

# Chemical Terrorism Preparedness and Response Card

Revised: July 2005

## RECOGNIZING CHEMICAL TERRORISM-RELATED ILLNESSES

Adequate planning and regular training are key to preparedness for terrorism-related events. Healthcare providers should be alert to illness patterns and reports of chemical exposure that might signal an act of terrorism. The following clinical, epidemiological and circumstantial clues may suggest a possible chemical terrorist event:

- An unusual increase in the number of people seeking care, especially with respiratory, neurological, dermatological or gastrointestinal symptoms
- Any clustering of symptoms or unusual age distribution (e.g., chemical exposure in children)
- Location of release not consistent with a chemical's use
- Simultaneous impacts to human, animal and plant populations
- Any unusual clustering of patients in time or location (e.g., persons who attended the same public event)

**Any unusual symptoms, illnesses or clusters of these should be reported immediately. EMS personnel should call their medical control facility and dispatching agency. The county health department and local Poison Control Center should also be notified.**

### PHONE NUMBERS

<b>Poison Control Centers</b>	<b>1-800-222-1222</b>
<b>County Health Department</b>	
Consult phone book blue pages under "County Offices" _____	
<b>New York State Department of Health (NYSDOH)</b>	
Bureau of Toxic Substance Assessment	<b>518-402-7800</b>
Wadsworth Center Laboratories	<b>518-474-7161</b>
After hours: NYSDOH Duty Officer	<b>1-866-881-2809</b>
After hours: SEMO State Warning Point	<b>518-457-2200</b>
(SEMO - State Emergency Management Office)	
<b>New York City Department of Health</b>	
Poison Control Center	<b>212-764-7667</b>

### MEDICAL PREPAREDNESS REFERENCES AND RESOURCES

This response card is only a summary of important information. For more detail for preparedness planning, review the following resources and those at the end of Table 2:

\*Textbook of Military Medicine – Medical Aspects of Chemical and Biological Warfare.

**[https://ccc.apgea.army.mil/sarea/products/textbook/Web\\_Version/index\\_2.htm](https://ccc.apgea.army.mil/sarea/products/textbook/Web_Version/index_2.htm)**

\*Centers for Disease Control and Prevention Public Health Emergency Preparedness and Response  
**<http://www.bt.cdc.gov/Agent/AgentlistChem.asp>**

\*National Center for Disaster Preparedness. 2003. Pediatric Preparedness for Disasters and Terrorism: A National Consensus Conference, Executive Summary. Mailman School of Public Health, Columbia University: New York City.

**TABLE 1**  
**RECOGNIZING AND DIAGNOSING HEALTH EFFECTS OF**  
**CHEMICAL AGENTS**

<b>Agent Type</b>	<b>Agent Names</b>	<b>Any Unique Characteristics</b>	<b>Signs and Symptoms</b>
<b>Nerve</b>	<ul style="list-style-type: none"> <li>- Cyclohexyl sarin (GF)</li> <li>- Sarin (GB)</li> <li>- Soman (GD)</li> <li>- Tabun (GA)</li> <li>- VX</li> <li>- Some insecticides (cholinesterase inhibitors)</li> <li>- Novichok agents/ Soviet V</li> </ul>	<ul style="list-style-type: none"> <li>- Miosis (pinpoint pupils)</li> <li>- Copious secretions/ sweating</li> <li>- Muscle twitching/ fasciculations</li> </ul>	<ul style="list-style-type: none"> <li>- Miosis (pinpoint pupils)</li> <li>- Blurred/dim vision</li> <li>- Headache</li> <li>- Nausea, vomiting, diarrhea</li> <li>- Copious secretions/ sweating</li> <li>- Muscle twitching/ fasciculations</li> <li>- Breathing difficulty</li> <li>- Seizures</li> <li>- Loss of consciousness</li> </ul>
<b>Asphyxiant/Blood</b>	<ul style="list-style-type: none"> <li>- Arsine</li> <li>- Cyanogen chloride</li> <li>- Hydrogen cyanide</li> </ul>	<ul style="list-style-type: none"> <li>- Possible skin color changes: cherry-red (cyanide or cyanogen chloride); yellow or bronze (arsine)</li> <li>- Possible cyanosis</li> <li>- Possible frostbite*</li> </ul>	<ul style="list-style-type: none"> <li>- Confusion</li> <li>- Nausea</li> <li>- Gasping for air, similar to asphyxiation but more abrupt onset</li> <li>- Seizures</li> </ul>
<b>Choking/ Pulmonary-damaging</b>	<ul style="list-style-type: none"> <li>- Chlorine</li> <li>- Hydrogen chloride</li> <li>- Nitrogen oxides</li> <li>- Phosgene</li> </ul>	<ul style="list-style-type: none"> <li>- Chlorine is a greenish-yellow gas with pungent odor</li> <li>- Phosgene gas may smell like newly-mown hay or grass</li> <li>- Possible frostbite*</li> </ul>	<ul style="list-style-type: none"> <li>- Eye and skin irritation</li> <li>- Airway irritation</li> <li>- Dyspnea, cough</li> <li>- Sore throat</li> <li>- Chest tightness</li> </ul>
<b>Blistering/ Vesicant</b>	<ul style="list-style-type: none"> <li>- Mustard/Sulfur mustard (HD, H)</li> <li>- Nitrogen mustard (HN-1,HN-2,HN-3)</li> <li>- Lewisite (L)</li> <li>- Phosgene oxime (CX)</li> </ul>	<ul style="list-style-type: none"> <li>- Mustard (HD) may have an odor like mustard, garlic or horseradish</li> <li>- Lewisite (L) may have an odor like geranium</li> <li>- Phosgene oxime (CX) may have a pepper-like or pungent odor</li> </ul>	<ul style="list-style-type: none"> <li>- Redness and blisters of the skin</li> <li>- Tearing, conjunctivitis, corneal damage</li> <li>- Mild respiratory distress to marked airway damage</li> </ul>
<b>Incapacitating/ Behavior-altering</b>	<ul style="list-style-type: none"> <li>- Agent 15/BZ</li> </ul>	<ul style="list-style-type: none"> <li>- May appear as mass drug intoxication with erratic behaviors, shared realistic and distinct hallucinations, disrobing and confusion</li> <li>- Hyperthermia</li> <li>- Mydriasis (dilated pupils)</li> </ul>	<ul style="list-style-type: none"> <li>- Dry mouth and skin</li> <li>- Initial tachycardia</li> <li>- Altered consciousness, delusions, denial of illness, belligerence</li> <li>- Hyperthermia</li> <li>- Ataxia (lack of coordination)</li> <li>- Hallucinations</li> <li>- Mydriasis (dilated pupils)</li> </ul>

\*Frostbite may occur from skin contact with liquid arsine, cyanogen chloride or phosgene.

**Table 2  
DECONTAMINATION AND TREATMENT**

Agent Type	Decontamination	Treatment	Other Patient Considerations
		Assess ABCs	
<b>Nerve</b>	<ul style="list-style-type: none"> <li>- Remove clothing immediately</li> <li>- Gently wash skin with soap and water</li> <li>- Do not abrade skin</li> <li>- For eyes, flush with plenty of water or normal saline</li> </ul>	<ul style="list-style-type: none"> <li>- Atropine before other measures</li> <li>- Pralidoxime (2-PAM) chloride</li> <li>- See nerve agent antidote Table 3</li> </ul>	<ul style="list-style-type: none"> <li>- Onset of symptoms from dermal contact with liquid forms may be delayed</li> <li>- Repeated antidote administration may be necessary</li> </ul>
<b>Asphyxiant/ Blood</b>	<ul style="list-style-type: none"> <li>- Remove clothing immediately if no frostbite*</li> <li>- Gently wash skin with soap and water</li> <li>- Do not abrade skin</li> <li>- For eyes, flush with plenty of water or normal saline</li> </ul>	<ul style="list-style-type: none"> <li>- Rapid treatment with oxygen</li> <li>- For cyanide, use sodium nitrite or amyl nitrite, if available, and then sodium thiosulfate</li> <li>- See cyanide antidote Table 4</li> </ul>	<ul style="list-style-type: none"> <li>- Arsine and cyanogen chloride may cause delayed pulmonary edema</li> </ul>
<b>Choking/ Pulmonary-damaging</b>	<ul style="list-style-type: none"> <li>- Remove clothing immediately if no frostbite*</li> <li>- Gently wash skin with soap and water</li> <li>- Do not abrade skin</li> <li>- For eyes, flush with plenty of water or normal saline</li> </ul>	<ul style="list-style-type: none"> <li>- Fresh air, forced rest</li> <li>- Semi-upright position</li> <li>- If signs of respiratory distress are present, oxygen with or without positive airway pressure may be needed</li> </ul>	<ul style="list-style-type: none"> <li>- May cause delayed pulmonary edema, even following a symptom-free period that varies in duration with the amount inhaled</li> </ul>
<b>Blistering/ Vesicant</b>	<ul style="list-style-type: none"> <li>- Immediate decontamination is essential to minimize damage</li> <li>- Remove clothing immediately</li> <li>- Gently wash skin with soap and water</li> <li>- Do not abrade skin</li> <li>- For eyes, flush with plenty of water or normal saline</li> </ul>	<ul style="list-style-type: none"> <li>- Immediately decontaminate skin</li> <li>- Flush eyes with water or normal saline for 10-15 minutes</li> <li>- If breathing difficulty, give oxygen</li> </ul>	<ul style="list-style-type: none"> <li>- Possible pulmonary edema</li> <li>- Mustard has an asymptomatic latent period</li> <li>- Phosgene oxime causes immediate pain</li> <li>- Lewisite has immediate burning pain, blisters later</li> <li>- Specific antidote British Anti-Lewisite (BAL) may decrease systemic effects of Lewisite</li> </ul>
<b>Incapacitating/ Behavior-altering</b>	<ul style="list-style-type: none"> <li>- Remove clothing immediately</li> <li>- Gently wash skin with water or soap and water</li> <li>- Do not abrade skin</li> </ul>	<ul style="list-style-type: none"> <li>- Evaluate mental status</li> <li>- Use restraints as needed</li> <li>- Monitor core temperature carefully</li> </ul>	<ul style="list-style-type: none"> <li>- Hyperthermia and self-injury are greatest risks</li> <li>- Hard to detect because it is an odorless and non-irritating substance</li> <li>- Possible serious arrhythmias</li> <li>- Specific antidote (physostigmine) may be available</li> </ul>
<p>*For frostbite areas, do NOT remove any adhering clothing. Wash area with plenty of warm water to release clothing.</p>			

**References for Preparedness and Response Card:**

1. Agency for Toxic Substances and Disease Registry (ATSDR). 2001. Managing Hazardous Materials Incidents Vol. I, II, III. Division of Toxicology, U. S. Department of Health and Human Services. Public Health Service: Atlanta, GA.  
<http://www.atsdr.cdc.gov/mhmi.html>
2. Chemical Casualty Care Division USAMRICD. 2000. Medical Management of Chemical Casualties Handbook, Third edition. U.S. Army Medical Research Institute of Chemical Defense

(USAMRICD). Aberdeen Proving Ground: Aberdeen, MD.

<https://ccc.apgea.army.mil/sarea/products/handbooks/MMCC/mmccthirdeditionjul2000.pdf>

- U.S. Army Edgewood Research, Development and Engineering Center. 1999. Technician EMS Course. Domestic Preparedness Training Program, Version 8.0. U.S. Army SBCCOM. Aberdeen Proving Ground: Aberdeen, MD.

**TABLE 3  
NERVE AGENT ANTIDOTE RECOMMENDATIONS**

Nerve agent antidotes may be obtained as auto-injector syringes. These devices rapidly deliver antidotes intramuscularly, typically to the thigh or buttocks. Atropine, in auto-injector form, is available as the AtroPen in amounts of 0.5, 1, or 2 mg. 2-PAM chloride, in auto-injector form, is available as the 600 mg ComboPen. A Mark I kit contains two auto-injector syringes; the smaller one with 2 mg atropine and the larger one with 600 mg 2-PAM chloride.

The spring-loaded design of the auto-injectors provides a forceful delivery that may cause tissue damage, especially to children and smaller patients. Children weighing less than 15 lb (about 7 kg), generally those younger than 6 months old, should not ordinarily be treated with the nerve agent antidote auto-injectors. In this age group, atropine should be individualized at doses of 0.05 mg/kg.

Patient	Mild/Moderate Effects <sup>1</sup>	Severe Effects <sup>2</sup>	Other Treatment
<b>Child</b>	Atropine: 0.05 mg/kg IM <b>or</b> IV (minimum 0.1 mg, maximum 5 mg);  <b>and</b>  2-PAM chloride: 25 mg/kg IM <b>or</b> IV (maximum 2 g IM <b>or</b> 1 g IV)	Atropine: 0.1 mg/kg IM <b>or</b> IV (minimum 0.1 mg, maximum 5 mg);  <b>and</b>  2-PAM chloride: 50 mg/kg IM <b>or</b> IV (maximum 2 g IM <b>or</b> 1 g IV)	Assisted ventilation after antidotes for severe exposure.  <b>Repeat atropine</b> at 2-5 minute intervals until secretions have diminished and breathing is comfortable or airway resistance has returned to near normal.  <b>Repeat 2-PAM chloride</b> once at 30-60 minutes, then at one- hour intervals for 1-2 doses, as necessary.
<b>Adult</b>	Atropine: 2 to 4 mg IM <b>or</b> IV;  <b>and</b>  2-PAM chloride <sup>3</sup> : 600 mg IM, <b>or</b> 25 mg/kg IV slowly	Atropine: 6 mg IM;  <b>and</b>  2-PAM chloride <sup>3</sup> : 1,800 mg IM, <b>or</b> 50 mg/kg IV slowly	<b>Diazepam</b> for seizures: Child - 0.05 to 0.3 mg/kg IV (maximum 10 mg); Adult - 5 mg IV  <b>Other benzodiazepines (e.g. lorazepam, midazolam)</b> may provide relief.  <b>Phentolamine</b> for 2-PAM chloride-induced hypertension: 1 mg IV for children; 5 mg IV for adults.

- Mild/Moderate effects of nerve agents** include localized sweating, muscle fasciculations, nausea, vomiting, weakness, dyspnea.
- Severe effects of nerve agents** include unconsciousness, seizures, apnea, flaccid paralysis.
- Dose selection of 2-PAM chloride for elderly patients should be cautious (usually starting at 600 mg IM, or 25 mg/kg IV slowly) to account for the generally decreased organ functions in this population.

**NOTE:** 2-PAM chloride is pralidoxime chloride or Protopam Chloride.

**CHEMPACK:** CHEMPACK is a federal program to provide nerve agent antidotes (Atropine, 2-PAM, Diazepam) to medical personnel during an emergency. Contact your county EMS coordinator, health department or emergency management office for more information.

**TABLE 4  
CYANIDE ANTIDOTE RECOMMENDATIONS**

Victims whose clothing or skin is contaminated with hydrogen cyanide liquid or solution can secondarily contaminate response personnel by direct contact or through off-gassing vapors. Avoid dermal contact with cyanide-contaminated victims or with gastric contents of victims who may have ingested cyanide-containing materials. Victims exposed only to hydrogen cyanide gas do not pose contamination risks to rescuers. **If the patient is a victim of recent smoke inhalation (may have high carboxyhemoglobin levels), administer only sodium thiosulfate.**

Patient	Mild (conscious)	Severe (unconscious)	Other Treatment
<b>Child</b>	If patient is conscious and has no other signs or symptoms, antidotes may not be necessary.	Sodium nitrite <sup>1</sup> : 0.12 - 0.33 ml/kg, not to exceed 10 ml of 3% solution <sup>2</sup> slowly IV over <u>absolutely</u> no less than 5 minutes, or slower if hypotension develops  <b>and</b> Sodium thiosulfate: 1.65 ml/kg of 25% solution IV over 10 - 20 minutes <sup>3</sup>	For sodium nitrite-induced orthostatic hypotension, normal saline infusion and supine position are recommended.  If still apneic after antidote administration, consider sodium bicarbonate for severe acidosis.
<b>Adult</b>	If patient is conscious and has no other signs or symptoms, antidotes may not be necessary.	Sodium nitrite <sup>1</sup> : 10 - 20 ml of 3% solution <sup>2</sup> (300 mg) slowly IV over <u>absolutely</u> no less than 5 minutes, or slower if hypotension develops  <b>and</b> Sodium thiosulfate: 50 ml of 25% solution (12.5 g) IV over 10 - 20 minutes <sup>3</sup>	
<ol style="list-style-type: none"> <li>1. If sodium nitrite is unavailable, administer amyl nitrite by inhalation from crushable ampules. If neither is available, use sodium thiosulfate alone.</li> <li>2. Available from Taylor Pharmaceuticals in cyanide antidote kit, formerly known as the Pasadena or Lilly Cyanide Kit.</li> <li>3. If there is an inadequate clinical response after 30 minutes, administer a second dose of sodium thiosulfate which is half the initial dose.</li> </ol>			

## PERSONAL PROTECTIVE EQUIPMENT (PPE)

### **DO NOT BECOME A CASUALTY!**

First responders face the greatest exposure potential, often to unidentified agents. To protect yourself:

- Be alert
- Keep an appropriate distance
- Stay upwind
- Wait for assessment by a HAZMAT team before entering

Ideally, responders in an unknown situation should wear Level A PPE. Exposure can occur from inhalation of vapors, dermal contact or eye contact. The following is a general discussion to help responders/healthcare providers determine appropriate PPE.

### **PPE to Prevent Inhalation Exposure:**

Protection from both vapors and particulates may be required when the chemical agent is being released. After release, protection from vapors is most important. Half-face and full-face respirators, with the appropriate canister, can provide good protection from vapors. These operate by negative pressure and must be fit tested for optimal protection. Powered, air-purifying respirators (PAPR) and self-contained breathing apparatus (SCBA) provide even greater protection and operate under positive pressure so that fit characteristics are less important. Surgical and N-95 masks will not protect against inhalation of vapors.

### **PPE to Prevent Dermal Exposure:**

Latex examination gloves provide very little protection from most chemical agents and can cause allergies. Gloves made of Viton, nitrile, butyl or neoprene provide more protection and, in some styles, allow adequate dexterity. However, the resistance of these materials to different chemicals varies and it is best to have a variety of gloves available. Double gloving may provide additional protection. Chemical-resistant aprons, suits and boots can also minimize dermal exposure.

### **PPE to Prevent Eye Exposure:**

Full-face respirators, PAPR and SCBA will provide protection from both splashes and vapors. Protective eyewear, such as goggles or a face shield, will not provide protection from chemical vapors. Protective eyewear is required during decontamination to prevent splashing into eyes.

## **DECONTAMINATION GUIDELINES**

Proper decontamination is often the most important first step in treating a patient exposed to chemical agents. Immediate removal of patient clothing can remove up to 90 percent of the contaminant. Removed clothing should be bagged and sealed.

After the clothing is removed, the patient's skin and eyes may need to be decontaminated. In most cases, decontamination of skin can be accomplished by gentle and thorough washing with soap and water followed by a thorough water rinse. For eyes, flush with plenty of water or normal saline. Decontamination water may need to be contained.

Bleach solutions, concentrated or dilute, should not be used on people. Diluted bleach (1 part household bleach to 9 parts water) can be used on equipment and other hard surfaces. Because bleach solutions irritate the eyes, skin and respiratory tract, they must be handled with caution and used with adequate ventilation.

It is important not to abrade the skin during washing or rinsing. This is especially true after exposure to blistering/vesicant agents which bind to skin. These agents may leave the skin compromised and susceptible to further damage. For choking/pulmonary-damaging agents or incapacitating/behavior-altering agents, a rinse in water alone may be adequate.

## **ODORS**

Some chemical agents are accompanied by a characteristic odor that may provide a warning. However, after a while, people may become used to the chemical and no longer detect the smell. The chemical may still be present even if there is no detectable odor.

## **DISCLAIMER**

The information on this card is meant to be a quick guide and is not intended to be comprehensive. This information or the web sites and references listed in this card are not a substitute for professional medical advice, diagnosis, or treatment of the individual. Please consult other references, Poison Control Center, and check antidote dosages, particularly for children and pregnant women.