

**Medication Protocols
Introduction**

Lorain County EMS Protocols
Medication Protocol 1
Revised 3/17/2006

1. PURPOSE

- 1.1. This section will discuss the medications and their pharmacology used in the State of Ohio State of Ohio Regional Physician Advisory Board EMS Guidelines and Procedures Manual.

2. MEDICATION LIST

NDC #	Brand Name	Generic Name	Form	Strength	Quantity
0574-0121-74	Actidose-Aqua	Activated Charcoal	Suspension	25 grams	1
55390-0068-01	Adenosine	Adenosine	Vial	12mg/ml	2
	Adenosine	Adenosine	Vial	6mg/ml	1
0548-3339-00	Atropine Sulf.	Atropine Sulfate	Syringe	1mg/10ml	3
1170410601	Atropine Sulf.	Atropine Sulf.	Auto-Inj.	2mg/10ml	15
63739-0025-01	Baby Aspirin	Aspirin 81mg	Tablet	81mg	>4
0074-2290-31	Benadryl	Diphenhydramine	Syringe	50mg/ml	2
0548-3304-00	Calcium Chl.	Calcium Chloride	Syringe	10%	2
63323-616-03	Cordadone	Amiodarone	SDV	150mg/3ml	3
0187-0746-33	Insta-Glucose	Dextrose	Gel	31 gram tube	3
0548-3316-00	Dextrose	Dextrose	Syringe	50%	2-3
0074-7809-22	Dopamine HCl	Dopamine HCl	IV Bag	400mg/250ml	1
0548-3316-00	Epinephrine 1:10,000	Epinephrine	Syringe	1mg/10ml	5
66860-021-02	Epinephrine 1:1,000	Epinephrine	Amp PF	1mg/ml	2
0548-9061-00	Epinephrine 1:1,000	Epinephrine	Vial	30mg/30ml	1
49502-0500-01	Epipen	Epinephrine	Auto-Inj.	0.3mg	1
55390-0004-01	GlucaGen	Glucagon	2 vials	1mg	1
0074-1144-01	Isoptin	Verapamil HCl	Vial	5mg/ml	2
0074-9631-04	Lasix	Furosemide	Syringe	40mg/4ml	3
0548-3390-00	Lidocaine 2%	Lidocaine HCl	Syringe	100mg/5ml	3
0338-0409-03	Lidocaine 20%	Lidocaine HCl	IV Bag	2gm/500ml	1
00074-1258-30	Morphine Sulf.	Morphine Sulfate	Syringe	4mg/ml	2
0548-1469-00	Narcan	Naloxone HCl	Syringe	2mg/2ml	2-3
58177-324-18	NitroQuick	Nitroglycerin	SL Tabs	0.4mg(1/150gr)	1

NDC #	Brand Name	Generic Name	Form	Strength	Quantity
59630-300-20	Nitro Pump Spray	Nitroglycerin	Spray Btl	400mcg/spray	1
	Nitrous Oxide	Nitrous Oxide	Gas	99%	1
	Oxygen	Oxygen	Gas		
63323-302-01	Pitressin	Vasopressin	Vial	20Units/ml	2
0641-0928-25	Phenergan	Promethazine	Vial	25mg/ml	2
1704251600	Pralidoxime Chloride	Pralidoxime Chloride	Auto-Inj.	600mg/10ml	15
49502-697-61	Proventil	Albuterol	Vial	2.5mg/3ml(.83%)	6-10
17270-721-01	Proventil	Albuterol	Aerosol	90mcg/Inh,17gm	1
63323-424-05	Romazicon	Flumazenil	Vial	0.5mg/5ml	2
0548-3352-00	Sod. Bicarb.	Sodium Bicarb.	Syringe	50mEq/50ml	2
	Sodium Chloride	Sodium Chloride	IV Bag	1000ml	>3
	Sodium Chloride	Sodium Chloride	IV Bag	500ml	>3
0074-6138-03	Sod. Chl./Irrig	Sodium Chloride	Solution	0.9%	3
0074-6139-03	Sterile Water	Sterile Water, Irrig.	Bottle	500ml	3
24208-920-64	Tetracaine HCl	Tetracaine HCl	Btl/Ophth	0.5%	2
	Toradol	Ketorolac tromethamine	Vial	60mg/2ml	1
6505-01-274-0951	Valium	Diazepam	Auto-inj.	10mg/10ml	5
00074-1273-32	Valium	Diazepam	Syringe	10mg/2ml	2

3. Drug Box Contents:

3.1. BLS

3.1.1. Actidose; Insta-Glucose; Epipen; NitroQuick; Oxygen; Proventil (90mcg/Inh, 17gm Multidose); Sodium Chloride irrigation, Sterile Water, NAAK (Atropine Auto-Inj., Pralidoxime Auto-Inj., Valium Auto-Inj.)

3.2. Intermediate

3.2.1. Actidose; Baby Aspirin; Benadryl; Insta-Glucose; Dextrose 50%; Epinephrine 1:1,000; Epipen; Glucagon; Morphine Sulphate; Narcan; NitroQuick; Nitro Pump Spray; Nitrous Oxide; Oxygen; Proventil (Vial); Proventil (Aerosol); Sodium Chloride IV (1000 & 500 cc bags); Sodium Chloride irrigation, Sterile Water; Toradol; Valium; NAAK (Atropine Auto-Inj., Pralidoxime Auto-Inj., Valium Auto-Inj.)

3.3. Paramedic

3.3.1. All of the drugs listed above in Section 2.

Medication Protocols
Pharmacology Review

Lorain County EMS Protocols
Medication Protocol 2
Revised 3/27/2006

1. PURPOSE/ACTIONS OF DRUGS
 - 1.1. Local Effects
 - 1.2. Systemic Effects
2. EFFECTS DEPENDANT UPON
 - 2.1. Age of Patient
 - 2.2. Condition of Patient
 - 2.3. Dosage
 - 2.4. Route of Administration
3. ROUTE OF ADMINISTRATION
 - 3.1. Intravenous (IV)
 - 3.1.1. Most Rapidly Effective
 - 3.1.2. Most Dangerous
 - 3.1.3. Give SLOWLY Through an Established IV Line
 - 3.2. Intramuscular (IM)
 - 3.2.1. Takes Longer to Act
 - 3.2.2. Longer Duration of Action
 - 3.2.3. Deltoid or Gluteus Maximus Site
 - 3.2.4. Absorption VERY Dependent on Blood Flow
 - 3.3. Subcutaneous (SQ)
 - 3.3.1. Slower and More Prolonged Absorption
 - 3.3.2. Under Skin of Upper Arms, Thigh, Abdomen
 - 3.4. Inhalation
 - 3.4.1. Bronchodilators
 - 3.4.2. Steroids
 - 3.5. Endotracheal
 - 3.5.1. Epinephrine, Atropine, Lidocaine, Narcan
 - 3.5.2. Dilute Usual IV Dose with 10cc of Sterile Water
 - 3.6. Sublingual (SL)
 - 3.6.1. Rapid Absorption
 - 3.7. Oral

- 3.7.1. Ipecac
 - 3.7.2. Charcoal
 - 3.8. Rectal
 - 3.8.1. Rapid but Unpredictable Absorption
 - 3.9. Intracardiac
 - 3.9.1. Dangerous
 - 3.9.2. No Advantage Over IV or Endotracheal Routes
 - 3.9.3. Dilute Usual IV Dose with 10cc of Sterile Water
- 4. RATES OF ABSORPTION
 - 4.1. "Directly Related to Route of Administration"
 - 4.1.1. IV -- Fastest
 - 4.1.2. IM
 - 4.1.3. SQ
 - 4.1.4. Oral -- Slowest
- 5. ELIMINATION
 - 5.1. Many Methods
 - 5.2. Usually Metabolized by the Liver
 - 5.3. Eliminated by the Kidneys, Lungs, Skin
- 6. TERMS
 - 6.1. Indications - Conditions Drugs Used For
 - 6.2. Contraindications - Conditions Drugs Not Used For
 - 6.3. Depressants - Lessens / Decreases Activity
 - 6.4. Stimulant - Increases Activity
 - 6.5. Physiologic Action - Action From Normal Body Amounts of Drug
 - 6.6. Therapeutic Action - Beneficial Action Expected
 - 6.7. Untoward Reaction - Harmful Side Effect
 - 6.8. Irritation - Damage to Tissue
 - 6.9. Antagonism - Opposition Between Effects of Drugs
 - 6.10. Cumulative Action - Increased Action After Several Doses
 - 6.11. Tolerance - Decreased Effects After Repeated Doses
 - 6.12. Synergism - Combined Effects Greater Than Sum of Parts
 - 6.13. Potentiation - Enhancement of One Drug by Another
 - 6.14. Habituation - Drug Necessary for Feeling of "Well Being"
 - 6.15. Idiosyncrasy - Unexpected, Abnormal Response to a Drug
 - 6.16. Hypersensitivity - Exaggerated Response, Allergy
- 7. AUTONOMIC NERVOUS SYSTEM
 - 7.1. Controls Automatic or Involuntary Actions

- 7.2. Parasympathetic - Controls Vegetative Functions
- 7.3. Sympathetic - "Flight or Fight"
- 8. PARASYMPATHETIC NERVOUS SYSTEM
 - 8.1. Mediated by vagus nerve
 - 8.2. Acetylcholine is transmitter (cholinergic)
 - 8.3. Atropine is Acetylcholine Blocker
- 9. SYMPATHETIC NERVOUS SYSTEM
 - 9.1. Mediated by Nerves from Sympathetic Chain
 - 9.2. Norepinephrine is Transmitter (Adrenergic)
 - 9.3. Epinephrine is Released from Adrenals
- 10. SYMPATHETIC RECEPTORS
 - 10.1. Alpha (a)
 - 10.2. Beta (b)
- 11. COMMON SYMPATHETIC AGENTS
 - 11.1. Isoproterenol (Isuprel) - pure BETA
 - 11.2. Epinephrine (Adrenaline) - predominately BETA
 - 11.3. Dobutamine (Dobutrex) - predominately BETA, slight ALPHA
 - 11.4. Norepinephrine (Levophed) - predominately ALPHA
 - 11.5. Dopamine (Intropin) - BETA at low dose: ALPHA at high dose
 - 11.6. Metaraminol (Aramine) - predominately ALPHA
 - 11.7. Phenylephrine (Neo-Synephrine) - pure ALPHA
- 12. SYMPATHETIC BLOCKERS
 - 12.1. Propranolol (Inderal) - BETA BLOCKER
- 13. DRUG ADMINISTRATION
 - 13.1. Appropriate:
 - 13.1.1. Indication
 - 13.1.2. Order
 - 13.1.3. Dose
 - 13.1.4. Observation
 - 13.1.5. Dilution
 - 13.1.6. Route
 - 13.1.7. Rate

Medication Protocols
Activated Charcoal

Lorain County EMS Protocols
Medication Protocol 3
Revised 3/27/2006

1. THERAPEUTIC EFFECTS:
 - 1.1. Charcoal is an absorbent that adheres to many toxins, inhibiting their absorption from the GI tract
2. INDICATIONS:
 - 2.1. Poisoning / overdose
3. CONTRAINDICATIONS:
 - 3.1. None known
4. SIDE EFFECTS:
 - 4.1. Black stools
 - 4.2. Nausea
 - 4.3. Constipation
 - 4.4. Intestinal Obstruction—with sorbitol- may cause diarrhea
5. HOW SUPPLIED:
 - 5.1. 0.625g/5ml, 1g/5ml, 1.25g/5ml
6. ADULT DOSAGE:
 - 6.1. 1 to 2 g/kg (usually 30 to 100g) in 4-8 ounces water (or 10 times ingested toxin)
7. PEDIATRIC DOSAGE:
 - 7.1. 1 g/kg (or ten times ingested toxin)

Medication Protocols
Adenosine (Adenocard)

Lorain County EMS Protocols
Medication Protocol 4
Revised 3/27/2006

1. THERAPEUTIC EFFECTS:
 - 1.1. Adenosine slows Tachycardia associated with the AV node via modulation of the autonomic nervous system without causing negative inotropic effects. It acts directly on sinus pacemaker cells and Vagal nerve terminals to decrease chronotropic and dromotropic activity. Adenosine is the drug of choice for paroxysmal Supraventricular Tachycardia (PSVT) and can be used diagnostically for stable, wide-complex Tachycardia of unknown type after two doses of lidocaine.
2. CONTRAINDICATIONS:
 - 2.1. Second or third degree AV block, or sick-sinus syndrome
 - 2.1.1. Atrial flutter
 - 2.1.2. Atrial fibrillation
 - 2.1.3. Ventricular Tachycardia
 - 2.1.4. Hypersensitivity to adenosine
3. SIDE EFFECTS:
 - 3.1. Facial flushing Chest pain
 - 3.2. Lightheadedness Hypotension
 - 3.3. Paresthesia, Shortness of breath
 - 3.4. Headache Nausea
 - 3.5. Diaphoresis Metallic taste
 - 3.6. Palpitations
4. HOW SUPPLIED:
 - 4.1. 6mg/2ml and 12mg/4ml vials or prefilled syringes
5. ADULT DOSAGE:
 - 5.1. Initial Dose:6mg rapid IVP (over 1-3 sec.)immediately followed with a 20cc saline flush
 - 5.2. Repeat Dose: If no response is observed after 1-2 min., administer 12mg rapid IVP (over 1-3 sec.) immediately followed with a 20 cc saline flush to a max of 30 mg for an adult.
6. PEDIATRIC DOSAGE:
 - 6.1. Initial Dose:0.1mg/kg rapid IVP followed with a 10cc saline flush
 - 6.2. Repeat Dose: If no response is observed after 1-2 min., administer 0.2mg/kg rapid IVP followed with a 10cc saline flush up to a max dose of 0.5 mg/kg for pediatrics.

Medication Protocols Albuterol/Ventolin	Lorain County EMS Protocols Medication Protocol 5 Revised 3/2006, 7/17/2006
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1. THERAPEUTIC EFFECTS:
 - 1.1. Beta-2 stimulator, dilates smooth muscle, bronchodilator
2. INDICATIONS:
 - 2.1. Shortness of breath caused by bronchoconstriction
3. CONTRAINDICATIONS:
 - 3.1. Allergy to drug
 - 3.2. Shortness of breath not from bronchoconstriction
4. SIDE EFFECTS:
 - 4.1. Nervousness
 - 4.2. Weakness
 - 4.3. Tremor
 - 4.4. Increased heart rate
5. HOW SUPPLIED:
 - 5.1. Unit dose 2.5mg vials (3ml)
 - 5.2. Metered dose inhaler 90 mcg/spray multi-dose inhaler.
6. ADMINISTRATION:
 - 6.1. By inhalation through a breathing aerosol device or multi-dose inhaler.
7. ADULT DOSAGE:
 - 7.1. 2.5mg in N/S via aerosol device with oxygen at 6 liter per minute.
 - 7.2. 90 mcg/spray via multi-dose inhaler.
8. PEDIATRIC DOSAGE:
 - 8.1. 2.5mg in N/S via aerosol device with oxygen at 6 liter per minute.
 - 8.2. 90 mcg/spray via multi-dose inhaler.

Medication Protocols
Aspirin

Lorain County EMS Protocols
Medication Protocol 6
Revised 3/27/2006

1. THERAPEUTIC EFFECTS:
 - 1.1. Aspirin exhibits analgesic, anti-inflammatory and antipyretic activity. Due to aspirin's ability to inhibit platelet aggregation and cause vasodilatation, there is a decreased likelihood of thrombosis.
2. INDICATIONS:
 - 2.1. Sudden onset of cardiac related chest pain
 - 2.2. Patient must fit thrombolytic profile:
 - 2.2.1. 30 or older
 - 2.2.2. Systolic < 180 / Diastolic < 110
 - 2.2.3. Persistent chest pain 15 minutes or longer
 - 2.2.4. Lack of stroke, bleeding, CNS problems, trauma
 - 2.2.5. No pregnancy
3. CONTRAINDICATIONS:
 - 3.1. Aspirin hypersensitivity
 - 3.2. Active or history of GI lesions
 - 3.3. Impaired renal function
4. SIDE EFFECTS:
 - 4.1. GI bleeds
 - 4.2. Mucosal lesions
 - 4.3. Bronchial spasm in some asthma patients
5. HOW SUPPLIED:
 - 5.1. 325mg coated tablets or 4 – 81 mg. Tablets
6. ADMINISTRATION:
 - 6.1. Orally
7. ADULT DOSAGE:
 - 7.1. 160-325mg upon onset of cardiac signs and symptoms

Medication Protocols
Atropine Sulfate

Lorain County EMS Protocols
Medication Protocol 7
Revised 3/2006, 7/17/2006

1. THERAPEUTIC EFFECTS:

- 1.1. By blocking parasympathetic (Vagal) action on the heart, atropine increases the rate of discharge by the sinus node, enhances conduction through the AV junction, and accelerates the heart rate, thereby improving cardiac output.
- 1.2. In addition, by speeding up a slow heart to a normal rate, atropine reduces the chances of Ectopic activity in the ventricles and thus of ventricular fibrillation.
- 1.3. Atropine is most effective in reversing bradycardia due to increased parasympathetic tone or to morphine; it is less effective in treating bradycardia due to actual damage to the AV or SA node.

2. INDICATIONS:

- 2.1. SINUS BRADYCARDIA when accompanied by hypotension
- 2.2. SECOND and THIRD DEGREE HEART BLOCK when accompanied by bradycardia
- 2.3. In some cases of ASYSTOLE to remove any type of heart block
- 2.4. As an antidote in ORGANOPHOSPHATE POISONING (Mega doses)

3. CONTRAINDICATIONS:

- 3.1. Atrial flutter or Atrial fibrillation where there is a rapid ventricular response
- 3.2. Glaucoma - narrow angle
- 3.3. Use with extreme caution in myocardial infarction

4. SIDE EFFECTS:

- 4.1. The patient should be warned that they may experience some of the following side effects and that these side effects are part of the drug's usual and expected actions:
 - 4.1.1. Blurred vision, headache, Pupil dilatation* Dry mouth, thirst
 - 4.1.2. Flushing of the skin

5. HOW SUPPLIED:

- 5.1. Prefilled syringes containing 1mg in 10ml
- 5.2. Auto-Injector containing 2 mg. Used only for Nerve Agent Exposure!

6. ADMINISTRATION:

- 6.1. In the field, atropine is usually given intravenously for bradycardia
- 6.2. For organophosphate poisoning, a combination of intravenous and Intramuscular administration is commonly used
- 6.3. In resuscitation from cardiac arrest, if an intravenous route cannot be established, atropine may be given through the endotracheal tube

7. ADULT DOSAGE:

- 7.1. In bradycardia: 0.5mg IV, repeated at 5-minute intervals until the desired heart rate is achieved
 - 7.2. The total dose should not, however, exceed 3.0mg. (Except in organophosphates)
 - 7.3. Doses smaller than 0.5mg, or a dose given too slowly, may slow rather than speed up the heart rate
 - 7.4. Excessive doses may precipitate ventricular Tachycardia or fibrillation
 - 7.5. For Asystole, 1mg IV, repeated in 5 minutes if Asystole persists.
 - 7.6. For organophosphate poisoning: 2mg IM and 1mg IV.
 - 7.7. The IV dose may be repeated every 5 to 10 minutes as needed until a decrease in secretions is observed
 - 7.8. Endotracheal Dosage: 1.0-2.0mg diluted in 10ml NS
8. PEDIATRIC DOSAGE:
- 8.1. In bradycardia: 0.02mg/kg; may be repeated one time
 - 8.2. Minimum dose - 0.1mg
 - 8.3. Maximum dose - 0.5mg in child/1.0mg in adolescent
Endotracheal Dosage: 0.02mg/kg diluted in 10ml NS

Medication Protocols
Calcium Chloride

Lorain County EMS Protocols
Medication Protocol 8
Revised 3/27/2006

1. THERAPEUTIC EFFECTS:
 - 1.1. Reverses overdose with magnesium sulfate or calcium channel blockers (such as Verapamil).
 - 1.2. Previously, calcium was used in resuscitation because it was believed to stimulate the heart to beat in Asystole and to strengthen cardiac contractions in electromechanical dissociation.
 - 1.3. However, careful recent studies have failed to show any benefit from using calcium in cardiac arrest, and indeed the effects of calcium maybe harmful in that situation.
2. INDICATIONS:
 - 2.1. As an antidote to magnesium sulfate and Verapamil toxicity.
 - 2.2. When hyperkalemia or hypocalcemia is present (e.g., after multiple blood transfusions)
3. CONTRAINDICATIONS:
 - 3.1. Should be given with extreme caution, and in reduced dosage, to persons taking digitalis.
 - 3.2. Should not be given in the same infusion with sodium bicarbonate, since calcium chloride will combine with sodium bicarbonate to form an insoluble precipitate (calcium carbonate).
4. SIDE EFFECTS:
 - 4.1. When given to a patient who has been taking digitalis or when given too rapidly, calcium can cause sudden death from ventricular fibrillation.
 - 4.2. Given in appropriate circumstances, calcium preparations have no significant side effects.
5. HOW SUPPLIED:
 - 5.1. Calcium chloride: 10 ml of a 10% solution in prefilled syringes (1 gram)
6. ADMINISTRATION:
 - 6.1. Calcium preparations are given as a slow intravenous injection.
7. DOSAGE:
 - 7.1. For Verapamil toxicity:
 - 7.1.1. Calcium Chloride, 10 ml of a 10% solution slowly IV.
 - 7.2. For Cardiac Arrest:
 - 7.2.1. Calcium Chloride, 5ml (500mg) slow IVP.

Medication Protocols
Dextrose (Instant Glucose)

Lorain County EMS Protocols
Medication Protocol 09
Revised 3/2006, 7/17/2006

1. THERAPEUTIC EFFECTS:
 - 1.1. Restores circulating blood sugar level to normal in states of hypoglycemia.
 - 1.2. Acts transiently as an osmotic diuretic.
2. INDICATIONS:
 - 2.1. FOR PEDIATRIC PATIENTS:
 - 2.1.1. When blood sugar reading is below 70 with Glucometer:
 - 2.1.2. to treat coma caused by HYPOGLYCEMIA;
 - 2.1.3. to treat COMA OF UNKNOWN CAUSE;
 - 2.1.4. to treat STATUS EPILEPTICUS OF UNCERTAIN CAUSE; and
 - 2.1.5. some cases of REFRACTORY CARDIAC ARREST
3. CONTRAINDICATIONS:
 - 3.1. Intracranial hemorrhage
4. SIDE EFFECTS:
 - 4.1. Will cause tissue necrosis if it infiltrates; should therefore be given only through a good, rapidly flowing IV line
5. HOW SUPPLIED:
 - 5.1. Instant Glucose in a tube.
6. ADMINISTRATION:
 - 6.1. Instant Glucose given orally.
7. PEDIATRIC DOSAGE:
 - 7.1. Instant Glucose given orally.

Medication Protocols
Dextrose 50% (D50)

Lorain County EMS Protocols
Medication Protocol 10
Revised 3/2006, 7/17/2006

1. THERAPEUTIC EFFECTS:
 - 1.1. Restores circulating blood sugar level to normal in states of hypoglycemia.
 - 1.2. Acts transiently as an osmotic diuretic.
2. INDICATIONS:
 - 2.1. When blood sugar reading is below 70 with Glucometer:
 - 2.1.1. to treat coma caused by HYPOGLYCEMIA;
 - 2.1.2. to treat COMA OF UNKNOWN CAUSE
 - 2.1.3. to treat STATUS EPILEPTICUS OF UNCERTAIN CAUSE; and
 - 2.1.4. some cases of REFRACTORY CARDIAC ARREST
3. CONTRAINDICATIONS:
 - 3.1. Intracranial hemorrhage
4. SIDE EFFECTS:
 - 4.1. May precipitate severe neurologic symptoms in alcoholics
 - 4.2. Will cause tissue necrosis if it infiltrates; should therefore be given only through a good, rapidly flowing IV line
5. HOW SUPPLIED:
 - 5.1. Prefilled syringes and vials containing 50ml of 50% dextrose (= 25g of dextrose)
6. ADMINISTRATION:
 - 6.1. Given intravenously, through a free-flowing intravenous line, preferably in a large vein
 - 6.2. If possible, draw blood for serum glucose determinations before administering the dextrose
7. ADULT DOSAGE:
 - 7.1. 50ml of 50% dextrose (25g) as a bolus IV
8. PEDIATRIC DOSAGE:
 - 8.1. 1ml/kg in children over 50 pounds (Strictly for D50, not D25)

Medication Protocols
Diazepam (Valium)

Lorain County EMS Protocols
Medication Protocol 11
Revised 05/01/2005

1. THERAPEUTIC EFFECTS:
 - 1.1. Through its depressant action on the central nervous system, can terminate some seizures.
 - 1.2. Also has a calming effect in anxiety.
2. INDICATIONS:
 - 2.1. To treat STATUS EPILEPTICUS
 - 2.2. Given as a sedative prior to CARDIOVERSION in conscious patients
3. CONTRAINDICATIONS:
 - 3.1. Patients with allergies to benzodiazepines
 - 3.2. Should not be given to patients who have taken alcohol or other sedative drugs
 - 3.3. Should not be given to patients with respiratory depression from any source
 - 3.4. Should not be given to patients with hypotension
4. SIDE EFFECTS:
 - 4.1. Possible hypotension
 - 4.2. Confusion, stupor
 - 4.3. In some patients, especially the elderly, the very ill, and those with pulmonary disease, may cause respiratory arrest and/or cardiac arrest.
5. HOW SUPPLIED:
 - 5.1. In prefilled syringes and Ampules of 2ml and in vials of 10ml, in a concentration of 5mg/ml
 - 5.2. In a Nerve Agent Antidote Kit in an Auto-Injector containing 10 mg.
6. ADMINISTRATION:
 - 6.1. Given intravenously in slow titrated doses or intramuscularly in severe anxiety
 - 6.2. Before administering the drug, check and record the patient's vital signs
7. ADULT DOSAGE:
 - 7.1. For Status Epilepticus: Give 5mg (1.0ml) SLOWLY IV

- 7.2. Wait a few minutes, and recheck the BP; if it has fallen, do not give any more of the drug. If it is stable, and the desired therapeutic effect has not been achieved, give another 2.5mg (0.5ml) IV. Then recheck the BP. Continue until the seizures have stopped or the BP drops, but do not exceed a total dose of 10mg in the field.
 - 7.3. For Severe Anxiety that must, for some reason, be treated in the field:
Give intramuscularly: 2 to 5mg IM
8. PEDIATRIC DOSAGE:
- 8.1. 0.2mg/kg slow IVP (over 3 min.); maximum dose 5mg
 - 8.2. Rectally: 0.5mg/kg with endo-ject catheter to a maximum of 10mg

Medication Protocols Diphenhydramine Hcl (Benadryl)	Lorain County EMS Protocols Medication Protocol 12 Revised 05/2005, 7/17/2006
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1. THERAPEUTIC EFFECTS:

- 1.1. Blocks histamine effects in allergic reactions
- 1.2. Sedative
- 1.3. Reverses untoward effects of some phenothiazine tranquilizers.
- 1.4. Inhibits motion sickness (antiemetic)

2. INDICATIONS:

- 2.1. As an adjunct to epinephrine in the treatment of ANAPHYLACTIC SHOCK and SEVERE ALLERGIC REACTIONS
- 2.2. To treat EXTRAPYRAMIDAL REACTIONS (Parkinson-like movement disorders) caused by phenothiazine

3. CONTRAINDICATIONS:

- 3.1. Asthma
- 3.2. Narrow angle (acute) glaucoma
- 3.3. Prostate enlargement
- 3.4. Ulcer disease with symptoms of obstruction
- 3.5. Pregnancy

4. SIDE EFFECTS:

- 4.1. Resemble those of atropine:
 - 4.1.1. Drowsiness, confusion
 - 4.1.2. Blurring of vision
 - 4.1.3. Dry mouth
 - 4.1.4. Wheezing; thickening of bronchial secretions

5. HOW SUPPLIED:

- 5.1. In vials of 1ml containing 50mg/ml
- 5.2. In Ampules of 1ml containing 50mg/ml
- 5.3. In prefilled syringes containing 50mg in 2ml

6. ADMINISTRATION:

- 6.1. For most purposes, Diphenhydramine can be by deep Intramuscular injection or IVP

7. ADULT DOSAGE:

- 7.1. 25-50mg

8. PEDIATRIC DOSAGE:

- 8.1. 1mg/kg with no hypotension IM or IV

Medication Protocols
Dopamine (Intropin)

Lorain County EMS Protocols
Medication Protocol 13
Revised 05/01/2005

1. THERAPEUTIC EFFECTS:

- 1.1. Beta sympathetic drug-hence causes an increase in the force and rate of cardiac contractions as well as dilatation of renal and mesenteric arteries.
- 1.2. This latter effect promotes urine flow, and for this reason, dopamine is sometimes preferred over Norepinephrine (which constricts renal arteries) in shock.
- 1.3. Dopamine causes less increase in oxygen consumption by the myocardium than does Isoproterenol.
- 1.4. At low doses, the beta effects of dopamine predominate; at high doses, dopamine has alpha effects as well and thus will cause vasoconstriction.

2. INDICATIONS:

- 2.1. To increase cardiac output in **CARDIOGENIC SHOCK** while maintaining good renal perfusion

3. CONTRAINDICATIONS:

- 3.1. Should not be used as first-line therapy in hypotension caused by hypovolemia (e.g., Hemorrhagic shock), where volume replacement should precede the use of vasopressors
- 3.2. Pheochromocytoma (a tumor that produces epinephrine and/or related substances)
- 3.3. Should not be given in the presence of uncorrected tachyarrhythmias or ventricular fibrillation
- 3.4. Do not mix with bicarbonate since dopamine may be inactivated by alkaline solutions

4. SIDE EFFECTS:

- 4.1. Ectopic beats, palpitations, Tachycardia
- 4.2. Nausea, vomiting
- 4.3. Dyspnea, angina
- 4.4. Headache

5. HOW SUPPLIED:

- 5.1. 400mg in 250ml D5W Pre-Mix

6. ADMINISTRATION:

- 6.1. Given by titrated intravenous infusion (microdrip infusion set)

7. ADULT DOSAGE:

- 7.1. **START** the infusion at a rate of 5mcg/kg/min (e.g., 140-350ug/min for a 70kg man, or roughly 0.25ml/min of the above dilution). **TITRATE** the infusion according to the state of consciousness, blood pressure, and urine flow

Medication Protocols
Epinephrine (Adrenalin)

Lorain County EMS Protocols
Medication Protocol 14
Revised 05/2005, 7/17/2006

1. THERAPEUTIC EFFECTS:

- 1.1. In cardiac arrest, may restore electrical activity in Asystole; increases myocardial contractility; and decreases the threshold for defibrillation--all through its actions as a beta sympathetic agent.
- 1.2. In addition, the alpha effects of epinephrine cause vasoconstriction, which elevates the perfusion pressure and may improve coronary blood flow during external cardiac compressions.
- 1.3. In anaphylaxis, acts as a bronchodilator (beta effect) and helps maintain blood pressure (alpha effect).

2. INDICATIONS:

- 2.1. In CARDIAC ARREST, to restore electrical activity in Asystole or to enhance defibrillation potential in ventricular fibrillation; also to elevate systemic vascular resistance and thereby improve perfusion pressure during resuscitation
- 2.2. To treat the life-threatening symptoms of ANAPHYLAXIS
- 2.3. To treat acute attacks of ASTHMA

3. CONTRAINDICATIONS:

- 3.1. Must be used with caution in patients with angina, hypertension, or hyperthyroidism
- 3.2. THERE ARE NO CONTRAINDICATIONS TO THE USE OF EPINEPHRINE IN THE SITUATION OF CARDIAC ARREST OR ANAPHYLACTIC SHOCK

4. SIDE EFFECTS:

- 4.1. In a conscious patient, may cause palpitations, from Tachycardia or Ectopic beats, and elevations of blood pressure (which may not be desirable if the patient is already hypertensive)
- 4.2. The asthmatic with preexisting heart disease may experience dysrhythmias if treated with epinephrine

5. HOW SUPPLIED:

- 5.1. Prefilled syringes containing 1mg in 10ml (1:10,000 solution)
- 5.2. Ampules containing 1mg in 1ml (1:1,000 solution)
- 5.3. Multi-dose vial: 30mg in 30ml (1:1,000 solution)

6. ADMINISTRATION:

- 6.1. In cardiac arrest, epinephrine is given intravenously in an escalating dose every 3-5 minutes
 - 6.2. If an IV route cannot be established quickly, the drug may be instilled in the tracheo-bronchial tree via catheter through an endotracheal tube
 - 6.3. For anaphylactic reactions, epinephrine is given subcutaneous
7. ADULT DOSAGE:
- 7.1. CARDIAC ARREST SITUATIONS:
 - 7.1.1. Initial Dose: 1 mg (10 ml of 1:10,000 solution)
 - 7.1.2. Second and subsequent doses: 1 mg (10 ml of 1:10,000)
 - 7.1.3. Endotracheal dose: 2mg (1:1,000) diluted with 10ml normal saline given via catheter during ventilation
 - 7.1.4. ANAPHYLACTIC REACTIONS: Contact Medical Control for patients that are of age 40 years and up
 - 7.1.4.1. Mild reactions: 0.3 mg subcutaneous, (0.3ml of a 1:1,000 solution).
 - 7.1.4.2. Severe reactions, with shock: 0.5mg slow IV. (5ml of a 1:10,000 solution)
 - 7.1.4.3. FOR SEVERE ASTHMATIC ATTACKS: Contact Medical Control for patients that are of age 40 years and up, give 0.3 to 0.5 ml of a 1:1,000 solution, SQ.
8. PEDIATRIC DOSAGE:
- 8.1. Bradycardia: 0.01mg/kg 1:10,000 every 3 minutes
 - 8.2. Cardiac Arrest:
 - 8.3. Initial Dose: 0.01mg/kg 1: 10,000 IVP or IOP
 - 8.4. Second & Subsequent Dose: 0.1mg/kg 1:1000 IVP or IOP
 - 8.5. Endotracheal: 0.1mg/kg 1:1,000 diluted with 2ml of NS
 - 8.6. Newborn Cardiac Arrest:: 0.02mg/kg 1:10,000 every 5 min. By IV, IO
 - 8.7. Allergic Reaction/Asthma: 0.01mg/kg 1:1,000 SQ Max 0.3mg. No response and IV in place, 0.01mg/kg 1:10,000 IVP.

Medication Protocols
Furosemide (Lasix)

Lorain County EMS Protocols
Medication Protocol 15
Revised 05/01/2005

1. THERAPEUTIC EFFECTS:
 - 1.1. Potent diuretic, causing the excretion of large volumes of urine within 5 to 30 minutes of administration, thus useful in ridding the body of excess fluid in conditions such as congestive heart failure (CHF).
2. INDICATIONS:
 - 2.1. To reverse fluid overload associated with CONGESTIVE HEART FAILURE and PULMONARY EDEMA
3. CONTRAINDICATIONS:
 - 3.1. Should not be given to pregnant women
 - 3.2. Should not be given to patients with hypokalemia (low potassium)
 - 3.3. Hypokalemia may be suspected in a patient who has been on chronic diuretic therapy or whose EKG shows prominent P waves, diminished T waves, and the presence of U waves
4. SIDE EFFECTS:
 - 4.1. Immediate side effects may include nausea and vomiting, potassium depletion (with cardiac dysrhythmias), and dehydration
5. HOW SUPPLIED:
 - 5.1. Pre-filled syringes of 10ml in a concentration of 10mg/ml
6. ADMINISTRATION:
 - 6.1. In the field, Furosemide is given intravenously.
7. ADULT DOSAGE:
 - 7.1. 40-80 mg SLOWLY IV (injected over 1-2 min) depending on size and condition of patient.

Medication Protocols
Glucagon

Lorain County EMS Protocols
Medication Protocol 16
Revised 05/01/2005

1. THERAPEUTIC EFFECTS:
 - 1.1. Accelerates the breakdown of glycogen to glucose in the liver, causing an increase in blood glucose level.
 - 1.2. Glucagon also relaxes the smooth muscle of the GI tract
 - 1.3. Glucagon is helpful in hypoglycemia only if the liver glycogen is available.
 - 1.4. Because Glucagon is of little or no help in states of starvation, adrenal insufficiency, or chronic hypoglycemia, glucose should be considered for the treatment of hypoglycemia.
2. INDICATIONS:
 - 2.1. For the treatment of hypoglycemia when IV Dextrose is not available in anaphylaxis, if the patient is on beta blocking medication, hypertensive, has known coronary artery disease and/or is pregnant
3. CONTRAINDICATIONS:
 - 3.1. Glucagon is contraindicated in patients with known hypersensitivity to it or in patients with Pheochromocytoma
4. SIDE EFFECTS:
 - 4.1. Glucagon is relatively free of adverse reactions except for occasional nausea and vomiting which may also occur with hypoglycemia
 - 4.2. Generalized allergic reactions including urticaria, respiratory distress and hypotension, has been reported in patients who receive Glucagon by injection
5. HOW SUPPLIED:
 - 5.1. Vials of 1mg Glucagon with 1ml of diluting solution
6. ADMINISTRATION:
 - 6.1. For adults and for children weighing more than 20kg, administration may be by subcutaneous, intramuscular or intravenous injection.
 - 6.2. Glucagon must be reconstituted with dilution solution provided and used immediately. If dose is higher than 2mg, reconstitute with sterile water for injection and use immediately

- 6.3. Glucagon is compatible with dextrose solutions, BUT PRECIPITATES MAY FORM IN SOLUTIONS OF SODIUM CHLORIDE, potassium chloride or calcium chloride
7. ADULT DOSAGE:
 - 7.1. In hypoglycemia, 0.5 to 1.0mg IV, SQ or IM injection. Response is usually seen in 5 to 20 minutes. If no response, dose may be repeated 1 to 2 times
8. PEDIATRIC DOSAGE:
 - 8.1. Contact med control.

Medication Protocols
Lidocaine (Xylocaine) 2%

Lorain County EMS Protocols
Medication Protocol 17
Revised 05/01/2005

1. THERAPEUTIC EFFECTS:
 - 1.1. Suppresses ventricular Ectopic activity by decreasing the excitability of heart muscle and the cardiac conduction system.
2. CONTRAINDICATIONS:
 - 2.1. Known history of allergy to Lidocaine or local anesthetics (e.g., Novocain)
 - 2.2. Second or third degree heart block
 - 2.3. Wide complex ventricular escape beats associated with Sinus Bradycardia or sinus arrest Idioventricular rhythm
 - 2.4. Prophylactic use in AMI patients is not recommended.
3. SIDE EFFECTS:
 - 3.1. By decreasing the force of cardiac contractions as well as decreasing peripheral resistance, may cause a fall in cardiac output and blood pressure
 - 3.2. May cause numbness, drowsiness, or confusion when given in high doses, especially to the elderly or to patients in heart failure, may cause seizures.
 - 3.3. Discontinue use if signs of toxicity develop.
4. HOW SUPPLIED:
 - 4.1. Ampules and prefilled syringes containing 100mg in 5ml (20 mg/ml) for bolus injection. Maintenance infusion is 2g in 500 ml of D5W to result in a concentration of 4 mg/ml.
5. ADMINISTRATION:
 - 5.1. Given by intravenous bolus. If an intravenous route cannot be established, Lidocaine may be given via catheter through an endotracheal tube
 - 5.2. Reduce the dosage (both bolus and infusion) by half for patients in congestive heart failure or shock and for patients over 70 years old
 - 5.3. If arrhythmia is resolved with boluses, start a maintenance infusion.

<i>mg/minute:</i>	1 mg	2 mg	3 mg	4 mg
gtts/minute (60gtts/ml set)	15 gtts/min	30 gtts/min	45 gtts/min	60 gtts/min

6. ADULT DOSAGE:

6.1. 1.0 to 1.5mg/kg IV push; may repeat as needed every 5 minutes to a max dose of 3.0 mg/kg.

7. PEDIATRIC DOSAGE:

7.1. V-Fib: 1 mg/kg IV push, IO or ET

Medication Protocols
Morphine Sulfate

Lorain County EMS Protocols
Medication Protocol 18
Revised 05/01/2005

1. THERAPEUTIC EFFECTS:
 - 1.1. Decreases pulmonary edema by pooling blood in the peripheral circulation and thereby reducing venous return to the heart.
 - 1.2. Helps as well to decrease the anxiety associated with pulmonary edema.
2. INDICATIONS:
 - 2.1. To treat PULMONARY EDEMA associated with CONGESTIVE HEART FAILURE
 - 2.2. To RELIEVE PAIN in myocardial infarction and other selected conditions.
3. CONTRAINDICATIONS:
 - 3.1. Marked hypotension.
 - 3.2. Respiratory depression, except that caused by pulmonary edema, when the drug may be used if ventilatory support is provided.
4. SIDE EFFECTS:
 - 4.1. Hypotension (most likely in volume depleted patients).
 - 4.2. Increased vagal tone, leading to bradycardia. (This effect can be reversed with atropine.)
 - 4.3. Respiratory depression. (This effect can be reversed with Naloxone.)
 - 4.4. Nausea and vomiting.
5. HOW SUPPLIED:
 - 5.1. Prefilled (tubex) syringes containing 10mg.
6. ADMINISTRATION:
 - 6.1. Given by titrated intravenous injection. Administer over 1-5 minutes to reduce nausea and vomiting.
 - 6.2. If hypotension occurs, keep the patient flat, and do not give more of the drug. Watch for respiratory depression.
7. ADULT DOSAGE:
 - 7.1. 2 to 5mg slow IV push every 5 to 30 minutes until the desired therapeutic effect is achieved. Do not exceed 15mg in the field.

Medication Protocols
Naloxone (Narcan)

Lorain County EMS Protocols
Medication Protocol 19
Revised 05/01/2005

1. THERAPEUTIC EFFECTS:
 - 1.1. Specific antidote for narcotic agents.
 - 1.2. Reverses the actions of all narcotic drugs including Heroin, Morphine, Methadone, Codeine, Demerol, Dilaudid, Darvon, Paregoric, and Percodan.
Naloxone is thus effective in counteracting the effects of overdose from any of these agents.
 - 1.3. Naloxone will reverse stupor, coma, respiratory depression, etc. when these are due to narcotic overdose.
2. INDICATIONS:
 - 2.1. To treat known NARCOTIC OVERDOSE or coma suspected to be due to narcotic overdose.
3. CONTRAINDICATIONS:
 - 3.1. None
4. SIDE EFFECTS:
 - 4.1. Too rapid administration may precipitate projectile vomiting and ventricular dysrhythmias.
 - 4.2. Administration to people who are physically dependent on narcotics may cause an acute withdrawal syndrome.
 - 4.3. For this reason, Naloxone should be given very slowly, using improvement of respiratory status as an end point.
 - 4.4. In general, the duration of action of Naloxone is shorter than that of the narcotics it is used to counteract. Thus, the patient who has been successfully roused with Naloxone may fall back into stupor or coma as the Naloxone wears off. These patients must therefore be watched closely, and the dose of Naloxone should be repeated as necessary.
 - 4.5. Has been reported to cause pulmonary edema and sudden death in rare cases.
5. HOW SUPPLIED:
 - 5.1. 2mg in 2ml prefilled syringe or ampules.
6. ADMINISTRATION:

- 6.1. In the field, given by slow intravenous injection.
 - 6.2. As soon as there is improvement in the respirations, stop giving the drug.
 - 6.3. It is preferable that the patient NOT wakeup fully in the field, as these patients may be violent when brought abruptly out of coma.
USE RESPIRATIONS AS A GUIDE.
 - 6.4. If there is no response to two doses, suspect overdose with another, non-narcotic drug.
7. ADULT DOSAGE:
 - 7.1. Initial dose: 2mg Administer VERY SLOWLY IV while monitoring the rate and depth of the patient's respirations.
 - 7.2. If there is no response to the full dose of Naloxone, it may be repeated in 5 minutes in the same fashion.
8. PEDIATRIC DOSAGE:
 - 8.1. 0.1mg/kg Newborn dose: (narcotic dependent with decreased respiration)
0.1mg/kg every 3 minutes until respiration is improved.

Medication Protocols
Nitroglycerin

Lorain County EMS Protocols
Medication Protocol 20
Revised 05/01/2005

1. THERAPEUTIC EFFECTS:

- 1.1. The primary pharmacological effect of nitroglycerin and related drugs is to relax smooth muscle. Therefore, the effects of nitroglycerin on the cardiovascular system are chiefly due to relaxation of vascular smooth muscle (hence vasodilatation).
- 1.2. Nitroglycerin provides relief of pain in angina, probably by dilating coronary arteries and thereby increasing blood flow through them as well as by decreasing myocardial oxygen demand.
- 1.3. Through its vasodilatation action on peripheral vessels, nitroglycerin promotes pooling of the blood in the systemic circulation and decreases the resistance against which the heart has to pump (the afterload); these effects may be useful in treating congestive heart failure.

2. INDICATIONS:

- 2.1. To relieve the pain of ANGINA.
- 2.2. To lower the blood pressure in an ACUTE HYPERTENSIVE CRISIS.
- 2.3. To treat selected cases of PULMONARY EDEMA due to LEFT HEART FAILURE

3. CONTRAINDICATIONS:

- 3.1. Use with caution in myocardial infarction.
 - 3.1.1. Signs and Symptoms of Stroke.
 - 3.1.2. Increased intracranial pressure.

4. SIDE EFFECTS:

- 4.1. Transient, throbbing headache.
- 4.2. Hypotension
- 4.3. Dizziness, weakness

5. HOW SUPPLIED:

- 5.1. Many forms, including ointment, spray, tablets, sustained release capsules. In the field, 0.4 mg tablets and 0.4 mg spray bottles are preferred.

6. ADMINISTRATION:

- 6.1. Given sublingually (under tongue).
- 6.2. The patient should be semi-sitting or recumbent.
- 6.3. Monitor blood pressure and be prepared for hypotension.

7. ADULT DOSAGE:

- 7.1. One 0.4mg tablet or spray under the tongue.
- 7.2. May repeat once every 5 minutes as long as BP above 90 mmHg.

Medication Protocols Nitrous Oxide	Lorain County EMS Protocols Medication Protocol 21 Revised 05/01/2005
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1. THERAPEUTIC EFFECTS:
 - 1.1. Provides rapid, easily reversible relief of pain.
2. INDICATIONS:
 - 2.1. Relief of pain from:
 - 2.2. Acute myocardial infarction.
 - 2.3. Musculoskeletal trauma.
 - 2.4. Burns.
 - 2.5. Other conditions (e.g., kidney stones, labor).
3. CONTRAINDICATIONS:
 - 3.1. Any altered state of consciousness, e.g., head injury (masks the neurologic signs one needs to monitor).
 - 3.2. Chronic obstructive pulmonary disease.
 - 3.3. Acute pulmonary edema (these patients need 100% oxygen).
 - 3.4. Known pneumothorax or chest injury where pneumothorax may be present (N₂O collects in dead air spaces and may thus expand a pneumothorax).
 - 3.5. Abdominal distention or abdominal trauma where bowel sounds are absent.
 - 3.6. Major facial injury.
 - 3.7. Shock.
4. SIDE EFFECTS:
 - 4.1. Light-headedness, drowsiness.
 - 4.2. Occasional nausea and vomiting.
 - 4.3. Ambulance crew may experience giddiness if the vehicle is not properly vented.
5. HOW SUPPLIED:
 - 5.1. In the United States, nitrous oxide for field use is supplied as Nitronox, a set containing an oxygen cylinder and a nitrous oxide cylinder joined by a

valve that regulates flow to provide a 50:50 mixture of the two gasses.
The mixture is piped to a demand valve apparatus.

6. ADMINISTRATION:

- 6.1. Nitrous oxide is self-administered by inhalation.
- 6.2. The patient is instructed to hold the mask to their face, to form a tight seal around the nose and mouth, and to breathe normally. As the patient gets drowsy, the mask will fall away from their face.
- 6.3. **THE PATIENT MUST CONTROL THE DEMAND VALVE THEMSELVES.** The paramedic should not hold the facemask in place for the patient.

<p style="text-align: center;">Medication Protocols Oxygen (O2)</p>	<p style="text-align: right;">Lorain County EMS Protocols Medication Protocol 22 Revised 05/01/2005</p>
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1. THERAPEUTIC EFFECTS:
 - 1.1. Reverses the deleterious effects of hypoxemia on the brain, heart, and other vital organs.
2. INDICATIONS:
 - 2.1. Any condition in which global or local hypoxemia may be present:
 - 2.2. CARDIAC or RESPIRATORY ARREST (given with artificial ventilation)
 - 2.3. DYSPNEA or RESPIRATORY DISTRESS from any cause.
 - 2.4. CHEST PAIN.
 - 2.5. SHOCK.
 - 2.6. COMA from any cause.
 - 2.7. CHEST TRAUMA.
 - 2.8. NEAR-DROWNING.
 - 2.9. PULMONARY EDEMA.
 - 2.10. TOXIC INHALATIONS (smoke, chemicals, carbon monoxide).
 - 2.11. ACUTE ASTHMATIC ATTACK.
 - 2.12. ACUTE DECOMPENSATION OF COPD.
 - 2.13. STROKE, HEAD INJURY.
 - 2.14. REPEATED SEIZURES.
 - 2.15. Any patient in CRITICAL CONDITION.
3. CONTRAINDICATIONS:
 - 3.1. None.
 - 3.2. May depress respirations in rare patients with chronic obstructive pulmonary disease. This is not a contraindication to its use, but simply means that such patients must be watched closely and assisted to breathe if the respiratory rate declines.
4. SIDE EFFECTS:
 - 4.1. None when given for short periods to adults. (less than 24 hr.)

5. HOW SUPPLIED:

5.1. As a compressed gas in cylinders of varying sizes.

6. ADMINISTRATION:

6.1. Administered by inhalation from a dosage mask, nasal cannula, endotracheal tube, etc.

6.2. A patent airway and adequate ventilation must be ensured.

7. ADULT DOSAGE:

7.1. Depends on the condition being treated. For cardiac arrest and other critical conditions, 100% oxygen should be given as soon as possible.

<p>Medication Protocols Phenegran (Promethazine)</p>	<p>Lorain County EMS Protocols Medication Protocol 23 Revised 05/01/2005</p>
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1. THERAPEUTIC EFFECTS:
 - 1.1. Blocks the cholinergic receptors in the vomiting center that are believed to mediate the nausea and vomiting caused by gastric irritation.
 - 1.2. Phenegran depresses parts of the brain involved with wakefulness.
2. INDICATIONS:
 - 2.1. Treatment and prevention of motion sickness; prevention and control of nausea and vomiting associated with many other conditions such as AMI, GI conditions. In cases with AMI it is preferably given IV.
3. CONTRAINDICATIONS:
 - 3.1. Coma or severe CNS depression
 - 3.2. Hypersensitivity to antihistamines or phenothiazine
 - 3.3. Patient has consumed large amounts of depressants (alcohol, barbiturates, narcotics)
 - 3.4. Children whose signs and symptoms may suggest Reye's syndrome or other hepatic diseases.
 - 3.5. Antiemetics SHOULD NOT be used in children with vomiting of unknown etiology.
4. SIDE EFFECTS:
 - 4.1. Drowsiness Vertigo
 - 4.2. Blurred Vision Headache
 - 4.3. Urticaria Dry Mouth
 - 4.4. Hypotension
5. HOW SUPPLIED:
 - 5.1. One milliliter syringes or ampules containing 25mg/ml.
6. ADMINISTRATION:
 - 6.1. The preferred parenteral route of administration for Phenegran is by deep Intramuscular injection.

- 6.2. The proper intravenous administration of this product is well tolerated but use of this route is not without some hazard. Inadvertent intra-arterial injection can result in gangrene of the affected extremity.
 - 6.3. Subcutaneous injection is contraindicated as it may result in tissue necrosis.
7. ADULT DOSAGE:
 - 7.1. For severe nausea and vomiting:
 - 7.2. 12.5 to 25mg slow IV push or deep IM injection
8. PEDIATRIC DOSAGE:
 - 8.1. 0.25 to 0.5mg/kg given by slow IV push or deep IM injection.
 - 8.2. Max dose 25 mg. CHILDREN 12 YEARS OLD OR YOUNGER ONLY.

<p>Medication Protocols Pralidoxime Chloride</p>	<p>Lorain County EMS Protocols Medication Protocol 24 Revised 4/3/2006</p>
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1. THERAPEUTIC EFFECTS:

- 1.1. Reactivates enzyme inhibited by the nerve agent.
- 1.2. Nerve agents attack the nervous system by over stimulating the nervous system which controls body functions through use of chemicals which act as “instructions” to nerves, muscles and glands.
- 1.3. Nerve agents interfere with normal chemical instructions
- 1.4. Pralidoxime Chloride removes organophosphate from acetylcholinesterase which can then deactivate acetylcholine
- 1.5. Re-establishes normal skeletal muscle contraction
- 1.6. Relieves twitching and paralysis of respiratory muscles

2. INDICATIONS:

- 2.1. This medication should be given in conjunction with Atropine. The 2 mg of Atropine in the auto-injector should be given before Pralidoxime Chloride. If symptoms persist, repeat with Atropine then Pralidoxime Chloride.
- 2.2. Emergency medical personnel have donned personal protective equipment subsequent to recognizing existence of chemical agent hazard in area
- 2.3. Some or all of signs and symptoms of nerve agent poisoning listed are present:
 - unexplained runny nose
 - tightness of chest with difficulty in breathing
 - pinpointed pupils of the eye (miosis)
 - blurred vision
 - drooling, excessive sweating
 - nausea, vomiting, and abdominal cramps
 - involuntary urination and defecation
 - jerking, twitching, and staggering
 - headache, drowsiness, coma, convulsions
 - stoppage of breathing

3. CONTRAINDICATIONS:

- 3.1. A total of three (3) nerve agent antidote kits have been given.
- 3.2. Antidotes counter or relieve effects of poisons such as nerve agents. Use antidotes only when signs and symptoms of exposure are present; they will not protect if given before exposure.
- 3.3. Not effective on blister agents, blood agents, pepper spray, mace, tear gas or other TICs
- 3.4. Children under 10 years of age or less than 50 kg. This is due to the fact that you can administer any less than 600mg that is in the auto-injector.

4. SIDE EFFECTS:

- 4.1. 2 to 5 minutes after intramuscular injection of 2-PAM Cl, mild to moderate pain may be experienced at site of injection
- 4.2. 2-PAM Cl in a non-exposed person may cause:
 - blurred vision
 - double vision (diplopia)
 - impaired accommodation
 - dizziness
 - headache
 - drowsiness
 - nausea
 - rapid heart rate (tachycardia)
 - increased systolic and diastolic blood pressure
 - hyperventilation

5. HOW SUPPLIED:

- 5.1. Auto-injector in a nerve agent antidote kit (NAAK) with 600mg in the injector.
- 5.2. Store auto-injectors at room temperature (between 58 and 86 degrees F)
- 5.3. Keep them from freezing

6. ADMINISTRATION

- 6.1. EMT-Basics, EMT-Intermediates, EMT-Paramedics can administer the NAAK in an emergency situation as long as they have received training in the nerve agent exposure protocol.
- 6.2. Depending on severity of signs or symptoms, immediately administer one (1) atropine auto-injector (2 mg), followed by one (1) 2-PAM Cl auto-injector (600 mg).
- 6.3. Atropine should be given first; followed immediately by 2-PAM Cl.

- 6.4. If nerve agent signs or symptoms are still present after 5–10 minutes (depending on severity), repeat injections.
- 6.5. If signs or symptoms still exist after an additional 10 minutes, repeat injections for a third time.
- 6.6. If signs or symptoms remain after the third set of injections, **do not** give any more antidotes but seek medical help immediately.
- 6.7. If severe signs and symptoms are present:
 - In case of very severe exposure, all three auto-injector kits (atropine and 2-PAM Cl) should be administered in rapid succession; then medical help should be sought.
 - Remove secretions, maintain patient's airway and, if necessary, use artificial ventilation.
 - Morphine, theophylline, aminophylline, or succinylcholine should not be used with 2-PAM Cl. Tranquilizers of the reserpine or phenothiazine type are to be avoided.
 - 2-PAM Cl is most effective if administered immediately after exposure. Generally, little is accomplished if the drug is given more than 6 hours after termination of exposure.
- 6.8. After auto-injector has been activated
 - 6.8.1. Empty syringe should be disposed of properly
 - 6.8.2. It cannot be refilled nor can the protruding needle be retracted
 - 6.8.3. It should be disposed of in a “sharps” container
 - 6.8.4. Consider adding sharps container to kit
 - 6.8.5. Note dosage on triage tag or write on chest or forehead of patient

Medication Protocols Romazicon	Lorain County EMS Protocols Medication Protocol 25 Revised 05/01/2005
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1. THERAPEUTIC EFFECTS:
 - 1.1. Provides reverse actions of benzodiazepines. Restores, increases level of consciousness, psychomotor functions and breathing capabilities.
2. INDICATIONS:
 - 2.1. Overdose of benzodiazepines.
3. CONTRAINDICATIONS:
 - 3.1. Any patient with known hypersensitivity to flumazenil or benzodiazepines.
 - 3.2. Any patient who has been given a benzodiazepine for control of a potentially life-threatening condition (control of Intracranial pressure or status epilepticus).
 - 3.3. In patients who are showing signs of serious cyclic antidepressant overdose
4. SIDE EFFECTS:
 - 4.1. Dizziness
 - 4.2. Injection site pain
 - 4.3. Increased sweating
 - 4.4. Headache
 - 4.5. Blurred vision
 - 4.6. Seizures
5. HOW SUPPLIED:
 - 5.1. 10 mL multiple-use vials containing 0.1 mg/mL.
6. ADMINISTRATION:
 - 6.1. 0.2 mg (2 mL) IV over 15 seconds.
 - 6.2. If desired LOC is not obtained after 45 seconds repeat dosage of 0.2 mg (2 mL) IV over 15 seconds.
 - 6.3. May repeat dose at 60 second intervals up to maximum total dose of 1 mg (10 mL).

Medication Protocols
Sodium Bicarbonate

Lorain County EMS Protocols
Medication Protocol 26
Revised 05/01/2005

1. THERAPEUTIC EFFECTS:
 - 1.1. By neutralizing excess acid, helps return the blood towards a physiologic pH, in which normal metabolic processes and sympathomimetic agents (such as epinephrine) work more effectively.
2. INDICATIONS:
 - 2.1. To treat METABOLIC ACIDOSIS, as in:
 - 2.1.1. Prolonged resuscitation attempt with effective ventilation; and/or return of spontaneous circulation after long arrest interval.
 - 2.1.1.1. Note: Not a first line drug for resuscitation.
 - 2.1.2. To treat HYPERKALEMIA (high serum potassium).
 - 2.1.3. Contact Medical Control for possible use in overdose of: barbiturates, tricyclic antidepressants, cocaine and diphenhydramine.
3. CONTRAINDICATIONS:
 - 3.1. Conditions in which the patient cannot tolerate a salt load, such as congestive heart failure. Not useful or effective in hypercarbic acidosis (cardiac arrest and CPR without intubation).
 - 3.1.1. Note: Adequate ventilation, CPR and treatment of shock, not bicarbonate are the primary interventions for acidosis in cardiac arrest.
4. SIDE EFFECTS:
 - 4.1. Because each mEq of bicarbonate comes along with a mEq of sodium, sodium bicarbonate has the same effect as any other salt-containing infusion, i.e., it increases the vascular volume.
 - 4.2. Three 50ml syringes of sodium bicarbonate (1 mEq/ml) contain approximately the same amount of salt as 1 liter of normal saline.
 - 4.3. Patients in borderline heart failure cannot tolerate salt loads of this magnitude.
 - 4.4. Administration of sodium bicarbonate lowers serum potassium.
 - 4.5. In some cases, this is the desired effect, as when bicarbonate is used to treat hyperkalemia.

- 4.6. However, in cardiac patients, if the potassium falls too low, the heart becomes irritable, and dysrhythmias may occur.
- 4.7. This is especially likely in patients taking diuretics.
- 4.8. Sodium bicarbonate administration transiently raises the arterial carbon dioxide level, and thus its administration must be accompanied by controlled hyperventilation to blow off this excess CO₂. (e.g., with bag-valve-mask)
5. HOW SUPPLIED:
 - 5.1. Vials and prefilled syringes of 50ml, containing 1 mEq/ml.
6. ADMINISTRATION:
 - 6.1. Given by intravenous bolus injection.
7. ADULT DOSAGE:
 - 7.1. For cardiac arrest:
 - 7.2. If used at all, 1 mEq/kg IV after the first 10 minutes of CPR.
 - 7.3. Acidosis should thereafter be prevented by hyperventilation.
 - 7.4. DO NOT GIVE BICARBONATE IN THE SAME SYRINGE WITH EPINEPHRINE OR CALCIUM.
 - 7.5. For other conditions: As ordered by physician.
8. PEDIATRIC DOSAGE:
 - 8.1. Cardiac Arrest:
 - 8.2. 1 mEq/kg IV diluted with 1ml/kg NS
 - 8.3. Newborn: 0.5mEq/kg IV diluted with .5ml/kg NS

Medication Protocols Toradol (Ketorolac tromethamine)	Lorain County EMS Protocols Medication Protocol 27 Revised 12/2005, 7/29/2006
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1. THERAPEUTIC EFFECTS:
 - 1.1. Reduces pain.
2. INDICATIONS:
 - 2.1. Adult patients (for patients 18 years and older)
 - 2.2. Toradol is indicated for short-term management of severe, acute pain that requires analgesia at the opiate level.
3. CONTRAINDICATIONS:
 - 3.1. Toradol is contraindicated in patients with known hypersensitivity to aspirin or other NSAIDS.
 - 3.2. Active or history of peptic ulcer disease, recent GI bleeding or perforation, advanced renal impairment and in those at risk for renal failure due to volume depletion.
 - 3.3. Suspected or confirmed cerebrovascular bleeding, and those with a high risk of bleeding; use as a prophylactic before major surgery; use in labor or lactation; use with aspirin or other NSAIDS.
4. SIDE EFFECTS:
 - 4.1. Cardiovascular: Vasodilation, pallor.
 - 4.2. Gastrointestinal: GI pain, peptic ulcers, nausea, dyspepsia, GI bleeding (higher risk in the geriatric population).
 - 4.3. Central Nervous System: Headache, nervousness, abnormal thinking, euphoria.
 - 4.4. Hypersensitivity: Bronchospasm, anaphylaxis.
5. HOW SUPPLIED:
 - 5.1. 60mg/2ml vial
6. ADMINISTRATION:
 - 6.1. IV push.
7. ADULT DOSAGE:
 - 7.1. Adults less than 65 years – 60mg.
 - 7.2. Adults over 65 years of age – 30 mg
 - 7.3. Adults with renal impairment or failure – 30mg.
 - 7.4. Adults less than 50kg – 30mg

Medication Protocols Tetracaine (Pontocaine, Ophthalmic)	Lorain County EMS Protocols Medication Protocol 28 Revised 05/01/2005
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1. THERAPEUTIC EFFECTS:
 - 1.1. Provides local anesthesia to eyes.
 - 1.2. Provides relief from eye pain so that an appropriate eye exam and treatment can be completed.
2. INDICATIONS:
 - 2.1. Irritation and/or pain of the eyes when there is a non-penetrating injury.
3. CONTRAINDICATIONS:
 - 3.1. Penetrating or open eye injury.
 - 3.2. Allergy or hypersensitivity to Tetracaine and other local anesthetics (Lidocaine, Novocain and other –caine family drugs).
4. SIDE EFFECTS:
 - 4.1. Burning sensation in eyes
 - 4.2. Redness
 - 4.3. Tearing
5. HOW SUPPLIED:
 - 5.1. Ophthalmic drops in dropper bottle
6. ADMINISTRATION
 - 6.1. 1-2 drops in affected eye every 5-10 minutes as needed for pain control. Don't touch dropper tip to eye, lid or finger to keep bottle sterile. Discard with each patient use. It is for one patient only.

Medication Protocols Vasopressin	Lorain County EMS Protocols Medication Protocol 29 Revised 05/2005, 7/17/2006
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1. THERAPEUTIC EFFECTS:
 - 1.1. Vasopressin produces the same positive effects as epinephrine in terms of vasoconstriction and increasing the blood flow to the brain and heart during CPR.
 - 1.2. However, Vasopressin does not have the negative, adverse effects of epinephrine on the heart; such as increased ischemia and irritability and paradoxically, the propensity for VF.
2. INDICATIONS:
 - 2.1. Pulseless VT/VF
3. CONTRAINDICATIONS:
 - 3.1. Any patient with known hypersensitivity to Vasopressin (anaphylaxis) or nephritis – inflammation of the kidney.
 - 3.2. Not recommended for responsive patients with CAD.
 - 3.3. May provoke cardiac ischemia and angina.
4. EFFECTS:
 - 4.1. Vasoconstriction
 - 4.2. Increase Blood Pressure
 - 4.3. Increases coronary blood flow.
 - 4.4. Improves cerebral oxygenation.
 - 4.5. Antidiuretic.
5. HOW SUPPLIED:
 - 5.1. 20 Units in 1 ml vial.
6. ADMINISTRATION:
 - 6.1. 40 U IV push x1 (wait 3-5 minutes before giving 1 mg epinephrine 1:10,000, administered in place of the first or second dose of Epinephrine)

Medication Protocols Verapamil (Isoptin, Calan)	Lorain County EMS Protocols Medication Protocol 30 Revised 05/01/2005
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1. THERAPEUTIC EFFECTS:
 - 1.1. Antagonizes the effects of calcium ion (Calcium Channel Blocker), thereby slowing SA node discharge and delaying conduction through the AV junction.
2. INDICATIONS:
 - 2.1. Alternative drug (after adenosine) to terminate PSVT with narrow QRS complex and adequate blood pressure and preserved left ventricular function.
 - 2.2. May control ventricular response in patients with atrial fibrillation, flutter, or multifocal atrial tachycardia.
3. CONTRAINDICATIONS:
 - 3.1. Wide complex tachycardia of uncertain origin. RESULTS MAY BE FATAL!
 - 3.2. Patients with Wolff-Parkinson-White syndrome (WPW).
 - 3.3. Cardiogenic shock or heart failure.
 - 3.4. Sinus node disease ("sick sinus syndrome").
 - 3.5. AV block (Second or Third degree).
 - 3.6. Hypotension not due to tachyarrhythmia.
 - 3.7. Patient taking a beta-blocking drug, such as propranolol may cause severe hypotension.
 - 3.8. Use with caution in patients taking digitalis.
4. SIDE EFFECTS:
 - 4.1. May cause hypotension, bradycardia, AV block, or cardiac arrest.
 - 4.2. May exacerbate CHF in patients with left ventricular dysfunction.
5. HOW SUPPLIED:
 - 5.1. Ampules of 10 mg in 2 ml (5 mg/ml).
6. ADMINISTRATION:
 - 6.1. 2.5 to 5.0 mg IV bolus over 2 minutes.
 - 6.2. Second dose: 5-10 mg, if needed, in 15-30 minutes to total dose of 30 mg.
 - 6.3. Older patients: Administer over 3 minutes.