

TOXIC EXPOSURE - CARBON MONOXIDE

UPDATED 4/2025

ALL PROVIDERS / EMT

- ☐ Scene and patient management
 - Safely and rapidly remove the patient(s) from the source of exposure.
 - Collect environmental CO levels if equipment is available.
- ☐ Focused history and physical exam
 - Estimation of exposure time.
 - Pulse oximetry readings are unreliable in carbon monoxide exposures
- ☐ Cardiac monitor and ETCO₂
- ☐ **Treatment Plan**
 - Administer 100% high-flow oxygen via non-rebreather mask.
 - Any exposure to carbon monoxide related to a closed space fire (such as a house fire) often also results in cyanide exposure.
- ☐ **Key Considerations**
 - Patients with symptoms of headache, nausea, tachycardia, neurologic changes, or a CO monitor reading >10% should be transported.
 - Pregnant patients: The fetus is very sensitive to even low levels of CO.
 - All pregnant patients exposed to CO should be transported, regardless of the symptoms or the CO level.

ADULT

PEDIATRIC

Pediatric weight-based dosing should not exceed adult dosing.

AEMT

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| <ul style="list-style-type: none"> <input type="checkbox"/> Advanced airway management, vascular access and fluid therapy <input type="checkbox"/> Closed Space Fires: Consider hydroxocobalamin 5 g (contained in a single vial), administered by IV/IO infusion over 15 minutes (approximately 15 mL/min) | <ul style="list-style-type: none"> <input type="checkbox"/> Advanced airway management, vascular access and fluid therapy <input type="checkbox"/> Closed Space Fires: hydroxocobalamin 70mg/kg over 15 minutes IV/IO (approximately 15ml/min) not to exceed a max dose of 5 grams unless advised by direction of OLMC or Poison Control |
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| <ul style="list-style-type: none"> <input type="checkbox"/> Epinephrine drip 2–10 mcg/min IV/IO infusion. Titrate to maintain a SBP >100 mmHg. <input type="checkbox"/> Push Dose Epinephrine 10mcg as needed to maintain a SBP >100 mmHg. | <ul style="list-style-type: none"> <input type="checkbox"/> Epinephrine 0.1–0.5 mcg/kg/min IV/IO infusion. Titrate to maintain an appropriate SBP for age. <input type="checkbox"/> Push Dose Epinephrine 1mcg/kg/min as needed to maintain an appropriate SBP for age. |
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TOXIC EXPOSURE – CYANIDE

UPDATED 4/2025

ALL PROVIDERS / EMT

- ☐ Scene Management
 - If properly trained and equipped, safely and rapidly remove the patient(s) from the source of exposure.
 - Request HazMat response as appropriate.
 - Industries in which to consider cyanide exposure:
 - Electroplating and Metallurgy
 - Organic chemicals production
 - Photographic developing
 - Manufacture of plastics
 - Fumigation of ships
 - Some mining processes especially gold/copper
 - Patients and EMS providers may be exposed to cyanide in the following ways;
 - Breathing air, drinking water, touching soil, or eating foods that contain cyanide.
 - Breathing smoke during closed-space fires.
 - Breathing air near a hazardous waste site containing cyanide.
 - Eating foods naturally containing cyanide compounds, such as tapioca, lima beans, apricot seeds and almonds. However, the portions eaten in the United States contain relatively low amounts of cyanide.
- ☐ Focused history and physical exam
 - Be alert for exposure related signs and symptoms;
 - Acute dyspnea/tachypnea without cyanosis
 - Nausea/vomiting
 - Seizures
 - Hyper or hypotension
 - Total body erythema (redness)
 - Cardiac monitor, CO₂, and Pulse Oximetry monitoring
- ☐ Treatment Plan
 - Administer high flow oxygen immediately and continuously
 - Pulse oximetry readings may not be accurate because of cyanide interaction
 - Cardiac monitor and ETCO₂

ADULT

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Pediatric weight-based dosing should not exceed
Adult dosing.

AEMT

- ☐ Advanced airway, vascular access and fluid therapy
- ☐ **Hydroxocobalamin (CYANOKIT®) for adults is 5 g** (contained in a single vial), administered by IV/IO infusion over 15 minutes (approximately 15 mL/min)

AEMT

- ☐ Advanced airway, vascular access and fluid therapy
- ☒ **Hydroxocobalamin (CYANOKIT®) can be used in children. Administer 70mg/kg over 15 minutes IV/IO (approximately 15ml/min) not to exceed a max dose of 5 grams unless advised by direction of OLMC or Poison Control**

PARAMEDIC

- ☐ **Epinephrine 2–10 mcg/min IV/IO infusion.** Titrate to maintain a SBP >100 mmHg.
- ☐ **Push Dose Epinephrine 10mcg** as needed to maintain a SBP >100 mmHg

PARAMEDIC

- ☐ **Epinephrine 0.1–0.5 mcg/kg/min IV/IO infusion.** Titrate to maintain an appropriate SBP for age.
- ☐ **Push Dose Epinephrine - 1mcg/kg/min** as needed to maintain an appropriate SBP for age.

TOXIC EXPOSURE - HYDROFLUORIC ACID

UPDATED 4/2025

ALL PROVIDERS / EMT

- ☐ Scene Management
 - Industrial Exposures in which to consider hydrofluoric acid
 - Aluminum processing
 - Chemical plants
 - Construction – waste products
 - Creation of chlorofluorohydrocarbons for refrigerants, aerosols, foams, plastics, and specialty solvents
 - Dry Cleaning Spotting Solutions
 - Electroplating
 - Foundry cast sand removal
 - Glass etching or cleaning
 - Meat packing industry
 - Petroleum refineries for high octane gasoline
 - Semiconductor silicon etching or cleaning
 - Stainless steel “pickling”
 - Stone etching or polishing
 - Uranium processing
- ☐ Focused history and physical exam
- ☐ Cardiac monitor, CO2, and pulse oximetry monitoring
- ☐ **Treatment Plan**
 - **Skin Exposure**
 - Immediate irrigation. Clothing, jewelry etc., is removed as irrigation is taking place.
 - Soak burned skin in magnesium hydroxide antacid preparations (milk of magnesia, Mylanta, Maalox).
 - **Calcium Gluconate Gel** for application – Mix 25mL of 10% Calcium Gluconate in 75mL of a sterile water-soluble lubricant. Apply topically or if hand exposure possibly in a glove
 - **Eye Exposure**
 - Continuous rinsing for a minimum of 15 minutes or until a calcium ocular solution is available.
 - **Oral ingestion** – conscious/alert patient only – OT recommended for the pediatric patient.
 - If the patient is able to swallow, administer any calcium or magnesium-based antacid (milk of magnesia, Mylanta, Maalox). In the absence of these products, have the patient drink approximately 8-16 oz. of water. Consult OLMC for questions.

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- ☐ Advanced airway, vascular access and fluid therapy
- ☐ **Calcium Gluconate Gel** for application – Mix 25mL of 10% Calcium Gluconate in 75mL of a sterile water-soluble lubricant. Apply topically or if hand exposure possibly in a glove

- ☐ Advanced airway, vascular access and fluid therapy
- ☐ **Calcium Gluconate Gel** for application – Mix 25mL of 10% Calcium Gluconate in 75mL of a sterile water-soluble lubricant. Apply topically or if hand exposure possibly in a glove

PARAMEDIC

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TOXIC EXPOSURE - ORGANOPHOSPHATES / NERVE AGENTS

UPDATED 4/2025

ALL PROVIDERS

- ☐ Scene management
 - If properly trained and equipped, safely and rapidly remove the patient(s) from the source of exposure.
 - Request HazMat response as appropriate
 - Be aware of exposure Level
 - Mild – miosis (constricted pupils) only or no symptoms
 - Moderate – Other “S.L.U.D.G.E.M.” symptoms
 - Severe – Unconscious, in respiratory distress, seizing, flaccid or apneic
- ☐ Focused history and physical exam.
 - Assess for “S.L.U.D.G.E.M.” presentation (Salivation, Lacrimation, Urination, Defecation, Gastrointestinal cramping, Emesis and Miosis).
- ☐ Cardiac monitor, CO₂, and pulse oximetry monitoring
- ☐ **Treatment Plan**
 - Irrigate immediately
 - Remove clothing, jewelry etc. as irrigation is taking place
- ☐ **Key Considerations**
 - Always protect yourself from exposure before entering a treatment zone.
 - Nerve agents, organophosphates and carbamates are the general categories of these toxic substances.
 - These agents may be used in fertilizers or as pesticides, herbicides, fungicides, fire retardants, or biowarfare agents.

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- ☐ **Atropine/Pralidoxime kits** (Mark I, Duodote, etc.)
 - Mild Exposure with no symptoms may require no treatment
 - Moderate Exposure with evidence of SLUDGEM give 1-2 Kits
 - Severe Exposure with respiratory distress and SLUDGEM give 3 Kits

- ☉ **Contact OLMC or Poison Control for instructions**

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- ☐ **Atropine sulfate 2 mg** rapid IV (preferred) or IM repeated every 10 minutes until you have:
 - Control of bronchorrhea (excessive watery sputum)
 - Control of bronchoconstriction, (as reflected by level of oxygenation and ease of ventilation)
 - Reversed dangerous bradyarrhythmias or AV-blocks

- ☉ **Contact OLMC or Poison Control for instructions**