**N-Acetylcysteine (NAC, Acetadote™ (IV), Mucomyst™ (PO))**

**Indication:** Acetaminophen Poisoning

**Administration and Dosage:**

**ORAL DOSING:**
- Load: 140 mg/kg
- Maintenance: 70 mg/kg q 4 h x 17 doses

**IV DOSING:**
- Load: 150 mg/kg x 60 min (max 15 gm)
  - Then: 50 mg/kg x 4 h (max 5 gm)
  - Then: 100 mg/kg x 16 h (max 10 gm)

Note: Shorter courses of oral NAC therapy may be appropriate in selected cases. IV doses should follow standard dosing regimen with few exceptions. Note that prolonged IV infusion may be required or suggested in some situations. Please contact your poison center or consult a toxicologist for further information.

**Package Insert:**
http://www.acetadote.net/Acetadote21-539-12_PI_Clean_June2013.pdf

**Contraindications/cautions**

Acetadote is contraindicated in patients with hypersensitivity or previous anaphylactoid reactions to acetylcysteine or any components of the preparation. Serious anaphylactoid reactions, including death in a patient with asthma, have been reported in patients administered acetylcysteine intravenously.

Acetadote should be used with caution in patients with asthma, or where there is a history of bronchospasm. The total volume administered should be adjusted for patients less than 40 kg and for those requiring fluid restriction. To avoid fluid overload, the volume of diluent should be reduced as needed. If volume is not adjusted, fluid overload can occur, potentially resulting in hyponatremia, seizure, and death.

In the literature, the most frequently reported adverse reactions attributed to IV acetylcysteine administration were rash, urticaria and pruritus. The frequency of adverse reactions has been reported to be between 0.2% and 20.8%, and they most commonly occur during the initial loading dose of acetylcysteine

**FDA Status:**
FDA labeled indication
**Sodium Bicarbonate (NaHCO₃)**

**Indication: Tricyclic Antidepressant and other Sodium Channel Blocker Poisoning**
- Goal is QRS narrowing
- Monitor EKG as indicated for widened QRS due to sodium channel blockade

**Indication: Salicylate Poisoning: serum and urinary alkalinization**
- Goal is serum pH between 7.4 and 7.55; urine pH >8.0
- Must make sure serum K ~ 4.0

**Administration and Dosage:**
- 8.4% (1 mEq/mL) 50 ml ampule = 50 mEq
- 7.5% (0.892 mEq/mL) 50 ml ampule = 44.6 mEq
  - Bolus: 1-2 mEq/kg IVP over 1-2 min
  - Infusion: Adult: 2-3 amps in 1 L D₅W @ 150-200 mL/h
    - Peds: 2-3 amps in 1 L D₅W @ twice maintenance

**Note:** Some recommend diluting to half for neonates (use caution)

**Package Insert:**

**Contraindications/Cautions**

Sodium bicarbonate is contraindicated in severe metabolic/respiratory alkalemia or hypernatremia, pulmonary edema, intolerance to volume or sodium loading (renal failure, CHF). Bicarbonate can cause excessive alkalemia, hypocalcemic tetany, hypokalemia, impaired oxygen release from hemoglobin, hypernatremia, hyperosmolality, QT prolongation and torsades (due to electrolyte shifts), volume overload, pulmonary edema, CHF exacerbation.

**FDA Status:**
FDA Labeled Indication (Toxicity of Drug)

**Bromocriptine**

**Indication: Neuroleptic Malignant Syndrome**

**Administration and Dosage:**
- Adult: 2.5-10 mg orally 3-4 times per day

**Package Insert:**
**Contraindications/cautions:**
Bromocriptine is contraindicated in uncontrolled hypertension or toxemia of pregnancy. Use with caution in patients with h/o angina, MI, stroke, vasospastic disorders, or bipolar disorder. There are limited data on use in children less than 7 years old. Initial hypotension and syncope can occur with bromocriptine, followed by hypertension and exacerbation of vasospastic disorders. Patients may experience headache, fatigue, hallucinations, seizures, mania, and psychosis.

**FDA Status:**
Non-FDA labeled indication/Off label

**L-Carnitine**

**Indication:** Valproic Acid Poisoning
- With altered mental status and hyperammonemia, and/or hepatotoxicity

**Administration and Dosage:**
Note: Optimal dosing for VPA toxicity not well established. Suggested dosing is below.
- **Loading Dose:** 100 mg/kg IV (max 6 g) over 15-30 min
- **Then:** 15 mg/kg (maximum 3g per dose) IV q 4 h over 10-30 min
- **Prophylaxis:** 100 mg/kg/d PO ÷ q 6h (maximum 3g/day in adults and 2g/day in children)

**Package Insert:**

**Contraindications/Cautions**
No known contraindications. Hypertension, hypotension, and tachydysrhythmias may occur during IV infusion. Patients may experience fishy body odor.

**FDA Status:**
Non-FDA Labeled Indication

**Cyproheptadine**

**Indication:** Serotonin Toxicity (Syndrome) (3\textsuperscript{rd} line after benzodiazepines and cooling)

**Administration and Dosage:**
- **Adult:** 12 mg orally, then 2 mg every 2 hours until symptoms improve. Maintenance 8 mg every 6 hours. Maximum of 32 mg in 24 hours
- **Pediatric:** 0.25 mg/kg/day orally divided every 6 hours, maximum 12 mg/day
Contraindications/cautions:
Cyproheptadine is contraindicated in patients with acute (narrow) angle closure glaucoma, stenosing peptic ulcer, bladder neck obstruction, or pyloroduodenal obstruction. Patients may experience anticholinergic side effects such as mydriasis and urinary retention.

FDA Status:
Non-FDA labeled indication/Off label

Dantrolene

Indication: Malignant Hyperthermia

Administration and Dosage:
1—2.5 mg/kg IV, repeat every 15 min until signs of hypermetabolism improve, up to a maximum of 10 mg/kg.
Prevention of Recurrence: 4-8 mg/kg/day orally in 4 divided doses for 1-3 days. 100mg maximum individual dose, 400 mg maximum total daily dose.
Prevention prior to anesthesia: 2.5mg/kg IV infused over 1 hour prior to anesthesia

Contraindications/Cautions:
Patients receiving intravenous dantrolene for malignant hyperthermia may experience muscle weakness and respiratory depression. Fatal hepatotoxicity has been reported after chronic oral administration.
FDA Status:
FDA Labeled Indication

Calcium

• 1 g CaChloride (CaCl$_2$) = 13.6 mEq Ca$^{2+}$
• 1 g CaGluconate = 4.5 mEq Ca$^{2+}$

Indication: Calcium Channel Blocker or Beta Blocker Poisoning

Administration and Dosage:
Adult: CaChloride (CaCl$_2$) 10% - 10 mL IV (1 gm) over 5-10 minutes
Peds: CaChloride (CaCl$_2$) 10% - 0.1-0.2 ml/kg (10-20 mg/kg) IV over 10-15 minutes (not to exceed adult dose)

Adult: CaGluconate 10% - 30 ml/dose IV (3 gms) over 5-10 minutes
Peds: CaGluconate 10% - 0.2-0.5 ml/kg (20-50 mg/kg) IV, up to 10 ml/dose, over 5-10 minutes (not to exceed adult dose)

Infusion: 0.5 mEq/kg/hr IV = 0.2 - 0.4 mL/kg/hr of CaCl$_2$ (10%), or 0.6 - 1.2 mL/kg/hr of CaGluconate (10%)

NOTE - There are few established criteria regarding the total dosing or endpoints of therapy. Initial therapy should consist of IV crystalloid, followed by calcium salts. Multiple parameters can establish clinical response, including but not limited to increased blood pressure and heart rate, QTc narrowing, etc. Repeat dosing, or initiation of a continuous infusion can lead to hypercalcemia. If using multiple bolus doses (more than three doses in 30 minutes) or a continuous infusion, it is recommended that you contact or consult your regional poison center or medical toxicologist for further management. (link to 1-800-222-1222) [add to top of document or each page?]

Contraindications/Cautions: Sclerotic to vessels with extravasation risk leading to dermal necrosis. Recommended through central access if available, or reliable large bore peripheral line

Indication: Hydrofluoric Acid

Topical: 3.5 grams CaGluconate (25 mL of 10% CaGluconate solution) plus 5 oz (140 g) of a water-soluble lubricant (such as KY Jelly or Surgilube) or commercially available calcium gel (2.5%). Submerge affected area completely for at least 30 to 60 minutes.

Contraindications/Cautions: Provider must be cautious to wear barrier protection when handling gel after patient contact, especially if massaging gel to affected area.

FDA Status:

Non-FDA labeled indication/Off label

Glucagon

Indication: Beta Blocker Poisoning
Administration and Dosage:

Adult: Start at 50 µg/kg (titrate successive doses to max 10 mg) IV over 1-2 min, repeat every 10-15 min 1-2 times PRN

Then 1-5 mg/h (max 10 mg/h) IV in D₅W

Peds: 50 µg/kg IV load then 70 µg/kg/hr

Contraindications/Cautions:
Glucagon is contraindicated in patients with known hypersensitivity to it or in patients with known pheochromocytoma. Generalized allergic reactions, including urticaria, respiratory distress, and hypotension, have been reported in patients who received Glucagon by injection.

FDA Status:
Non-FDA labeled indication/Off label

High Dose Insulin Euglycemia (HIE)

Indication: Calcium Channel Blocker or Beta Blocker Poisoning

Administration and Dosage:

Insulin: 1 Unit/kg IV bolus regular human insulin

Then: 0.5-1.0 Unit/kg/hour IV infusion

[e.g., mix as 500 Units regular insulin in 50 mL NS (10 Units/mL)]

NOTE - Increase infusion if no effect in 15 minutes, titrating to 10 Units/kg/hr. Check capillary glucose every 30 min initially, and monitor serum potassium because an intracellular shift can occur.

In Addition Add:

Dextrose: 25 - 50 g (0.5 - 1 g/kg) IV bolus (if serum glucose < 400 mg/dL, otherwise unnecessary.)

Then: 0.25 - 0.5 g/kg/h IV infusion

{see Dextrose section}

NOTE - Establish capillary glucose baseline prior to initiation. Add glucose bolus when < 400 mg/dL. Titrate to prevent hypoglycemia (< 60 mg/dL.) Dextrose is best administered as D₅₀ through central venous access to reduce fluid volume administered. Monitor glucose every 30 minutes until stable, and then every 1 - 2 hours. Titrate to maintain serum glucose concentration between 100 and 200 mg/dL.
**Contraindications/Cautions:**

Therapy takes time to show clinical effect, titration should be performed to response. Risks of hypoglycemia and hypokalemia should be noted and monitoring should be regularly performed to prevent these complications.

**FDA Status:**
Non-FDA labeled indication/Off label

**Dextrose (Glucose)**

**Indication:** Hypoglycemic agents

**Administration and Dosage:**

Dose: 0.5 -1.0 g/kg IV

**Adult:** D$_{50}$W (50 g/100 ml) IV

**Peds:**
- D$_{25}$W (25 g/100 ml) IV, 2 - 4 mL/kg IV
- D$_{10}$W (10 g/100 ml) IV, 5 - 10 mL/kg IV
- D$_{5}$W (5 g/100 ml) IV, 10 - 20 mL/kg IV

**Neonates:** D$_{10}$ (10 g/100 ml) IV, 1 - 2 mL/kg (0.25 g/kg)

"1:2:4" - Use of D$_{50}$ as the dextrose source. "1" for adults. "2" is a 1:1 dilution of D$_{50}$ with water (D$_{25}$) for children. "4" is a 1:4 dilution of D$_{50}$ with water (D$_{10}$) for neonates.

Alternatively, the “rule of 50”. Divide 50 by the type of dextrose solution to arrive at rate in ml/kg:

- Adult (D$_{50}$W): 50/50 = 1 ml/kg
- Child (D$_{25}$W): 50/25 = 2 ml/kg
- Infant (D$_{10}$W): 50/10 = 5 ml/kg

**Contraindications/cautions:**

Dextrose is an important intervention in a patient with symptomatic hypoglycemia. If the patient’s altered mental status has resolved after administration, it is important to utilize the gastrointestinal tract and feed the patient rather than continue to treat with intravenous dextrose. Repeat bolus dosing of dextrose can lead to hypoglycemia in a patient who has a competent pancreas and can release insulin. Also, consider administering thiamine in patients who are at risk for deficiency (i.e. alcoholic malnutrition, bariatric surgery patients, etc.)
FDA Status:
FDA Labeled Indication

**Digoxin-Specific Fab (DigiFab™)**

**Indication:** Digoxin and other cardiotoxic steroid poisoning

**Administration and Dosage:**
- Reconstitute with 4 ml sterile H₂O
- IV over 30 min (IVP if critical)
- Utilize a 0.22 µm membrane filter

Amount ingested known:
# vials = [amount (mg)] x 0.8 / 0.5 mg

*Level known:*
# vials = [level (ng/ml)] x [weight (kg)] / 100

Unknown ingestion/level (empiric therapy):
- **Adult:** 10-20 vials (acute); 3-6 vials (chronic)
- **Peds:** 10 vials (acute) 1-2 vials (chronic)

**Package Insert:**


**Contraindications/Cautions:**

Patients receiving digoxin specific Fab may experience rapid drop in serum potassium concentration. Anaphylaxis and hypersensitivity reactions are possible. Patients with allergies to papain, chymopapain, other papaya extracts, or the pineapple enzyme bromelain may be at risk.
Clinically misleading measurement of standard serum digoxin concentration may occur due to interference with digitalis immunoassay measurements.

FDA Status:
FDA Labeled Indication

**Cyanide Antidote Kit [Hope Nithiodote kit™ (formerly Lilly or Taylor kit)]**

**Indication:** Cyanide Poisoning
• Consider in fire victim with hypotension, altered mental status, and metabolic acidosis with an elevated serum lactic acid (>10 mmol/l)
• Hydroxocobalamin generally preferred if available

Administration and Dosage:

*Sodium Nitrite (NaNO₂)* 3% (30 mg/ml) [administer prior to sodium thiosulfate if indicated; see Note]

*Adult*: 10 mL (300 mg) IV over 2-4 min

*Peds*: 0.2 ml/kg IV over 2-4 min

*Sodium Thiosulfate 25% (250 mg/ml)*

*Adult*: 50 mL (12.5 g) IV over 10-30 min

*Peds*: 0.25 g/kg (1 mL/kg) IV up to adult dose

Note: Do NOT administer nitrites if smoke/fire victim/CO exposure.

Package Insert:

Contraindications/Cautions:

Boxed warning: LIFE THREATENING HYPOTENSION AND METHEMOGLOBIN FORMATION

Sodium nitrite has been associated with severe hypotension, methemoglobinemia, and death at doses less than twice recommended therapeutic doses. Hypotension may occur concurrently or separately. Sodium nitrite should be used to treat life-threatening cyanide poisoning. When the diagnosis of cyanide poisoning is uncertain and/or the patient is not in extremis, special consideration should be given to administration of sodium nitrite if the patient is known or suspected to have diminished oxygen or cardiovascular reserve (e.g., smoke inhalation victims, pre-existing anemia, substantial blood loss, cardiac or respiratory compromise) or to be at higher risk of developing methemoglobinemia (e.g., congenital methemoglobin reductase deficiency).

Methemoglobin levels should be monitored and oxygen administered during treatment with sodium nitrite whenever possible. When sodium nitrite is administered to humans a wide range of methemoglobin concentrations occur. Methemoglobin concentrations as high as 58% have been reported after two 300-mg doses of sodium nitrite administered to an adult. Sodium nitrite should be used with caution in the presence of other drugs that may cause methemoglobinemia such as procaine and nitroprusside. Sodium nitrite should be used with caution in patients who may be particularly susceptible to injury from vasodilation and its related hemodynamic sequelae. Hemodynamics should be monitored closely during and after administration of sodium nitrite and sodium thiosulfate, and infusion rates should be slowed if hypotension occurs.
Anemia: Patients with anemia will form more methemoglobin (as a percentage of total hemoglobin) than persons with normal red blood cell (RBC) volumes. Optimally, these patients should receive a sodium nitrite dose that is reduced in proportion to their oxygen carrying capacity.

Smoke inhalation or carbon monoxide poisoning: potential for worsening hypoxia due to methemoglobin formation.

Neonates and infants may be more susceptible than adults and older pediatric patients to severe methemoglobinemia when sodium nitrite is administered. Reduced dosing guidelines should be followed in pediatric patients.

Because patients with G6PD deficiency are at increased risk of a hemolytic crisis with sodium nitrite administration, alternative therapeutic approaches should be considered in these patients. Patients with known or suspected G6PD deficiency should be monitored for an acute drop in hematocrit. Exchange transfusion may be needed for patients with G6PD deficiency who receive sodium nitrite.

Sodium nitrite should be used with caution in the presence of concomitant antihypertensive medications, diuretics or volume depletion due to diuretics, or drugs known to increase vascular nitric oxide, such as PDE5 inhibitors.

Sodium thiosulfate drug product may contain trace impurities of sodium sulfite. The presence of a trace amount of sulfites in this product should not deter administration of the drug for treatment of emergency situations, even if the patient is sulfite-sensitive.

**FDA Status:**
FDA Labeled Indication

**Hydroxycobalamin (Cyanokit™)**

**Indication:** Cyanide Poisoning

Dose:
Adult: 5 gm IV over 15 min
Children: 70 mg/kg (max 5 g) IV over 30 min

Repeat PRN (max total 15 g) IV

Note: may discolor body fluids and interfere with colorimetric laboratory testing

**Package Insert:**
https://www.meridianmeds.com/pdf/CYANOKIT_PI.pdf
**Contraindications/Cautions:**

Use caution in the management of patients with known anaphylactic reactions to hydroxocobalamin or cyanocobalamin. Allergic reactions may include: anaphylaxis, chest tightness, edema, urticaria, pruritus, dyspnea, rash, and angioneurotic edema. Substantial increases in blood pressure may occur following CYANOKIT® therapy.

Usage may interfere with certain clinical laboratory evaluations including CO measurement by cooximetry.

Because of its deep red color, hydroxocobalamin may cause hemodialysis machines to shut down due to an erroneous detection of a “blood leak.” This should be considered before hemodialysis is initiated in patients treated with hydroxocobalamin.

Due to potential photosensitivity, patients should avoid direct sun until erythema resolves.

**FDA Status:**

FDA Labeled Indication

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**Flumazenil (Romazicon™)**

**Indication:** Benzodiazepine Poisoning

**Administration and Dosage:**

- **Adult:** Initial: 0.2 mg IV over 1-2 minute
  
  May repeat with 0.3 mg, then 0.5 mg, to a maximum dose of 3 mg

- **Infusion:** 0.1-1.0 mg/h IV (in NS or D5W)

- **Peds (>1 year):** 0.01 mg/kg (up to 0.2 mg) IV over 1 minute, may repeat up to 4 times to a maximum total dose of 0.05 mg/kg or 1 mg, whichever is lower.

**Package Insert:**

http://medlibrary.org/lib/rx/meds/flumazenil-8/

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**Contraindications/Cautions:**

Use in patients on chronic benzodiazepine therapy may precipitate abrupt benzodiazepine withdrawal including seizures. Not expected to reverse the effects of non-benzodiazepine sedative hypnotics. Not recommended in cases of serious cyclic antidepressant poisoning or in cases when seizures are likely. Use with caution in alcohol dependent patients or in patients with hepatic impairment. Patients who have received flumazenil for reversal of benzodiazepine effects should be monitored for resedation for an appropriate period of time, up to 120 minutes, based on the dose and duration of the benzodiazepine employed.

**FDA Status:**

FDA Labeled Indication
**Fomepizole (Antizol™)**

**Indication:** Methanol, Ethylene Glycol poisoning

**Administration and Dosage:**
Load: 15 mg/kg IV in 100 ml NS over 30 min
Maint: 10 mg/kg IV q12 hours x 4 doses then 15 mg/kg IV q12 hours thereafter

*Patients undergoing hemodialysis:*
Re-load if > 6 h since last dose (15 mg/kg)
Maintenance during HD: q4 hours
At end, give scheduled dose if > 3 hours or, ½ dose if 1 - 3 h since last dose, then continue with q12 hour dosing

**NOTE** - The half-life of methanol is approximately 54 hours in the presence of fomepizole. The half-life of ethylene glycol is about 15 hours with normal renal function and almost 50 hours with impaired renal function.

**Package insert:**
http://medlibrary.org/lib/rx/meds/antizol-1/

**FDA Status:**
FDA Labeled Indication

**Ethanol (ETOH)**

**Indication:** Methanol, Ethylene Glycol poisoning [generally not used; fomepizole preferred]

**Administration and Dosage:**

*IV:*
10% ETOH (100 mg/ml) (may use 5%)
Load: 0.8 g/kg (8 ml/kg of 10%) over 1 h
Maint (ethanol naïve): 80 - 130 mg/kg/h (0.8 - 1.3 ml/kg/h of 10%)
Maint (ethanol tolerant): 150 mg/kg/h (1.5 ml/kg/h of 10%)
HD: 250 - 350 mg/kg/h (2.5 - 3.5 ml/kg/h of 10%)

*PO:*
20% ETOH (200 mg/ml) (may use 40%)
Load: 0.8 g/kg (4 ml/kg of 20%) over 1 h
Maint (ethanol naïve): 80 - 130 mg/kg/h (0.4 - 0.65 ml/kg/h of 20%)
Chronic (ethanol tolerant): 150 mg/kg/h (0.75 ml/kg/h of 20%)
HD: 250 - 350 mg/kg/h (1.25 - 1.75 ml/kg/h of 20%)

**Package Insert:**
Contraindications/Cautions:
Ethanol causes CNS depression that is at least additive with that of the agent it is being used to treat. Dosing of the continuous infusion can be difficult because of the unpredictability of the metabolic rate. Additionally, prolonged infusion leads to tolerance. IV formulation for infusion may not be available at most centers. Adverse effects of ethanol administration include hyponatremia, hypoglycemia, pancreatitis, and hepatitis.

FDA Status:
Non-FDA labeled indication/Off label

Folate (Folic Acid)

Indication: Methanol Poisoning

Administration and Dosage:
1-2 mg/kg, up to 50 mg, every 4 hours for 24 hours
   Extra dose at completion of hemodialysis

Contraindications/Cautions:
Folate can cause nausea, abdominal distension, and a bitter taste in the mouth. Chronic use can lead to zinc depletion due to interference with zinc absorption.

FDA Status:
Non-FDA labeled indication/Off label

Leucovorin (Folinic Acid)

Indication: Methotrexate Poisoning

Administration and Dosage:

Dose: If MTX plasma level known, use Bleyer nomogram, view at http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3074357/figure/F1/

Dose: MTX dose ingested on molar basis

Dose (empiric): 100 mg/m^2 IV over 15-30 min (max 160 mg/min)

Administer every 3-6 h x several days or until serum MTX < 10 nmol/L or < 100 nmol (in cancer) and no bone marrow toxicity
Contraindications/Cautions:

Slow infusion of no more than 160 mg/minute is recommended due to calcium content. Never to be administered intrathecally. Rarely seizures are reported. Leucovorin can increase toxicity of fluoropyrimidines such as 5-fluorouracil.

FDA Status:
FDA Labeled Indication

Vitamin B6 (Pyridoxine)
Indication: Ethylene Glycol Poisoning

Administration and Dosage:
Adult: 50 mg IV or IM every 6h or 100 mg/d IV

Indication: Isoniazid and other Hydrazide and Hydrazine (Gyromitra mushrooms) Poisoning
Known Amount Ingested: 1g per gram of INH ingested (max 5 g or 70mg/kg in peds)
  • If seizing: may be given at 0.5 gm/min IV until seizure terminates with remainder IV over 4-6 h
If not seizing: administer full dose over 4-6 h

No established dose for hydrazines and hydrazides. May use the same dosing as for INH, although no human data available.

Contraindications/Cautions:
Use caution if known sensitivity to pyridoxine or parabens preservative. Chronic dosing is rarely associated with peripheral neuropathy. Preservatives in some vials may lead to CNS depression (chlorbutanol or benzyl alcohol).

FDA Status:
FDA Labeled Indication (Adverse Reaction to Drug—Vitamin B6 Deficiency)
**Intravenous Lipid Emulsion**

**Indication:** Local Anesthetic Toxicity (LAST)

**Administration and Dosage:**
*Loading Dose:* 1.5 ml/kg of 20% solution over 1 minute. Followed by infusion.
*Infusion:* 0.25 ml/kg/min over 30-60 minutes. Infusion rate can be increased if blood pressure declines.

Note: The bolus may be repeated for persistent dysrhythmia and the infusion rate can be increased for hypotension.

**Indication:** Non-LAST with cardiovascular collapse

Poorly studied. Consider for poisoning by drugs expected to be lipid soluble based on Log D, or Log P. See [http://lipidrescue.org](http://lipidrescue.org) for further information.

Consider same dosing as above for LAST.

**Package Insert:**
[http://www.accessdata.fda.gov/drugsatfda_docs/label/2007/017643s072,018449s039lbl.pdf](http://www.accessdata.fda.gov/drugsatfda_docs/label/2007/017643s072,018449s039lbl.pdf)

**Contraindications:**
Intravenous lipid emulsion is generally contraindicated in those with allergies to soy or egg products unless the condition is morbid. Relative contraindications include pulmonary disease, disorders of fat metabolism, and history of pancreatitis. Black Box Warning: Neonatal death has occurred in preterm infants due to impaired clearance and elimination of the drug. Adverse events include pancreatitis, fat emboli, and phlebitis.

**FDA Status:**
Non-FDA Labeled Indication

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**Vitamin K1 (Phytonadione)**

**Indication:** Warfarin overdose or excessive anticoagulation.


**Indication:** Brodifacoum or other Long-Acting Anticoagulant Rodenticide Poisoning

**Administration and Dosage:**
*Adult:* 25-50 mg PO TID-QID x 1-2 d, then per INR
*Pediatric:* 5-10mg (0.4mg/kg) BID-QID

- Notes: Recheck PT and INR after 48 hours and adjust dose in consultation with a medical toxicologist
• IV administration should be reserved for life-threatening bleeding at any elevation of INR. Supplementation with fresh frozen plasma (FFP) or prothrombin complex concentrate (4-factor, such as KCenta) depending on fluid volume need and antidote availability.
• A starting dose of Vitamin K 10mg IV is recommended in such cases at a rate no greater than 1mg/min in adults, while monitoring for anaphylactoid reactions.
• Recombinant factor VIIa should generally be avoided due to risk of thrombosis.

Package Insert:
http://dailymed.nlm.nih.gov/dailymed/lookup.cfm?setid=e8808230-2c44-44c6-8cab8f29b6b34051

Contraindications/Cautions:
Vitamin K is contraindicated in those with known hypersensitivity to Vitamin K or preservatives. Hematomas can occur with IM administration. Patient with mechanical valves may have thrombosis. Black box warning: Anaphylactoid reactions and resultant fatalities have been reported with IV and IM administration of Vitamin K. This route is to be reserved for true emergencies and should be administered in a monitored setting.

FDA Status:
FDA Labeled Indication (Drug Reversal, Anticoagulant)

Methylene Blue

Indication: Methemoglobinemia

Administration and Dosage:
IV: 1-2 mg/kg (0.1-0.2 mL/kg) of 1% over 5 min repeat dosing may be required (max 7 mg/kg)
Neonate: 0.3-1 mg/kg IV

Package Insert:

Contraindications/cautions:
Methylene blue may make pulse oxygenation drop and has been associated with serotonin syndrome. Methylene blue should not be given by subcutaneous or intrathecal injection. Methylene blue must be injected intravenously very slowly over a period of several minutes to prevent local high concentrations of the compound from producing additional methemoglobinemia. Do not exceed recommended dosage.

Flush with 30 mL of saline after administration to minimize pain
**Naloxone (Narcan™)**

**Indication: Opioid Poisoning**

**Administration and Dosage:**

*Adult:* Start at 0.04 - 0.4 mg IV/IM/SQ/Intranasally/Intratracheal. Repeat dose if initial response not adequate, up to 10 mg total. Titrate to RR ≥ 12 and sufficient tidal volume. If opioid naïve, can start with 0.4 mg.

*Peds:* 0.01 mg/kg IV (IM, SQ, Intraosseous, Intratracheal can be used but not preferred) if opioid naïve (0.001 mg/kg if opioid dependent)  
Titrate to 0.1 mg/kg IV if no effect

*Neonate:* (asphyxia neonatorum) 0.01 mg/kg via umbilical vein (IM, SQ) q 2-3 min  
For recurrent resp depression consider infusion: 6.6 x [reversal dose (mg)] in 1 L NS @ 100 ml/h or 2/3 of reversal dose infused hourly. Titrate to RR ≥ 12.

**Package Insert:**

[http://www.hospira.com/products_and_services/drugs/NALOXONE_HYDROCHLORIDE](http://www.hospira.com/products_and_services/drugs/NALOXONE_HYDROCHLORIDE)

**Contraindications/cautions:**

Opioid dependent patients may have symptoms of opioid withdrawal including vomiting, diarrhea, diaphoresis, myalgia, tachycardia, hypertension, tachypnea, and rarely delirium. Acute lung injury is described although the relative contribution of opioid antagonist is unclear. In neonates this may also include seizures, excessive crying, and hyperactive reflexes.

**FDA Status:**

FDA Labeled Indication

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**Octreotide (Sandostatin™)**

**Indication: Sulfonylurea poisoning**

**Administration and Dosage:**

*Adult:*  50 - 100 μg SQ every 6 h

*Peds:*  1-1.25 μg/kg (max adult) SQ every 6 h

Continue therapy x 24h, then monitor blood glucose off therapy for 24 hours
**Package Insert:**

**Contraindications/cautions:**
Octreotide administration has been associated with bradyarrhythmia, congestive heart failure, hyperglycemia, hypothyroidism, and ascending cholangitis. Treatment failures have been reported when the antidote is administered intravenously. Subcutaneous administration sites should be rotated.

**FDA Status:**
Non-FDA Labeled Indication

**Protamine sulfate**

**Indication:** Heparin Poisoning
1 mg (max 50 mg) neutralizes 100 U (1mg) heparin

**Administration and Dosage:**
Administer over 1-3 minutes (not more than 50mg in a 10 minute period)
Dosage:
- Immediately after heparin: 1.0-1.5 mg of protamine IV for each 100 units of heparin
- Within 30-60 minutes of heparin: 0.5-0.75 mg protamine IV for each 100 units of heparin
- If 2 or more hours after heparin: 0.25-0.375mg of protamine for each 100 units of heparin
- Unknown quantity of heparin: 25-50mg IV over 15 minutes, then determine aPTT after 5-15 and for up to 2-8 hours to determine need for additional dosing

**Package Insert:**
http://dailymed.nlm.nih.gov/dailymed/lookup.cfm?setid=e1964129-33f4-4e4e-86e3-8e6a4e65bd83

**Contraindications/cautions:**
Protamine is contraindicated in those with known sensitivity to the drug and in neonates if formulated with benzyl alcohol as a preservative. Rapid IV administration can cause hypotension, bradycardia, and anaphylactoid reactions. Excessive dosing may cause anticoagulation and increased bleeding risk.

**FDA Status:**
FDA Labeled Indication
**Physostigmine (Antilirium™)**

**Indication:** Antimuscarinic Toxicity

- For reversal of neurobehavioral effects
- Normal QRS interval
- Atropine at bedside, cardiac monitor, pulse oximetry

**Administration and Dosage:**

*Adult*: 1-2 mg IV over > 5 min with assessment for cholinergic signs, such as bradycardia, rales, salivation.
  - May repeat in 5 – 10 minutes PRN if anticholinergic findings do not resolve and cholinergic findings do not appear
*Peds*: 20 µg/kg titrated as above

**Package insert:**

**Contraindications/Cautions:**

Should be administered slowly as described. Relative contraindications include seizures, asthma, intestinal or bladder obstruction, peripheral vascular disease, intraventricular conduction defects, AV block, or severe aspirin allergy. Do not use in patients with QRS or QT prolongation. In patients without antimuscarinic toxicity, physostigmine administration can produce signs of cholinergic toxicity such as vomiting, diarrhea, bronchorrhea, fasciculations, weakness, ataxia, confusion, and seizures.

**FDA Status:**

FDA Labeled Indication

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**2-Pam (Pralidoxime Chloride, Protopam™, Mark I™, DuoDote™)**

**Indication:** Organophosphate poisoning

**Administration and Dosage:**

*Adult*: 1-2 g (20-40 mg/kg) in 100 ml NS IV infused over 15-30 min. May repeat the dose in one hour and every 10-12 hours thereafter, or start an infusion.
  - Maint: 8 to 10 mg/kg/h or 500 mg/h IV

*Peds*: 20-50 mg/kg (max 2 gm) in 100 ml NS IV infused over 30-60 min. May repeat the dose in one hour and then start an infusion.
  - Maint: 10-20 mg/kg/h IV

The Mark 1 kit contains 600 mg of pralidoxime and 2 mg of atropine in two autoinjectors for IM use. They have been recently replaced by the DuoDote.
The DuoDote contains 600 mg of pralidoxime and 2.1 mg of atropine in a single autoinjector for IM use.

Package insert:  

Contraindications/cautions: Rapid infusion can cause temporary worsening of cholinergic manifestations including muscle rigidity, paralysis, convulsions, apnea, and cardiac arrest. In patients with myasthenia gravis, pralidoxime can precipitate a myasthenic crisis. Reduce the dose in renal insufficiency.

FDA Status:  
FDA Labeled Indication

Atropine [Mark ™, DuoDote™]

Indication: Organophosphate/Carbamate Poisoning

Administration and Dosage:
Adult: 1-2 mg (mild) or 3-5 mg (severe) IV  
   Double every 3-5 min until lungs are clear and muscarinic toxic symptoms are reversed  
   Maint: 10-20% of loading dose infused hourly IV, titrate prn  
Peds: 20-50 µg/kg (min 0.1 mg/max 0.5 mg) IV,

Package Insert:  
http://www.hospira.com/products_and_services/drugs/ATROPINE_SULFATE_01_ADULT

Contraindications/cautions.

In the absence of excess acetylcholine, atropine can produce antimuscarinic effects such as dry mouth, flushing, tachycardia. With large doses of atropine, confusion, delirium, hallucinations, and ataxia are reported. Atropine can worsen narrow angle glaucoma, obstructive uropathy, myasthenia gravis, and gastroparesis and should be used with caution in patients with these conditions. In patients with coronary artery disease, atropine induced tachycardia may cause myocardial ischemia.

FDA Status:  
FDA Labeled Indication
Black widow antivenom (lactrodectus mactans)
Indication: Severe lactrodectus mactans envenomation

Administration and Dosage:
Skin Testing (prior to administration): Administer horse serum provided in the antivenom kit as directed.

Adult/Pediatric: 1 vial in 10-50 ml of normal saline, administer IV over 15 -30 minutes. Adults may require a second vial of antivenom to control symptoms

Dosage Notes: Reconstitute the lyphophylized antivenom to2.5mL by gently swirling for 15-30 minutes with the supplied diluent. Do not shake. Dilute the 2.5mL of reconstituted antivenom to a total volume of 10-50mL using normal saline.

Package Insert:

Contraindications/cautions:
Black widow spider antivenom is contraindicated in those with known hypersensitivity to horse serum. Hypersensitivity and anaphylaxis may occur during infusion. Serum sickness is possible.

FDA Status:
FDA Labeled Indication

Crotalidae polyvalent immune fab (Crofab™)
Indication: Crotalid snake envenomation

Administration and Dosage:
Adult and pediatric: 4-6 vials mixed in 250 mL NS over 1 hour initially

Maintenance dose of 2 vials in 250 mL NS IV every 6 hours for 3 additional doses is recommended by the manufacturer If clinical or laboratory stability not achieved or maintained, administer an additional 4-6 vials over 1 hour.

Package Insert:

Contraindications/cautions:
Crotalid immune fab is contraindicated in those with a known hypersensitivity to sheep/sheep
serum or papain/papayas. Immediate hypersensitivity, flushing, wheezing, and delayed hypersensitivity may occur.

Very expensive, and some experts do not recommend using the maintenance dose unless needed.

**FDA Status:**
FDA Labeled Indication

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**Scorpion (Centruroides) Immune Fab2 (Anascorp™)**

**Indication:** Centruroides scorpion envenomation

**Administration and Dosage:**
Adult and Pediatric: 3 vials by IV infusion over 10 minutes

Additional doses administer 1 vial over 10 minutes as needed at 30-60 minute intervals

**Package Insert:**

**Contraindications/cautions:**
Patients receiving scorpion immune fab may experience pruritis, rash, severe hypersensitivity (equine plasma derived), serum sickness, nausea, vomiting, or fever.

**FDA Status:**
FDA Labeled Indication

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**References:**


**Disclaimer:**

This information contained in this document is offered for general information and is not meant to offer diagnosis or treatment recommendations nor to substitute for clinical judgement. For advice and recommendations in the care of a poisoned patient, please contact your local medical toxicologist or poison information center at 1-800-222-1222