



R7DHRE  
Hazardous  
Materials  
Guideline:  
**Unidentified  
Chemical**



# REGION VII DISASTER HEALTH RESPONSE ECOSYSTEM (R7DHRE) CHEMICAL SPECIALTY TEAM

Call Your Poison Center for Immediate Assistance: 1-800-222-1222

## Hazardous Materials Guideline: Unidentified Chemical

This document is intended as a supplement for discussion with your local poison center or toxicologist.

### 1.0 BACKGROUND

**1.1 Description:** When a chemical is unidentified, worst-case possibilities concerning toxicity must be assumed.

**1.2 Mechanism of Injury:** The potential for severe local effects and severe systemic effects (e.g., organ damage) should be assumed until proven otherwise. If the chemical was stored as a liquefied compressed gas in a cylinder, contact with liquid form of the gas may result in frostbite injury.

**1.3 Routes of Exposure:** Inhalation, Dermal, Ocular, Ingestion.

### 2.0 PROVIDER SAFETY

**2.1 Personal Protective Equipment (PPE) – Decontamination Team:** When a chemical is unidentified, the worst-case possibilities concerning toxicity must be assumed.

**2.1.1** Personnel decontaminating patients must wear full-body chemical-resistant clothing and respiratory protection.

**2.1.2** Respiratory protection should consist of a positive pressure air or oxygen source, such as an air-line respirator or a Self-Contained Breathing Apparatus (SCBA).

**2.1.21** A positive pressure air or oxygen source is preferred if there is doubt as to the identity of the chemical in question or if there may be exposure to a level of unidentified chemical which would overwhelm the filter.

**2.2 Personal Protective Equipment (PPE) – Treatment Team:** Personnel treating patients who have been adequately decontaminated probably need no additional PPE other than universal precautions since there probably is no serious risk of secondary contamination.

**2.2.1** If there a concern for secondary contamination even after adequate decontamination, personnel should wear the appropriate level of PPE.

## 2.3 Patient Decontamination:

**2.3.1** It is best to perform complete decontamination of ALL victims when the identity of the chemical is unknown. Persons contaminated with condensed vapors, liquids, or solids do pose a risk of secondary contamination from off-gassing of unidentified chemical vapors and direct contact with the chemical.

**2.3.1.1** Potential for Secondary Contamination: The route of exposure, the extent of exposure, and the state the chemical is in (i.e. gas, vapor, liquid, solid) are important in determining the potential for secondary contamination. Victims who were exposed only to a gas and have no gross deposition of the material on their clothing or skin may or may not pose risks of secondary contamination to response personnel.

**2.3.1.2** Secondary contamination of other response personnel is more likely when:

**2.3.1.2.1** The victim has condensation of chemical vapor on their clothes or skin

**2.3.1.2.2** The victim's skin or clothing is wet with liquid chemical

**2.3.1.2.3** The victim has a powder or solid chemical on their hair, skin or clothes

**2.3.1.2.4** The victim has ingested a chemical

**2.3.1.2.5** Toxic vomitus may also pose a danger either through direct contact with the vomit or off-gassing of vapor. Prepare the treatment areas (ambulance, ED, etc.) for rapid clean up in case the victim vomits toxic material.

**2.3.1.2.6** All of these situations may cause secondary contamination by direct contact with the chemical or by off-gassing of its vapor.

**2.3.2** Brush any powder or solids from the skin, hair, and clothes of victims.

**2.3.3** Remove contact lenses if it can be done without additional trauma to the eye. Irrigate eyes for a minimum of 15 minutes. Continue irrigation until eye pH is neutral (7 to 8).

**2.3.4** Remove ALL clothing and jewelry. Double bag clothing and jewelry to prevent off-gassing.

**2.3.5** Decontamination is best accomplished by irrigation with copious amounts of water. Wash skin and hair with plain water for a minimum of 5 minutes and then wash twice with soap & water after washing with plain water. Washing with water alone (for a longer period of time) is acceptable if soap is not available. Neutralization is NOT recommended. Skin pH can be checked to assure that all of the unidentified chemical has been removed.

**2.3.5.1** Be alert for the possibility that the unknown chemical in question may react with water to form toxic gasses, ignite, explode, or generate enough heat to cause thermal burns.

**2.3.6** Watch for hypothermia in children and the elderly, when decontamination is done with un-heated water, or during cold weather.

**2.3.7** Frostbite Considerations: Handle frostbitten skin and eyes with caution. Re-warm the affected area in the same manner as for environmentally induced frostbite. For eyes, use lukewarm water or saline to irrigate and re-warm eyes, as appropriate.

## 3.0 SIGNS & SYMPTOMS

**3.1** Severity of symptoms will depend upon the concentration of the unidentified chemical to which the person is exposed and the duration of exposure. General symptoms which may be seen after exposure to an unknown chemical are listed below. Specific chemicals may cause other, specific symptoms which are not listed here.

**3.2** Toxidromes are groups of signs and symptoms that occur following exposure to certain types of chemicals. Identification of toxidromes is helpful in determining the class of chemical involved, its potential toxicity, and treatment. For example, the cholinergic toxidrome may indicate exposure to organophosphate insecticides or other nerve agents.

**3.3** Inhalation: Irritation of the eyes, nose, throat, and upper airway, lacrimation, rhinorrhea, cough, bronchoconstriction, shortness of breath. Severe exposure to an unknown chemical might cause caustic burns to upper airway, upper airway obstructions and damage to the alveoli causing pulmonary edema, decreased oxygenation and systemic hypoxia.

**3.4** Dermal: If concentrated solutions contact the skin, chemical burns may occur, which may be severe. If a liquefied compressed gas is released and contacts the skin, frostbite may result.

**3.5** Ocular: May see irritation or burns to eyes. Severe exposure to unknown chemical might lead to blindness. The full extent of ocular damage may not be fully evident for several days.

**3.6** Ingestion: May see nausea, vomiting, diarrhea, and abdominal pain. Exposure to an unknown chemical might cause corrosive burns to the mouth, esophagus and stomach.

**3.7** Systemic: May see hypotension, hypoxemia, renal failure, rhabdomyolysis, seizures, acidosis.

## 4.0 DIAGNOSTICS

**4.1** Unidentified chemical poisoning is a clinical diagnosis and there is no specific diagnostic testing. Any diagnostic evaluation should be based on sign and symptoms of irritation or corrosive effects.

**4.2** Continuous monitoring of pulse oximetry and end-tidal carbon dioxide should be used in symptomatic patients to evaluate the need for supplemental oxygen and additional monitoring.

**4.3** Consider a chest x-ray in patients with persistent symptoms and hypoxia.

## 5.0 TREATMENT (After Appropriate Decontamination)

**5.1 General:** Follow standard Basic and Advanced Life Support Guidelines. There may be a specific treatment or antidote for a specific chemical; thus, the importance of trying to identify the chemical, or chemical family, to which the patient was exposed. There is no “universal antidote” for exposure to an unidentified chemical.

**5.1.1 Note:** Use catecholamines with caution because of the possibility of enhanced risk of cardiac arrhythmias after exposure to certain chemicals (i.e. halogenated hydrocarbons).

**5.2 Inhalation:** Maintain the patient’s airway, with endotracheal intubation or cricothyroidotomy if necessary. Endotracheal intubation should be performed only under direct visualization because of edema and potential damage to the oropharynx. Support oxygenation and ventilation as necessary.

**5.3** Use standard treatments for pulmonary edema and bronchospasm. Consider the use of PEEP and bronchodilators. Corticosteroids can be considered.

**5.4 Dermal:** Treatment is the same as that for thermal burns. If frostbite is present, rewarm the affected area in the same manner as for environmentally induced frostbite.

**5.5 Ocular:** Irrigate eyes to a neutral pH. The pH of the conjunctiva should be checked every 30 minutes for 2 hours after irrigation is stopped to ensure that the measured pH is that of the tissue and not the irrigating fluid. Ensure that any particulate matter has been removed. Perform a thorough eye exam: test visual acuity and perform fluorescein and slit lamp examinations. Ophthalmology consultation is highly recommended. Immediately consult an ophthalmologist for patients who have corneal injuries.

**5.6 Ingestion:** Do NOT give activated charcoal or induce emesis. Consider dilution by giving 2 to 4 ounces of milk or water orally ONLY to patients who are conscious, able to swallow, and are able to protect their airway. Endoscopic evaluation may be necessary.

**5.7 Possible Systemic Effects:** When the chemical has not been identified, consider observing the patient for systemic effects, which may include, but are not limited to, seizures, loss of consciousness, delirium, respiratory failure, hypoxia, pulmonary edema, hypotension, bradycardia, nausea, vomiting, diarrhea, hematemesis, rhabdomyolysis, methemoglobinemia, hemolysis, metabolic acidosis, renal failure, etc.

**5.8 Possible Delayed Effects:** When the chemical has not been identified, consider observing the patient for an extended period or admit to the hospital.

**5.9 Public Health Notification:** If a public health risk is possible or actually exists, notify your state or local health department or another responsible public agency.

**Disclaimer:** This guideline is intended to be an informational reference only and should not be used as a substitute for consultation with a poison center or toxicologist, and/or the clinical judgement of the bedside team.

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DO NOT REVISE. Contact Kathy Jacobitz at the Nebraska Regional Poison Center ([kjacobitz@nebraskamed.com](mailto:kjacobitz@nebraskamed.com)) for permission to modify or to provide suggestions for updates. Check <https://www.regionviidhre.com/chemical-team> for the latest version.

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