonary infiltrates, hepatic and/or thyroid dysfunction and peripheral neuropathy.

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
V-Fib/Pulseless V-Tach	300 mg, repeat once at 150 mg	IV / IO	IV / IO
V-Tach with pulse	150 mg	IV / IO	Mix with 100 ml of NS and infuse over 10 minutes. **Contact OLMC for additional doses.**
A-Fib with RVR	150 mg	IV / IO	**Contact OLMC**

PEDIATRIC DOSING

INDICATION	DOSE	ROUTE	NOTES
V-Fib/Pulseless V-Tach	5.0 mg / kg	IV / IO	May repeat twice with 5 mg/kg
V-Tach with pulse	5.0 mg / kg	IV / IO	Mix with 100 ml of NS and infuse over 20-60 minutes to a max of 300 mg.

All Providers

ASPIRIN

SUPPLIED: 81 mg chewable tablets (Children's aspirin).

PHARMACOLOGY AND ACTIONS:
Aspirin inhibits prostaglandins and disrupts platelet function for the life of the platelet. It is also a mild analgesic and anti-inflammatory agent.

INDICATIONS:
In unstable angina and acute myocardial infarction, aspirin has been shown to lower mortality and is indicated in patients with suspected ischemic chest pain.

CONTRAINDICATIONS:
A. Allergy to aspirin or aspirin induced asthma.
B. History of bleeding disorder (i.e. hemophilia)
C. Current ulcer or GI bleeding.
D. Suspected aortic dissection.

SIDE EFFECTS AND NOTES:
A. High doses of aspirin can cause ringing in the ears.
B. May cause heartburn, nausea and vomiting.

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Cardiac chest pain (AMI)	81-324 mg (see notes)	Oral	Bring the patient up to 324 mg within the last 6 hours.

PEDIATRIC DOSING (Not indicated for pediatric patients)

P

ATROPINE SULFATE

SUPPLIED: 1 mg / 10 ml pre-filled syringe

PHARMACOLOGY AND ACTIONS:

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

A. Increases heart rate (by blocking vagal influences).
B. Increases conduction through the AV node.
C. Reduces motility and tone of the GI tract.
D. Reduces action and tone of the urinary bladder (may cause urinary retention).
E. Dilates pupils.

INDICATIONS:

A. To increase the heart rate in bradycardia or pacemaker failure.
B. To improve conduction in second and third degree heart block.
C. As an antidote for some insecticide exposures (e.g. anti-cholinesterases, organophosphates) and nerve gases.
D. To treat hypersalivation after Ketamine administration.

CONTRAINDICATIONS:

A. Atrial fibrillation and atrial flutter because increased conduction may speed ventricular rate excessively.

PRECAUTIONS:

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, mental confusion).

SIDE EFFECTS AND NOTES:

A. Atropine blocks cholinergic (vagal) influences already present. If there is little cholinergic stimulation present, effects will be minimal
B. Remember in cardiac arrest situations, atropine dilates pupils.

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Bradycardia	1 mg	IV/IO	Repeat every 3-5 minutes. Max dose 3mg
Bradycardia with presence of acute MI	1 mg	IV/IO	Call OLMC for administration
Organophosphates	2-4 mg	IV/IO	Call OLMC for administration
Hypersalivation after Ketamine administration	0.5 mg	IV/IO	Call OLMC for administration

PEDIATRIC DOSING

INDICATION	DOSE	ROUTE	NOTES
Bradycardia	0.02 mg/kg. Minimum dose is 0.1 mg; may repeat 1x	IV/IO	Do not exceed 0.5 mg
Organophosphates	0.05 mg/kg. Repeat every 5 minutes. Minimum dose is 0.15 mg	IV/IO	Call OLMC for administration

P

CALCIUM CHLORIDE

SUPPLIED: 1 GRAM/ 10 ML Pre-filled syringe

PHARMACOLOGY AND ACTIONS:
Calcium is the most common cation in the human body. The majority of the body stores of calcium are located in bone. It plays an important role in many physiologic functions and is essential for proper nerve and muscle function.

INDICATIONS:
A. Suspected calcium channel/ beta blocker overdose.
B. Hyperkalemia from crush syndrome or dialysis patients (Regular, really wide tachycardia)
C. Second line drug to TXA in the presence of massive trauma with hemorrhagic shock, with (for adult) SBP below 90mmHg or HR above 110.

CONTRAINDICATIONS:
A. Hypercalcemia
B. Patients on Digoxin.

PRECAUTIONS:
A. Extravasation of Calcium will cause necrosis of tissue. The IV/IO should be secured and free blood return and checked for patency prior to administration. If extravasation does occur, immediately stop administration.

B. Administer slowly (no faster than 2ml/min) and stop if patient complains of distress.

C. Calcium chloride will precipitate if mixed with Sodium Bicarbonate. Flush catheter completely before administering one medication after another.

SIDE EFFECTS AND NOTES:
A. Rapid injection of Calcium Chloride may cause vasodilatation, decreased blood pressure, bradycardia, cardiac arrhythmias, syncope and cardiac arrest.

ADULT DOSING			
INDICATION	DOSE	ROUTE	NOTES
Cardiac Arrest with suspected hyperkalemia (missed dialysis)	1 gram	Slow IV/IO	IVP
Suspected calcium channel Blocker overdose	1-2 gram	Slow IV/IO	Use a proximal port. Administer over 5 minutes **CONTACT OLMC**
Hyperkalemia from crush syndrome or dialysis patients	1 gram	Slow IV/IO	Use a proximal port. Administer over 5 minutes **CONTACT OLMC**
Massive traumatic hemorrhage	1 gram	Slow IV/IO	Use a proximal port. Administer over 5 minutes
PEDIATRIC DOSING			
Cardiac Arrest with suspected hyperkalemia (missed dialysis)	20 mg/kg.	Slow IV/IO	**CONTACT OLMC**
Suspected calcium channel Blocker overdose.	20-40 mg/kg.	Slow IV/IO	**CONTACT OLMC**
Hyperkalemia from crush syndrome or dialysis patients	20 mg/kg.	Slow IV/IO	**CONTACT OLMC**
Massive traumatic hemorrhage	20 mg/kg.	Slow IV/IO	Use a proximal port. Administer over 5 minutes

A P

DEXTROSE 10-50%

SUPPLIED (D10%): 25 g / 250 ml

SUPPLIED (D50%): 25 g / 50 ml pre-filled syringe.

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

INDICATIONS:
A. Hypoglycemia and unable to tolerate oral glucose.
B. Unconscious patient when history is unobtainable and unable to obtain a blood sugar.
C. Neonatal resuscitation

CONTRAINDICATIONS:
Hyperglycemia

PRECAUTIONS:
A. Extravasation of Dextrose 50% is likely to cause necrosis of tissue. IV should be secured and free blood return of blood into the syringe or tubing should be checked 2-3 times during administration. If extravasation does occur, immediately stop administration.
B. Report any extravasation to receiving hospital personnel and document on the Prehospital Care Report.
C. Hyperglycemia may complicate or worsen a number of medical conditions (e.g. myocardial infarction and stroke).

SIDE EFFECTS AND NOTES:
D10 or D50 should be given whenever hypoglycemia is documented by blood glucose meters and the patient is unable to take oral medication.

ADULT DOSING			
INDICATION	DOSE	ROUTE	NOTES
D10%: Hypoglycemia	10 g (100 ml)	IV/IO	Repeat dose if BGL is under 80 after 8 minutes: establish D10% drip at 100 ml/hour
D50%: Hypoglycemia	12.5 - 25 g (25 - 50 ml)	IV/IO	Use a proximal port
PEDIATRIC DOSING			
D10%: Hypoglycemia	5 ml / kg 0.5 g / kg	IV/IO	Preferred - do not exceed adult dose. **Contact OLMC for repeat dose.**
NEONATAL DOSING - Patients *less* than 2 months			
D10%: Neonatal resuscitation / Hypoglycemia	2 ml / kg 0.2 g / kg	IV/IO	If BGL is less than or equal to 40

P

DILTIAZEM (Cardizem)

SUPPLIED: 100mg powder reconstitute into 100mL NS

PHARMACOLOGY AND ACTIONS:
Inhibits calcium ion passage across cell membrane slows SA and AV nodes conduction velocity decreases myocardial contractility and decreases peripheral vascular resistance.

INDICATIONS:
A. A-FIB RVR/ AFLUTTER RVR/ PSVT

CONTRAINDICATIONS:
Concurrent use with IV beta blockers, Wide Complex Tachycardia with unknown origin, Sick Sinus Syndrome, WPW, and High Degree AV Blocks, Pediatric patients

PRECAUTIONS:
A. May precipitate with use of Lasix
B. Caution in elderly patients
C. CHF
D. May cause hypotension
E. Watch for Arrhythmias

SIDE EFFECTS AND NOTES:

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
AFIB/AFLUTTER/PSVT above 150	Dosing is 0.25 mg/ kg for first dose (usually 20 mg) and second dose is 0.35 mg/kg (usually 30 mg)	IV over 3-5 minutes	**Contact OLMC**

PEDIATRIC DOSING – NONE

E A P

DIPHENHYDRAMINE (Benadryl®)

SUPPLIED: 50 mg / ml vial

PHARMACOLOGY AND ACTIONS:
Diphenhydramine is an antihistamine which blocks the action of histamines released from cells during an allergic reaction. It has direct CNS effects, which may be stimulant, or more commonly depressant, depending on individual variation. Diphenhydramine also has an anticholinergic and antiparkinsonian effect which is used to treat acute dystonic reactions to antipsychotic drugs (e.g. Haldol®, Thorazine®, Compazine®, Inapsine®). These reactions include oculogyric crisis, acute torticollis, and facial grimacing.

INDICATIONS:
A. The second-line drug in anaphylaxis and severe allergic reactions (after epinephrine).
B. Vomiting that is not responding to Zofran and or with prolonged QT
C. Dystonic reactions

CONTRAINDICATIONS:
Do not administer for excited/delirium

PRECAUTIONS:
A. May have an additive effect with alcohol or other CNS depressants.
B. May cause hypotension when given IV.
C. Nursing mothers.

SIDE EFFECTS AND NOTES:
Can cause sedation, respiratory depression, and urinary retention.

ADULT DOSING			
INDICATION	DOSE	ROUTE	NOTES
Anaphylaxis w/ BP greater than 70	0.5-1.0 mg / kg to a max of 50 mg	IV/IM	AEMT with medication endorsement - IM only
Anaphylaxis w/ BP greater than 70	50 - 100 mg	PO	All levels approved to administer.
Dystonic reaction	25mg	IV/IM	Paramedic Only
Vomiting	6.25-12.5mg IV or 25mg IM may repeat once, maximum dose of 25mg in total.	IV/IM	Paramedic Only
PEDIATRIC DOSING			
Anaphylaxis	0.5-1.0 mg / kg to a max of 50 mg	IV/IM/PO	IV: Paramedic only. IM: AEMT/P. PO: EMT/AEMT (with med endorsement), P.
Dystonic reaction	12.5mg-25mg	IV/IM	Paramedic Only
Vomiting	6.25-12.5mg IV or 12.5mg IM may repeat once, maximum dose of 12.5mg in total.	IV/IM	Paramedic Only

P

DROPERIDOL (Inapsine®)

SUPPLIED: 5mg in 2mL

PHARMACOLOGY AND ACTIONS:
Neuroleptic (tranquilizer)

INDICATIONS:
A. Vomiting not responding to Zofran
B. Use with headed injured patients to prevent vomiting
C. Severe agitation

CONTRAINDICATIONS:
A. Patients with known or suspected QT prolongation.

PRECAUTIONS:
A. The onset of action of single intramuscular and intravenous does is from 3-5 minutes following administration, although the peak effect may not be apparent for up to 30 minutes.
B. All patients receiving Droperidol must be placed on Cardiac Monitor ASAP.
C. If patients experience symptoms of dystonia, they can be treated with 25 mg of Benadryl IV

SIDE EFFECTS AND NOTES:
Zofran preferred as initial agent in TBI. Haldol or Droperidol preferred in acute psychiatric emergencies.

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Vomiting not responding to Zofran	0.625 mg-1.25 mg	IV/IM/IO	May repeat once, max of 2.5 mg
Use with headed injured patients to prevent vomiting	0.625 mg-1.25 mg	IV/IM/IO	May repeat once, max of 2.5 mg
Severe agitation	5 mg	IV/IM/IO	**Contact OLMC**

PEDIATRIC DOSING

E A P

DUONEB

SUPPLIED: 0.5 mg Ipratropium 3 mg Albuterol / 3 ml

PHARMACOLOGY AND ACTIONS:

Albuterol is a potent, relatively selective Beta-2 adrenergic bronchodilator and is associated with relaxation of bronchial smooth muscle and inhibition of release of mediators of immediate sensitivity from cells, especially MAST cells. The onset of improvement in pulmonary function is within 2 – 15 minutes after the initiation of treatment and the duration of action is from 4 – 6 hours. Albuterol has occasional Beta-1 overlap with clinically significant cardiac effects.

Ipratropium Antagonizes acetylcholine receptors producing bronchodilation half life is 2 hours

INDICATIONS:

A. To treat bronchial asthma and reversible bronchial spasm that occurs with chronic obstructive pulmonary disease.
B. Smoke inhalation.
C. To treat respiratory distress.

CONTRAINDICATIONS:
None in the pre-hospital setting.

PRECAUTIONS:
A. The patient's rhythm should be observed for arrhythmias. Stop treatment if frequent PVC's develop or any tachyarrhythmias other than sinus tachycardia appear or if heart rate increases by more than 20 beats/minute.
B. Paradoxical bronchospasm may occur with excessive administration.

SIDE EFFECTS AND NOTES:
Clinically significant arrhythmias may occur, especially in patients with underlying cardiovascular disorders such as coronary insufficiency and hypertension.

ADULT DOSING			
INDICATION	DOSE	ROUTE	NOTES
Respiratory distress	0.5 mg Ipratropium 3 mg Albuterol / 3ml	Nebulized	Follow with Albuterol as needed. No more than 1x every 4-6 hours
PEDIATRIC DOSING			
Respiratory distress	.25 mg Ipratropium 1.5 mg Albuterol	Nebulized	Follow with Albuterol as needed. No more than 1x every 4-6 hours

P

CARDIAC EPINEPHRINE (Adrenalin®)

SUPPLIED: 1:10,000 – 1mg/10ml pre-filled syringe

PHARMACOLOGY AND ACTIONS:
Epinephrine is a catecholamine with both alpha and beta effects. In general the following cardiovascular responses can be expected: increased heart rate, increased myocardial contractile force, increased systemic vascular resistance, increased arterial blood pressure, increased myocardial oxygen consumption, increased automaticity. Epinephrine is also a potent bronchodilator.

INDICATIONS:
A. Cardiac arrest

CONTRAINDICATIONS:
None in cardiac arrest

PRECAUTIONS:
Not recommended for traumatic arrest in the presence of asystole and PEA.

SIDE EFFECTS AND NOTES:
None

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Cardiac Arrest	1 mg 1:10,000	IV/IO	Q 3-5 minutes (Max of 2 rounds for shockable rythyms) May consider more in PEA or Asystole **P Only**

PEDIATRIC DOSING

INDICATION	DOSE	ROUTE	NOTES
Cardiac Arrest	0.01 mg/kg (0.1 ml/kg) 1:10,000	IV/IO	Q 3-5 minutes **P Only**

NEONATAL DOSING (Less than 2 months)

INDICATION	DOSE	ROUTE	NOTES
Cardiac Arrest or HR at less than 60 after 1 min. of chest compressions and ventilation	0.01-0.03 mg/kg 1:10,000	IM/IV/IO	**Paramedic only.** Newborn bradycardia generally due to decreased oxygenation

All Providers

RESPIRATORY EPINEPHRINE (Adrenalin®)

SUPPLIED: 1:10,000 – 1mg/10ml pre-filled syringe; 1:1,000 1mg/ml

PHARMACOLOGY AND ACTIONS:
Epinephrine is a catecholamine with both alpha and beta effects. In general the following cardiovascular responses can be expected: increased heart rate, increased myocardial contractile force, increased systemic vascular resistance, increased arterial blood pressure, increased myocardial oxygen consumption, increased automaticity. Epinephrine is also a potent bronchodilator.

INDICATIONS:
A. Systemic allergic reactions
B. Asthma in patients non-responsive to Albuterol

CONTRAINDICATIONS:
V-Tac

PRECAUTIONS:
Epinephrine increases cardiac work load and can precipitate angina, MI, or major dysrhythmias in individuals with ischemic heart disease.

SIDE EFFECTS AND NOTES:
A. May cause anxiety, tremor and headache.
B. Cardiac side effects include tachycardia, PVC's, angina and hypertension.

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Anaphylaxis	0.3-0.5 mg 1:1,000	IM	Q 3-5 minutes **Medication endorsed EMT, AEM T/P**
Severe Anaphylaxis / unresponsive to IM Epi	**0.2-0.4 mg 1:10,000**	**IV/IO**	**P Only. CONTACT OLMC**
Anaphylaxis	Adult Auto Injector	IM	ECP without medication endorsement may assist prescribed auto injector
Known Asthmatic - non-responsive to Albuterol.	0.3-0.5 mg 1:1,000	IM	**AEMT/P Only.** **CONTACT OLMC**

PEDIATRIC DOSING

INDICATION	DOSE	ROUTE	NOTES
Anaphylaxis	0.01 mg/kg 1:1,000 to a max single dose of 0.3 mg	IM	**Medication endorsed EMT, AEM T/P**
Anaphylaxis	Pediatric Auto Injector	IM	ECP without medication endorsement may assist prescribed auto injector
Respiratory distress / Stridor at rest	Epi 1:1,000 2mg OR 2mL	Nebulized	**AEMT/P Only.**

P

PUSH DOSE EPINEPHRINE (Adrenalin®)

SUPPLIED: 1:10,000 – 1mg/10mL pre-filled syringe **diluted to concentration 1:100,000*

PHARMACOLOGY AND ACTIONS:
Epinephrine is a catecholamine with both alpha and beta effects. In general the following cardiovascular responses can be expected: increased heart rate, increased myocardial contractile force, increased systemic vascular resistance, increased arterial blood pressure, increased myocardial oxygen consumption, increased automaticity. Epinephrine is also a potent bronchodilator.

INDICATIONS:

Supine Adult or Children > 10yo: SBP <90 preferred MAP (65)
Supine Pediatric <10 SBP <70 +(2X age in years)
Must be accompanied by signs of poor perfusion:

- Dizziness or lightheadedness
- Pallor/diaphoresis
- Poor peripheral pulses
- Mental status change

PRECAUTIONS:
Epinephrine increases cardiac work load and can precipitate angina, MI, or major dysrhythmias in individuals with ischemic heart disease.

Not recommended for traumatic arrest in the presence of asystole and PEA.

SIDE EFFECTS AND NOTES:
A. May cause anxiety, tremor and headache.
B. Cardiac side effects include tachycardia, PVC's, angina and hypertension.

ADULT DOSING			
INDICATION	DOSE	ROUTE	NOTES
BP less than 90 or MAP less than 65	.5-2mL (5-20mcg) q 3-5 min	IV	BP q 2 min then reassess
PEDIATRIC DOSING			
Supine Pediatric <10 SBP <70 +(2X age in years)	0.1ml/kg (1mcg/kg) q 3-5 min	IV	BP q 2 min then reassess

DILUTING FOR IV ADMINISTRATION

- Waste 1ml from a 10ml NS flush syringe.
- Into this syringe, draw up 1 ml of 1:10000 epinephrine from the cardiac amp (1ml 1:10000 contains 0.1mg epi =100mcg epi)
- The syringe now contains 10 ml of epinephrine at 10mcg/ml

P

FENTANYL (Sublimaze®)

SUPPLIED: 100 mcg / 2 cc vial

PHARMACOLOGY AND ACTIONS:
Fentanyl is a potent synthetic opioid analgesic that produces analgesia and sedation. It is about 50- 100 times more potent than Morphine on a weight basis. Onset of action when given is 2-3 minutes. Peak effect occurs at 3-5 minutes and lasts 15-45 minutes.

INDICATIONS:
A. Pain due to musculoskeletal injury or burn.
B. Suspected ischemic chest pain unresponsive to Nitroglycerin.
C. To manage/control extreme shivering from active cooling.

CONTRAINDICATIONS:
A. Known allergy to Fentanyl.
B. A systolic blood pressure of less than 100 mm/Hg.
C. Respiratory rate less than 10 breaths per minute, oxygen saturation of less than 90%, or significant respiratory depression. For pediatric patients, vital signs should be maintained within normal age-appropriate limits.

PRECAUTIONS:
A. Fentanyl can cause respiratory depression that is reversible with Naloxone. Respiratory depression can also be exacerbated by underlying lung disease and the use of other respiratory depressant drugs (benzodiazepines, alcohol, and cyclic antidepressants). Have Naloxone and respiratory support available when administering Fentanyl.

B. If administered rapidly and in very large doses, Fentanyl can cause muscle spasm and chest wall rigidity. The only reliable treatment for this is neuromuscular blockade.
C. The action of Fentanyl is prolonged and its elimination is slower in the elderly. Smaller maintenance doses are advisable.
D. Fentanyl must be used cautiously in patients who have already received Morphine for prehospital analgesia.

SIDE EFFECTS AND NOTES:
A. If hypotension develops, it is usually responsive to Naloxone, if hypotension continues, follow Shock protocol.
B. Check and document vital signs and patient response after each dose.
C. The goal of Fentanyl administration is patient comfort, not the total elimination of pain but the reduction in the perception of pain by the patient.

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Musculoskeletal injuries, shivering from active cooling, burns, chest pain (with no access (or allergic) to morphine).	25-50 mcg,	IV/IM/IN/IO	I99/P: Repeat 25-50 mcg every 5 min as needed. Not to exceed a max of 150 mcg. **Contact OLMC for further doses.**

PEDIATRIC DOSING

INDICATION	DOSE	ROUTE	NOTES
Musculoskeletal injuries, burns, chest pain (with no access to morphine).	0.5 mcg/kg, to a max dose of 50 mcg.	IV/IM/IN/IO	After 5 minutes, may repeat 1x if vital signs are stable. **Contact OLMC for further doses.**

P

FUROSEMIDE (Lasix®)

SUPPLIED: 10 mg / 1 cc vial

PHARMACOLOGY AND ACTIONS:
Furosemide is a potent diuretic with a rapid onset of action and short duration of effect. It acts primarily by inhibiting sodium reabsorption in the kidney. Increase in potassium excretion occurs along with the sodium excretion. As an IV bolus, causes immediate (3-4 minute) increase in venous capacitance. This decreases venous pre-load and probably accounts for its immediate effect in pulmonary edema. Peak effect is one-half to one hour after IV administration with a duration of about two hours. (Duration if taken orally is 6-8 hours with peak effect in 1-2 hours)

INDICATIONS:

In acute pulmonary edema from volume overload.

CONTRAINDICATIONS:
A. Hypovolemia or hypotension.
B. Pregnancy
C. Anuric renal failure

PRECAUTIONS:
A. May lead to profound diuresis with resultant shock and electrolyte depletion. Monitor patient closely after administration.

B. Hypovolemia, hypotension, hypernatremia and hypokalemia are the main toxic effects. Other toxic effects are usually not related to single-dose use.

C. Patients who are on digitalis and are having arrhythmias consistent with digitalis toxicity (atrial tachycardia with conduction block, non-paroxysmal junction tachycardia, sinus arrest, etc.) may need lower doses of Furosemide. Contact OLMC.

D. Because of the potency and need for close monitoring, Furosemide should only be given with specific indications.

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
In acute pulmonary edema from volume overload.	0.5 - 1mg / kg OR double daily dose.	IV/IO	Maximum dose is 80 mg.

PEDIATRIC DOSING (Not indicated for pediatric patients)

E A P

GLUCAGON

SUPPLIED: 1 mg vial of powder / 1 ml vial of dilutant

PHARMACOLOGY AND ACTIONS:
Glucagon is a hormone that causes glucose mobilization in the body. It works opposite to insulin, which causes glucose storage. It is released at times of insult or injury when glucose is needed and mobilizes glucose from body glycogen stores. Return to consciousness should be within 20 minutes of an IM dose if patient is hypoglycemic.

INDICATIONS:
A. Known hypoglycemia (preferably demonstrated by blood glucose determination) when patient is confused or comatose and dextrose is not available or an IV cannot be started
B. Possible Beta blocker overdose per OLMC.

CONTRAINDICATIONS:
None

PRECAUTIONS:
IV Dextrose is the treatment of choice for hypoglycemia in the patient who cannot tolerate oral glucose. The use of Glucagon is restricted to patients who are seizing, comatose, combative, or with collapsed veins and in whom an IV cannot be started.

SIDE EFFECTS AND NOTES:
A. Nausea and vomiting may occur with administration.
B. Persons with no liver glycogen stores (malnutrition, alcoholism) may not be able to mobilize any glucose in response to Glucagon.

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Hypoglycemia	1 mg	IM/IN	If unable to establish an IV and BGL less than 60.
Beta blocker overdose	**Contact OLMC for dosing.**		

PEDIATRIC DOSING

INDICATION	DOSE	ROUTE	NOTES
Hypoglycemia	0.5 mg under 20 kg. Over 20 kg, 1 mg	IM/IN	If unable to establish an IV and BGL less than 60. AEMT/P Only
Beta blocker overdose	**Contact OLMC for dosing.**		

Endorsed EMTs/AEMTs may only use glucagon for hypoglycemia

All Providers

GLUCOSE – ORAL (Glutose 15®)

SUPPLIED: 15 grams glucose in 37.5 grams of gel tube

PHARMACOLOGY AND ACTIONS:
Glucose is the body's basic fuel and it 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.

INDICATIONS:
Oral glucose is indicated in the conscious patient where a suspicion of hypoglycemia exists or a blood glucose measurement indicates a low blood glucose level.

CONTRAINDICATIONS:
Do not give to patients who cannot adequately protect their own airway.

PRECAUTIONS:
To give solutions orally, a patient must be continually assessed for the ability to protect his or her own airway. Do not give to patients who cannot adequately protect their own airway.

SIDE EFFECTS AND NOTES:
A. Oral glucose should be given to a conscious patient whenever hypoglycemia is documented by blood glucose meter. If these objective findings are not available, the EMT should use judgment based on signs and history.
B. Effects will be delayed in the elderly and people with poor circulation.
C. May be more tolerable if administered with liquid between dosages.
D. Patient's condition may require more than one dose of oral glucose.

ADULT DOSING			
INDICATION	DOSE	ROUTE	NOTES
Hypoglycemia	15 grams	Oral	
PEDIATRIC DOSING			
INDICATION	DOSE	ROUTE	NOTES
Hypoglycemia	15 grams	Oral	

HALOPERIDOL (Haldol)

SUPPLIED: 5 mg in 1 mL

PHARMACOLOGY AND ACTIONS:
Antipsychotic

INDICATIONS:
Aggressive psychosis, severe agitation

CONTRAINDICATIONS:
A. Excited delirium
B. Known prolonged QT

PRECAUTIONS:
Patients with dementia and/or Parkinson's.

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Aggressive psychosis	2.5-5 mg	IV/IO/IM	

PEDIATRIC DOSING (N/A)

P

HYDROXOCOBALAMIN (Cyanokit®)

SUPPLIED: 5G in 250mL bottle; 25mg/mL (200mL NS will need to be added to reconstitute solution)

PHARMACOLOGY AND ACTIONS:

In order to understand the pharmacokinetics of Hydroxocobalamin, we must first understand cyanides effect on the body. Cyanide exposure causes hypoxia via cellular asphyxiation. Cyanide acts on the body by inhibiting cytochrome oxidase in the cells mitochondria, thus disrupting oxidative phosphorylation (cells aren't able to utilize oxygen to produce energy). Hydroxocobalamin works to blunt the effect of cyanide by interacting with individual cyanide molecules to form Cyanocobalamin. Cyanocobalamin is a non-toxic molecule that then is renally excreted through the urine.

INDICATIONS:

1. Any known or suspected cyanide poisoning.
2. Exposure to fire or smoke in an enclosed area
3. Soot around mouth, nose, or back of mouth
4. Altered mental status after smoke inhalation.
5. History of seizure, ALOC, chest pain, SOB

CONTRAINDICATIONS:

1. Hypersensitivity to Hydroxocobalamin

PRECAUTIONS:

1. Aggressive airway management, treatment of dysrhythmias, and interventions for seizure activity needs to be completed prior to giving Cyanokit.
2. When reconstituting bottle needs to be gently inverted or rocked, **NOT SHAKEN**, otherwise it will be rendered ineffective. Solution needs to be rocked for 60 seconds.
3. Cyanokit solution when reconstituted should be dark red and free of particulate, otherwise it needs to be discarded.
4. No studies have been conducted on pregnant women. Clinical judgement should be used to determine if benefits outweigh possible risk.

SIDE EFFECTS AND NOTES:

Patients may experience a rapid increase in blood pressure after administration of Hydroxocobalamin, therefore blood pressure needs to be monitored closely.

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Known or suspected Cyanide exposure	5g reconstituted w/ 200mL NS (LR can also be used) over 15 min, repeat w/ add'l 5g can be considered if clinical presentation does not improve	IV Drip	DO NOT SHAKE bottle to reconstitute, otherwise medication will not work. Medication needs to 60 seconds of gentle rocking to reconstitute.

PEDIATRIC & NEONATAL DOSING
(2500 mg in 100 ml)

INDICATION	DOSE	ROUTE	NOTES
Known or suspected Cyanide exposure	100mg/kg given over 15 minutes	IV Drip	DO NOT SHAKE bottle to reconstitute, otherwise medication will not work. Medication needs to 60 seconds of gentle rocking to reconstitute.

PEDIATRIC DOSING CHART for 60 gtt drip set

Table 9-2 : Hydroxocobalamin (Cyanokit®) Pediatric Dosing

AGE	KG	MG	ML	GTT / second
Preemie	2	200	8	0.5
Newborn	4	400	16	1
4 MO	6	600	24	2
6 MO	8	800	32	2
1 YR	10	1000	40	3
2 YR	12	1200	48	3
3 YR	15	1500	60	4
4 YR	17	1700	68	4
5 YR	20	2000	80	5
6 YR	22	2200	88	5
7 YR	25	2500	100	6
8 YR	27	2700	108	6
9 YR	30	3000	120	7
10 YR	35	3500	140	9
11 YR	40	4000	160	11
12 YR	50	5000	200	13
13-15 YR	60	5000	200	13

P

KETAMINE

SUPPLIED: 500 mg in 5 ml AND 500 mg in 10 ml

PHARMACOLOGY AND ACTIONS:
Ketamine belongs to a class of drugs known as dissociative anesthetics. Other drugs in this category include phencyclidine (PCP), DXM and nitrous oxide (laughing gas). These types of drugs can make a person feel detached from sensations and surroundings as if floating outside the body.
Ketamine is sometimes used to induce and maintain general anesthesia, and in lower doses can relieve pain. It is most likely to be used for short-lasting diagnostic and surgical interventions such as dental extractions, and in procedures involving children.

INDICATIONS:
A. For pain management
B. For patients with hyperactive delirium syndrome with severe agitation OR those who pose danger to themselves or responders due to aggression.
C. CPR-induced consciousness
D. Post intubation sedation
E. TBI with Agitation

CONTRAINDICATIONS:
1.Patients who have a known allergy to Ketamine
2.Unresponsive patient
3. Patients with systolic BP below 90mmhg

PRECAUTIONS:
A.Possible medication errors may occur due to high concentration of the drug as well as varriability in concentrations available. Double check your dosage and ml given before administration.
B. Coach your patient before administration due to Ketamine being a dissociative drug advise patients they are in a safe place.
C. Patients may have emergence phenomenon with higher doses and may need versed to calm patient
D. May pre-medicate adults with 4 mg Zofran before ketamine administration

SIDE EFFECTS AND NOTES:
Patient may become extremely anxious or have hallucinations with Ketamine. Patients may also have increased salivation. At higher doses patient will become unresponsive and may need airway support.

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Pain Management	0.2 mg/kg	IV/IM/IO	IV: Draw up in 1 ml syringe and dilute dosage into 10 ml of NS. May repeat with OLMC
Hyperactive delirium syndrome / Extreme Aggression	4 mg/kg IM max 400mg 2 mg/kg IV max 200mg	IV/IM/IO	May repeat with OLMC
CPR Induced Consciousness	.5-1 mg/kg	IV/IM/IO	May repeat once at 10 mins.
Post intubation sedation	4 mg/kg IM max 400mg 2 mg/kg IV max 200mg	IV/IM/IO	May repeat with OLMC
TBI with agitation	0.2 mg/kg	IV/IM/IO	IV: Draw up in 1 ml syringe and dilute dosage into 10 ml of NS. May repeat with OLMC

PEDIATRIC DOSING (Same as Adult)

P

LEVOPHED (Norepinephrine)

SUPPLIED: 4mg/4ml vials **Mixing Instructions:** Mix 4 mg Norepinephrine in 250 ml NS

PHARMACOLOGY AND ACTIONS:
Primarily acts on alpha-adrenergic receptors to produce constriction of resistance and capacitance vessels causing an increase in systemic blood pressure and coronary artery blood flow.

INDICATIONS:
Map below 65; if no map available, systolic pressure under 90
A. Hypotension from sepsis (septic shock)
B. Cardiogenic shock
C. Overdose (with hypotension)
D. Transfusion reaction
E. Neurogenic shock
F. Hypotension post cardiac arrest
G. Hypotension not related to volume loss (not for anaphylaxis)

CONTRAINDICATIONS:
A. Hypovolemia, mesenteric/peripheral vascular thrombosis, profound hypoxia.
B. Cautions: Severe cardiac disease, hypertension, hypothyroidism, MAOI prescription.

PRECAUTIONS:
Requires large upper extremity venous access. Extravasation may cause necrosis. Check infusion site frequently. May cause blanching along course of peripheral vein (normal). Caution in patients on MAO inhibitors. May precipitate peripheral or visceral ischemia, renal hypoperfusion in hypovolemic shock and hemorrhagic shock. Avoid abrupt withdrawal.

SIDE EFFECTS AND NOTES:
Goal is minimum 65; if no map available, systolic pressure over 90
A. Anxiety
B. Palpitation
C. Hypertension
D. Reflex bradycardia
E. VT/VF (especially in hypoxic or hypercarbic patients).

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Hypotension from sepsis, cardiogenic shock, overdose, transfusion reaction, neurogenic shock, post cardiac arrest and hypotension not related to volume loss.	**Preferred:** 1-20mcg/min Titrate	**Preferred:** IV PUMP	BP Check every 2 minutes is mandatory. Goal is MAP min. 65 or systolic pressure over 90
	1-20mcg/min Titrate	IV DRIP (See below for drip rates)	Start at 4 mcg / min. BP Check every 2 minutes is mandatory. Goal is MAP min. 65 or systolic pressure over 90

PEDIATRIC DOSING

Hypotension from sepsis, cardiogenic shock, overdose, transfusion reaction, neurogenic shock, post cardiac arrest and hypotension not related to volume loss.	0.05-0.1 mcg/kg/min Titrate	IV PUMP	**Call OLMC**

DRIP RATES

4mg in 250ml / 60 gtt set:	15 gtt= 4 mcg 30 gtt= 8 mcg 45 gtt= 12 mcg 60 gtt= 16 mcg
4mg in 500ml / 60 gtt set:	15 gtt= 2 mcg 30 gtt= 4 mcg 45 gtt= 6 mcg 60 gtt= 8 mcg

P

LIDOCAINE

SUPPLIED: 100mg in 5 ml

PHARMACOLOGY AND ACTIONS:
Lidocaine is a 1b antiarrhythmic that blocks sodium channels. Acts as a local anesthetic that numbs the sensation of

INDICATIONS:
VF or VT Cardiac arrest. VT w/a pulse.Pain management for IO in conscious patients.

CONTRAINDICATIONS:
Hypersensitivity to local anesthetics of the amide type. Stokes-Adams syndrome, Wolff-Parkinson-White syndrome, or severe degrees of sinoatrial, atroventricular, or intraventricular block.

PRECAUTIONS:
Lidocaine toxicity can occur with higher doses and cause seizure and arythmia

SIDE EFFECTS AND NOTES:

ADULT DOSING			
INDICATION	DOSE	ROUTE	NOTES
VF or VT Cardiac arrest.	100 mg	IV/IO	Max of 2 rounds
VT with a pulse.	100 mg	IV/IO	**Contact OLMC**
Conscious IO	20 mg slowly over 120 seconds	IO	Prime the tubing. Allow lidocaine to dwell in IO space 60 seconds. Flush with 5 to 10 mL of normal saline
PEDIATRIC DOSING			
VF or VT Cardiac arrest.	1 mg per kg	IV/IO	Max of 2 rounds
VT with a pulse.	1 mg per kg	IV/IO	**Contact OLMC**
Conscious IO	0.5 mg/kg, not to exceed 20 mg slowly over 120 seconds.	IO	Prime the tubing. Allow lidocaine to dwell in IO space 60 seconds. Flush with 2-5 mL of normal saline

P

LORAZEPAM (Ativan)

SUPPLIED: 2mg in 1 ml vials

PHARMACOLOGY AND ACTIONS:
CNS depression via facilitation of inhibitory neurotransmitter gamma-aminobutyric acid (GABA) and Benzodiazepine receptor sites in the ascending reticular activating system. Effects include:
Muscle relaxation, anticonvulsant activity, and emotional behavior anxiolytic effects

INDICATIONS:
A. Seizure
B. Sedation post intubation
C. Anxiety emergencies
D. Intubation maintenance

CONTRAINDICATIONS:
A. Narrow angle glaucoma and pregnancy
B. Hypotension

PRECAUTIONS:
A. Use with caution if patient is hepatic or renal compromised
B. Increased CNS depression in patients intoxicated or on other depressant type drugs
C. Use caution in the presence of opioids and in the elderly.

SIDE EFFECTS AND NOTES:
• Respiratory depression
• Paradoxical reaction
• Hypotension
• Prolonged effect

ADULT DOSING			
INDICATION	DOSE	ROUTE	NOTES
Seizures	1-4 mg	IV/IM/IO	I99/P. May repeat once. **Call OLMC for additional.**
Post Intubation, Anxiety	2 mg	IV/IM	May repeat once. **Call OLMC for additional.**
PEDIATRIC DOSING			
Seizures	0.05 mg / kg (max. 4 mg)	IV/IM/IO	Versed is preferred for pediatric seizures.

P

MAGNESIUM SULFATE

SUPPLIED: 1 gram (50%) / 2 ml vial

PHARMACOLOGY AND ACTIONS:
Magnesium is a cation that is present in human cells and intercellular fluids. It acts as an antiarrhythmic agent and may convert ventricular fibrillation and ventricular tachycardia.

INDICATIONS:
A. Polymorphic V-Tach or Torsade's de Pointes.
B. For the treatment of seizures in eclampsia or with severe pre-eclampsia (severe headache, nausea & vomiting, upper abdominal pain) with OLMC approval.
C. Life threatening COPD/Asthma with impending respiratory failure or requiring NIPPV/Intubation, particularly dyspnea not relieved by bronchodilators and PPV

CONTRAINDICATIONS:
Systolic BP < 90

PRECAUTIONS:
In the non-arrest patient, Magnesium Sulfate may cause hypotension, bradycardia, decreased reflexes and respiratory depression.

SIDE EFFECTS AND NOTES:
See Precautions

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Polymorphic V-Tach or Torsade's de Pointes	1-2g	IV/IO	Slow IV over 1-2 minutes. IV push in cardiac arrest
Eclampsia	Normal dose is 4g over 5 minutes IV or 2g IM	Slow IV/IM	**Contact OLMC** if seizures continue.
Asthma / COPD not responsive to bronchodiltors	2g over 15 min	IV pump only	For 5 g/10 ml, draw 4 ml (2g) and mix in 250 ml D5

PEDIATRIC DOSING

INDICATION	DOSE	ROUTE	NOTES
Polymorphic V-Tach or Torsade's de Pointes	25-50 mg/kg over 1-2 minutes	IV/IO	**Contact OLMC**
Asthma	25 mg/kg IV	IV pump only	OLMC for pediatric patients with life threatening asthma or severe after 3 nebs

DILUTING FOR IV ADMINISTRATION

Dilute each gram (2 ml) of Magnesium Sulfate in 8 ml of Normal Saline. (Example: 1 gram (2 ml) – mix in 8 ml's of NS; 2 grams (4 ml) – mix in 16'ml of NS, etc.)

P

METHYLPREDNISOLONE (Solumedrol)

SUPPLED: 125 mg in 2 ml Needs to be mixed

PHARMACOLOGY AND ACTIONS:
A. Decreases hospital length of stay
B. Improves lung function
C. No difference between oral and IV in mortality, hospitalization, treatment failure, relapse at one month or secondary outcomes

INDICATIONS:
A. Life threatening COPD/Asthma with impending respiratory failure or requiring NIPPV/Intubation, particularly dyspnea not relieved by bronchodilators and PPV

B. Anaphylaxis

CONTRAINDICATIONS:
None in the pre-hospital setting.

PRECAUTIONS:
A. Highly immuno-supressed patients

B. May cause fluid retention and stress ulcers.

SIDE EFFECTS AND NOTES:
A. Hyperglycemia
B. GI Bleed
C. Immune suppression
D. Fluid retention

ADULT DOSING			
INDICATION	DOSE	ROUTE	NOTES
Respiratory distress/Anaphylaxis	62.5 mg	Slow IVP	(1ml of the 125mg/2ml solumedrol vial)
PEDIATRIC DOSING			
INDICATION	DOSE	ROUTE	NOTES
Respiratory distress/Anaphylaxis	1 mg/kg	Slow IVP	

P

MIDAZOLAM (Versed®)

SUPPLIED: 5 mg / 1 ml AND 2 mg / 2 ml

PHARMACOLOGY AND ACTIONS:
Midazolam is a benzodiazepine with potent sedative, anti-anxiety, and anticonvulsant properties. It also causes significant antegrade amnesia when administered IV.

INDICATIONS:
A. Status seizure (any seizure that has lasted longer than 2 minutes or two consecutive seizures without regaining consciousness)
B. To relieve anxiety, and produce amnesia during cardioversion, pacing
C. Patients who pose danger to themselves and/or responders due to aggression

CONTRAINDICATIONS:
A. Hypotension, systolic BP less than 100
B. Respiratory depression

PRECAUTIONS:
Midazolam causes respiratory depression and/or hypotension especially if administered rapidly or combined with opiates. Monitor patient closely including EtCO2.

SIDE EFFECTS AND NOTES:
A. Common side effects include drowsiness, hypotension, respiratory depression and apnea. These are more likely to occur in the very young and the elderly. Rarely, patients may experience paradoxical agitation.
B. Respiratory depression is more likely in patients who have taken other CNS depressant drugs such as opioids alcohol and barbiturates, or when given rapidly.
C. Midazolam is metabolized in the liver and excreted by the kidney. Doses should be adjusted accordingly in patients with underlying hepatic or renal diseases and low flow states such as congestive heart failure.

ADULT DOSING			
INDICATION	DOSE	ROUTE	NOTES
Seizure	1-4 mg	IV/IM/IN/IO	May repeat once. **Call OLMC for additional.**
Status Seizure	5 mg	IV/IM/IN/IO	May repeat once. **Call OLMC for additional.**
Status Seizure (No IV)	10 mg	IM	**Call OLMC for additional.**
Pacing/Cardioversion	2-4 mg	IV/IM/IN/IO	May repeat after 3-5 minutes to a max of 10 mg.
Severe agitation	2-4 mg	IV/IM/IN/IO	May repeat after 3-5 minutes to a max of 10 mg. 1 mg per nare IN.
Post Intubation	5 mg	IV/IM/IN/IO	
Anxiety	.5-1 mg	IV/IM/IN/IO	May repeat once as needed.
PEDIATRIC DOSING			
INDICATION	DOSE	ROUTE	NOTES
Seizures/Post Intubation	0.2 mg / kg. Max of 5 mg	IV/IM/IN/IO	May repeat once. **Call OLMC for additional doses.**

P

MORPHINE SULFATE

SUPPLIED: 10 mg in 1 ml

PHARMACOLOGY AND ACTIONS:
Morphine is a narcotic analgesic that induces drowsiness, mental clouding and mood changes. It also increases venous capacitance, decreases venous blood return (preload) and reduces systemic vascular resistance at the arteriolar level (afterload). This may lead to decreases in myocardial oxygen demand. Onset of action when given IV is 2-3 minutes and peak effect occurs at 7-10 minutes. Duration is 3-5 hours.

INDICATIONS:
A. Suspected ischemic chest pain unresponsive to nitroglycerin.
B. Pain due to burns and/or musculoskeletal injury.
C. Pain control for non-traumatic abdominal pain.

CONTRAINDICATIONS:
A. Known allergy to Morphine sulfates (Sulfa drugs are not sulfates)
B. Blood pressure less than 100 mmHg systolic.
C. Head injuries/headache/altered mental status.
D. Respiratory rate less than 10 breaths per minute or oxygen saturation less than 90%. For pediatric patients, vital signs should be maintained within the normal age-appropriate range.
E. Active labor.

PRECAUTIONS:
A. Morphine causes respiratory depression that is reversible with Naloxone. This respiratory depression is exacerbated by underlying lung disease (COPD, etc.) and other depressant drugs (Valium, alcohol, cyclic anti-depressants). Naloxone and respiratory support must be available when using Morphine.
B. Multi-system trauma/suspected bleed or pain of the head or abdomen.
C. If hypotension develops it is usually responsive to Naloxone administration and Trendelenburg position. If hypotension persists, follow Shock protocol.

SIDE EFFECTS AND NOTES:
A. The goal of Morphine administration is patient comfort (not the total elimination of pain but reduction in perception of pain by the patient).
B. Morphine is a Schedule II controlled substance. Follow your agency's Controlled Substance Policy or procedure for control and monitoring of use.

ADULT DOSING			
INDICATION	DOSE	ROUTE	NOTES
Musculoskeletal injury, burns, chest pain	2-5 mg Max of 15 mg	IV/IO/IM	Repeat Q 5 minutes
PEDIATRIC DOSING			
INDICATION	DOSE	ROUTE	NOTES
Musculoskeletal injury, burns	0.1 mg / kg. Max of 5 mg	IV/IO/IM	Repeat 1x after 5 minutes

E A P

NALOXONE (Narcan®)

SUPPLIED: 2 mg / 2 ml pre-filled syringe

PHARMACOLOGY AND ACTIONS:
Naloxone is an opioid antagonist which competitively binds to opioid receptor sites but which exhibits almost no pharmacologic activity of its own. Duration of effect is 1-4 hours.

INDICATIONS:
Suspected narcotic overdose

CONTRAINDICATIONS:
Do not use for treatment of neonates.

PRECAUTIONS:
A. In patients physically dependent on opioids, violent withdrawal symptoms may occur. Be prepared to restrain the patient.

B. Some opioid intoxications may require additional doses; contact with medical control for doses beyond 8 mg of Naloxone to reverse symptoms (e.g. Methadone, designer drugs).
C. Consider withholding Narcan after successful intubation. Contact OLMC.

SIDE EFFECTS AND NOTES:
A. The duration of some opioids is longer than Naloxone, repeat doses may be necessary. Monitor the patient closely. Patients who have received Naloxone must be transported to the hospital because coma may reoccur when Naloxone wears off.
B. Side effects are rare. Do not hesitate to use if indicated.
C. If no effect is seen from Naloxone administration, consider other causes of coma.

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Suspected narcotic or opioid overdose	0.4-4 mg	IV/IM/IN/IO	**Contact with OLMC after 8 mg.**

PEDIATRIC DOSING

INDICATION	DOSE	ROUTE	NOTES
Suspected narcotic or opioid overdose	0.1 mg / kg Max of 2 mg	IV/IM/IO	**Contact with OLMC after 2 mg.**
Suspected narcotic or opioid overdose	0.2 mg / kg Max of 2 mg	IN	1/2 dose for each nostril **Contact with OLMC after 2 mg.**

All Providers

NITROGLYCERIN

SUPPLIED: 0.4 mg tablets / 0.4 mg spray; pre-mixed bottle

PHARMACOLOGY AND ACTIONS:
Nitroglycerin is an organic nitrate and is a vasodilating agent. Its cardiovascular effects include: reduced venous tone (causing pooling of blood in the peripheral veins and decreased return of blood to the heart), decreased peripheral resistance, and dilation of coronary arteries. It also is a general smooth muscle relaxant.

INDICATIONS:
A. Cardiac chest pain

CONTRAINDICATIONS:
A. Blood pressure less than 100 mmHg systolic.
B. Patients who have taken erectile disfunction/female equivalent medications within 24 hours. Contact OLMC for direction.
C. No baseline vitals.

PRECAUTIONS:
A. Generalized vasodilation may cause profound hypotension and reflex tachycardia.
B. Consider establishing the IV prior to giving Nitro.
C. Use with caution in patients with borderline (systolic of 100-110) blood pressure or with inferior/right side MI.
D. Use caution in bradycardic/tachycardic patients.
E. Use caution with patients who have 30% drop in BP after first dose.

SIDE EFFECTS AND NOTES:
A. Common side effects are headache, flushing or dizziness.
C. Cardiac chest pain: 12 lead EKG preferred prior to Nitro

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Cardiac chest pain	0.4 mg Max of 3 doses	SL	q 5 minutes. Ensure systolic BP is greater than 100 mmHg. Contact OLMC for additional doses.
Cardiac chest pain/ pulmonary edema	5-25 mcg / minute	IV pump only	**Paramedic Only.** Titrate to effect. Maintain systolic BP greater than 100. Contact OLMC higher than 25 mcg.
Pulmonary edema with BP > 160/90	0.4 mg Max of 3 doses	SL	**Paramedic Only.** q 5 minutes. Ensure systolic BP is greater than 100 mmHg. Contact OLMC for additional doses.
Cardiac chest pain	Patient's prescribed nitro	SL	ECP without medications endorsement can assist with prescribed nitro q 5 max 3 doses ensure systolic BP is greater than 100mmHg

PEDIATRIC DOSING - Contact OLMC

P

ONDANSETRON (Zofran®)

SUPPLIED: 4 mg / 2 ml vial.

PHARMACOLOGY AND ACTIONS:
Ondansetron is a potent, highly selective serotonin (5-HT3) receptor agonist. Its precise mode of action in the

INDICATIONS:
A. Prevention and control of nausea and vomiting.
B. Prophylactic with pain medications.

CONTRAINDICATIONS:
A. Known hypersensitivity to Zofran or similar medications.

PRECAUTIONS:
A. Hypersensitivity reactions have been reported in patients who have exhibited hypersensitivity to other 5-HT3
B. Patients with bowel obstruction should be monitored closely following administration.
C. Ondansetron may precipitate if mixed with alkaline solutions.
D. Consult OLMC for patients with prolonged QT interval.
E. Women who are nursing.

SIDE EFFECTS AND NOTES:
A. The most common side effects include headache, dizziness, drowsiness and shivers.

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Nausea/vomiting Prophylactic with pain medications.	4 mg	Slow IV/IM	Consider and treat other causes of nausea. IVP over 2 minutes. **Contact OLMC with nursing women.**

PEDIATRIC DOSING

INDICATION	DOSE	ROUTE	NOTES
Nausea/vomiting Prophylactic with pain medications.	0.1 mg / kg Do not exceed adult dose.	Slow IV/IM	**Contact OLMC for use in patients less than 2 yrs old. IVP over 2 minutes**

All Providers

OXYGEN

SUPPLIED: Oxygen tank

PHARMACOLOGY AND ACTIONS:
Oxygen added to the inspired air raises the amount of oxygen in the blood and the amount delivered to the tissues. Breathing in most persons is regulated by small changes in acid/base balance and CO2 levels and it takes a large drop in oxygen concentration to stimulate respiration.

INDICATIONS:
A. Suspected hypoxemia/hypoxia from any cause with SpO2 less than 94%.
B. Carbon monoxide poisoning.
C. Head injury (TBI)

CONTRAINDICATIONS:
None

PRECAUTIONS:
A. If the patient is not breathing adequately on their own, the treatment of choice is ventilation with oxygen, not just supplemental oxygen.
B. In a small percentage of patients with chronic lung disease, administration of oxygen may decrease respiratory drive. Do not withhold oxygen because of this possibility. Be prepared to assist ventilation if needed.
C. Hyperoxygenation (pulse ox over 99%) can damage tissue. Not applicable for TBI
D. Use with caution in neonates

SIDE EFFECTS AND NOTES:
A. Non humidified oxygen is drying and irritating to mucous membranes.
B. Restlessness may be an important sign of hypoxemia/hypoxia.
C. Nasal cannula prongs work equally well on nose and mouth breathers.
D. Numbers not relevant without a good waveform.
E. In presence of CO poisoning, pulse oximeter is not accurate.

DOSING

INDICATION	DOSE	ROUTE	NOTES
Mild hypoxemia	1-6 LPM	Nasal Cannula	Goal of SpO2 94-99%. Chronic COPD patients may be lower.
Moderate hypoxemia/hypoxia	10-15 LPM	Non Re-Breather (NRB)	
Respiratory failure	15 LPM	BVM	
Bronchial constriction	6-8 LPM	Nebulizer	
Severe respiratory distress	Titrate O2 (5-10 cm H2O)	CPAP	
Head injury (TBI)	High flow of O2	Non Re-Breather (NRB)/BVM	Goal of SPO2 100%

P

PITOCIN (Oxytocin)

SUPPLIED: 10 unit vials

PHARMACOLOGY AND ACTIONS:
Synthetic hormone which directly produces phasic uterine contractions characteristic of normal labor and to treat

INDICATIONS:
Control of postpartum hemorrhage. Consider fundal massage and baby to breast before use.

CONTRAINDICATIONS:
A. Hypersensitivity
B. Toxemia of pregnancy
C. Undelivered fetus

PRECAUTIONS:
A. Status post cervical or uterine surgery
B. Uterine sepsis

SIDE EFFECTS AND NOTES:
A. Hypertension
B. Subarachnoid hemorrhage
C. Dysrhythmias
D. Uterine rupture
E. Hyponatremia

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Postpartum Hemorrhage	20 units in 1000 ml NS or LR	IV	Run wide open to control hemorrhage. Use fundal massage in conjunction.

PEDIATRIC DOSING

P

SALINE 3%

SUPPLIED: 500 mL bag

PHARMACOLOGY AND ACTIONS:
Shown to decrease ICP and Increase CPP in adults and pediatrics

INDICATIONS:
A. Severe TBI declining GCS or signs of increased ICP

CONTRAINDICATIONS:
Hypotension less than 90

PRECAUTIONS:
Best use will be in head injury without life-threatening bleeding/shock

SIDE EFFECTS AND NOTES:

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Head injury with signs of increasing ICP	250 ml initial bolus	IV	• Hold all other crystalloids after 3% administration • **Additional bolus with OLMC if no response at 30 min** • Confirm a well-secured, working IV before administration to avoid extravasation

PEDIATRIC DOSING

INDICATION	DOSE	ROUTE	NOTES
INDICATION	DOSE	ROUTE	NOTES
Head injury with signs of increasing ICP	5 ml/kg	IV pump	• Hold all other crystalloids after 3% administration • **Additional bolus with OLMC if no response at 30 min** • Confirm a well-secured, working IV before administration to avoid extravasation

P

SODIUM BICARBONATE

SUPPLIED: 50 mEq / 50 cc pre-filled syringe.

PHARMACOLOGY AND ACTIONS:
Sodium Bicarbonate is an alkalotic solution which neutralizes metabolic acids. It also shifts potassium intracellularly. Finally, it has effects on sodium channels TCA overdose. Acidosis depresses cardiac contractility and responses to catecholamines, and makes the heart more likely to fibrillate and less likely to defibrillate. Sodium Bicarbonate has been shown to increase intracellular acidosis. Not recommended in the routine cardiac arrest sequence.

INDICATIONS:
A. Symptomatic tri-cyclic antidepressant overdose or hyperkalemia.
B. Suspected acidosis caused by prolonged cardiac arrest.
C. Cardiac arrest associated with burn or crush injury(ies) or release from entrapment

CONTRAINDICATIONS:
None

PRECAUTIONS:
A. Addition of too much bicarbonate may result in alkalosis that is difficult to reverse and may cause as many problems in resuscitation as acidosis.
B. May increase cerebral acidosis, especially in diabetics who are ketonic.
C. Do not mix Sodium Bicarbonate with calcium preparations. Slowly flush one drug from the catheter before administering the other.

SIDE EFFECTS AND NOTES:

ADULT DOSING

INDICATION	DOSE	ROUTE	NOTES
Symptomatic tri-cyclic antidepressant overdose	1 mEq / kg	IV/IO	Signs of overdose: Ventricular arrythmias, tachycardia, DLOC, decreased BP, seizures
Cardiac arrest (suspected hyperkalemia)	1 mEq / kg	IV/IO	With good ventilation, after calcium
Cardiac arrest secondary to excited delirium	100 mEq	IV/IO	With good ventilation
Hyperkalemia	50 mEq in 1 liter bag and titrate per OLMC	IV/IO	**OLMC required**
Entrapment/Crush injury	1 mEq/kg prior to removal of crush	IV/IO	**OLMC required**

PEDIATRIC DOSING

Use same dosing as for adult with exception of hyperkalemia, call OLMC for dosing in that situation. For children less than 10 kg (1 yr), dilute by one-half with Normal Saline prior to administration.

P

TRANEXAMIC ACID (TXA)

SUPPLIED: 1 g in 10 ml

PHARMACOLOGY AND ACTIONS:
Tranexamic acid is a synthetic antifibrinolytic that reversibly binds on plasminogen (plasmin). This prevents plasmin from binding to and degrading fibrin, and as a result, the administration of TXA helps support and preserve the body's clotting mechanisms.

INDICATIONS:
A. First line drug in the presence of massive trauma with hemorrhagic shock, with (for adult) SBP below 90mmHg or HR above 110. Must be given within first hour. OLMC greater than one hour from injury. Do not delay transport to begin infusion.

B. Traumatic arrest due to suspected blood loss. Do not delay transport.

C. Significant post-partum hemorrhaging with signs of shock

CONTRAINDICATIONS:

Injury > 1 hour Contact OLMC
History of blood clots
Uterine eversion

PRECAUTIONS:
Rapid infusion reported to cause hypotension

ADULT DOSING			
INDICATION	DOSE	ROUTE	NOTES
Hemorrhagic shock, with SBP less than 90mm Hg and/or HR above 110.	2g over 1-2 minutes.	IV/IO	**OLMC required 1 hour from injury**
Traumatic arrest due to suspected blood loss	2g over 1-2 minutes.	IV/IO	**OLMC required 1 hour from injury**
Significant post-partum hemorrhaging with signs of shock	1g over 1-2 minutes.	IV/IO	**OLMC required**
PEDIATRIC DOSING (Under 12 years old)			
Signs and symptoms of shock from traumatic blood loss.	15 mg/kg over 1-2 minutes.	IV/IO	**OLMC required 1 hour from injury**
Traumatic arrest due to suspected blood loss	15 mg/kg over 1-2 minutes.	IV/IO	**OLMC required 1 hour from injury**