



## **Revised Recommendations for Medical Providers regarding Chemical Terrorism**

November 2004

The Chemical Terrorism Guidance Document for Medical Providers, originally distributed by the Office of Public Health Preparedness, Michigan Department of Community Health on February 14, 2003, has been revised to incorporate more detailed treatment information as well as cold weather decontamination guidelines. *This revision does not represent any heightened alert.* With respect to the risk of chemical terrorism, the Michigan Department of Community Health<sup>1</sup> requests that you:

- Be alert for:
  - An unusual increase in the number of people seeking care, especially with respiratory, neurological, gastrointestinal or dermatological symptoms
  - Any clustering of symptoms or unusual age distribution (e.g., chemical exposure in children)
  - Any unusual clustering of patients in time or location (e.g. persons who attended the same public event)
  - Unexplained deaths in young or healthy people

If any of these situations arise, hospital emergency department staff should immediately contact the Poison Control Center at (800) 222-1222, notify your local health department, and your local police agency. If required, the FBI will be requested by the police agencies.

- Proper decontamination is the most important first step in treating a patient suspected of exposure to a chemical agent, unless the patient has a life threatening condition, at which time simultaneous treatment and decontamination would need to occur. This involves prompt removal of clothing and washing with water and, if available, soap.
- If chemical exposure is suspected, appropriate measures should be undertaken to contain the patient in an isolated area until decontamination is completed. Emergency medical personnel must use appropriate personal protective equipment including skin and respiratory protection where indicated.

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<sup>1</sup> Information in this guidance document is adapted from an alert distributed by the New York City Department of Health and revised on March 4, 2003.

- Antidotes are available for cyanides and nerve agents.

***The information provided in this guidance document is only a summary. For more detail on medical treatment, review the resources at the end of this alert.***

## **DECONTAMINATION GUIDELINES**

Proper decontamination is 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. Clothing should not be pulled over the head; clothing should be cut off if possible. Removed clothing should be bagged, sealed and retained as possible evidence and for proper treatment and/or disposal. 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 water, and soap if available. Remove contact lenses if easily removable without additional trauma to the eye. Rinse eyes with plain water or normal saline for 10-15 minutes. Water used for decontamination should be contained, if possible, but should never delay decontamination.

Bleach solutions should not be used on people. Diluted bleach at 5% (1 part household bleach to 9 parts water) can be used on eyeglasses, equipment and other hard surfaces. Because bleach solutions irritate the eyes, skin and respiratory tract, they must be handled with caution and only 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 that 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.

Victims whose clothing or skin is contaminated with hydrogen cyanide liquid or solutions can secondarily contaminate emergency personnel by direct contact or through off-gassing vapors. Avoid dermal contact with cyanide-contaminated victims or with the 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.

### **Cold Weather Decontamination**

Although potentially life saving, outdoor wet-decontamination procedures during cold weather present risks that must be balanced against the hazards posed by chemical agents.

Special populations such as the elderly and children should be given special consideration for limited resources such as blankets and indoor shelter because of their limited ability to maintain a normal body temperature.

- Outdoor temperature above 65°F
  - Supply patient privacy
  - Remove clothes; decontaminate with copious water outdoors; move to post-decontamination area or shelter.

- Outdoor temperature 35-65°F
  - Supply patient privacy
  - Remove clothes; decontaminate with copious water outdoors or in a heated enclosure (use warm water when ever possible); move to a post-decontamination area in a heated enclosure with a temperature above 65°F.
  - This can be arranged by setting up a decontamination corridor near the entranceway to a hospital or other facility, such as a hotel or school.
  
- Temperature below 35°F
  - Remove clothes at the earliest opportunity; dry decontamination techniques such as blotting the victim with paper towels, dirt, sand until victims are moved indoors for wet-decontamination.
  - Consider indoor showers, indoor swimming pools, and hospital decontamination areas.
  - If victims are transported prior to having wet-decontamination, they should have their clothing removed before transport.

### **Special Considerations**

**Cold Shock** refers to the physiological response triggered by sudden cold-water exposure and can result in sudden death. The risk is greatest for those with pre-existing medical conditions. Cold shock can be minimized by encouraging people to gradually get wet, rather than being suddenly deluged with cold water.

**Hypothermia**, a condition of deep body cooling, takes longer to develop than cold shock. Most people can tolerate 55°F water with minimal discomfort. Shivering is not a sign of alarm, but lack of shivering if an individual is cold and wet is an indication of hypothermia. The risk of hypothermia can be decreased by quickly moving victims to warm shelters, using heated water for decontamination, providing clothing or blankets after decontamination.

*The key to successful decontamination is to use the fastest method that causes the least harm and does the most good for the majority of the victims.*

### **PERSONAL PROTECTIVE EQUIPMENT (PPE)**

Upon alert of possible chemically contaminated patients, the emergency room staff should *immediately* contact their in-house specialist (e.g., environmental health and safety officer) for specific hazard assessment and PPE recommendations to ensure consistency with the hospital's policies and procedures and to ensure their staff is properly protected. This should happen before patients arrive at the ED, if at all possible.

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

Protection from both vapors and particulates may be required if a chemical agent is being released. After release, protection from vapors is most important. Surgical and N-95 masks will

**not protect against inhalation of vapors.** Half-face and full-face respirators, with the appropriate canister, will 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. Where airborne concentrations cannot be reasonably estimated, the highest level of protection should be used.

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

Latex examination gloves provide little protection from most chemical agents and can cause allergies. Gloves made of Viton, nitrile, butyl or neoprene provides more protection. It is best to have a variety of gloves available. Double gloving will provide additional protection. Chemical-resistant aprons or suits can also prevent dermal exposure.

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

Protective eyewear is required during decontamination to prevent splashing into eyes. Full-face negative pressure air purifying respirators, PAPRs and SCBAs will provide eye and facial protection from both splashes and vapors. If a half face respirator is worn, protective eyewear should be worn. Protective eyewear that is not splash and vapor proof, such as safety glasses or a face shield will not provide protection from chemical vapors.

### **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. The absence of a particular agent's characteristic odor does not necessarily indicate the absence of that agent.

### **HEALTH EFFECTS, DECONTAMINATION AND TREATMENT**

The following tables provide a summary of the health effects, decontamination methods and treatment (Table 1). Information on antidotes for nerve agents is provided in Table 2, and for cyanide in Table 3.

**Note: The information contained in this guidance document is not intended to provide comprehensive guidelines. Additional information and references should be utilized.**

**TABLE 1. RECOGNIZING AND DIAGNOSING HEALTH EFFECTS OF CHEMICAL TERRORISM, INCLUDING DECONTAMINATION AND TREATMENT**

Agent Type	Agent Names	Unique Characteristics	Initial Effects	Decontamination	Medical Interventions	Other Patient Considerations
<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> </ul>	<ul style="list-style-type: none"> <li>•Miosis (pinpoint pupils)</li> <li>•Copious secretions</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> </ul> <p><i>NOTE: the mnemonic "SLUDGE":</i>  <b>S</b>alivation, sweating  <b>L</b>acrimation  <b>U</b>rination  <b>D</b>efecation, drooling, diarrhea  <b>G</b>astric upset and cramps  <b>E</b>mesis</p>	<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> <li>•Bleach solutions should NOT be used on people; diluted bleach (1 part household bleach to 9 parts water) can be used on eyeglasses, equipment and other hard surfaces</li> </ul>	<ul style="list-style-type: none"> <li>•Atropine</li> <li>•Pralidoxime (2-PAM) chloride</li> <li>•Benzodiazepines should be used for seizures or agitation</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> <li>•In a true nerve agent exposure, Pralidoxime therapy should be continued for at least 24 hours.</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 cherry red skin</li> <li>•Hydrogen cyanide has a bitter almond odor</li> </ul>	<ul style="list-style-type: none"> <li>•Confusion</li> <li>•Nausea</li> <li>•Patients may gasp for air, similar to asphyxiation but more abrupt onset</li> <li>•Seizures prior to death</li> </ul>	<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>•Rapid treatment with oxygen</li> <li>•For cyanide, use oxygen, sodium bicarbonate, and specific antidotes (such as nitrites and/or sodium thiosulfate)</li> </ul>	<ul style="list-style-type: none"> <li>•Arsine and cyanogen chloride may cause delayed pulmonary edema</li> <li>•Arsine causes massive hemolysis</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 smells like newly mown hay or grass</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>	<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>•Fresh air, forced rest</li> <li>•If signs of respiratory distress are present, oxygen with or without positive airway pressure may be needed</li> <li>•Other supportive therapy, as needed</li> </ul>	<ul style="list-style-type: none"> <li>•May cause delayed pulmonary edema, from 12-24 hours, even following a symptom-free period that varies in duration with the amount inhaled</li> </ul>

**TABLE 1. (continued) RECOGNIZING AND DIAGNOSING HEALTH EFFECTS OF CHEMICAL TERRORISM; INCLUDING DECONTAMINATION AND TREATMENT RECOMMENDATIONS**

Agent Type	Agent Names	Unique Characteristics	Initial Effects	Decontamination	Medical Interventions	Other Patient Considerations
<b>Blistering/ Vesicant</b>	<ul style="list-style-type: none"> <li>• Mustard/Sulfur mustard (HD, H)</li> <li>• Mustard gas (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) has an odor like burning garlic or horseradish</li> <li>• Lewisite (L) has an odor like geranium</li> <li>• Phosgene oxime (CX) has a pepperish or pungent odor</li> </ul>	<ul style="list-style-type: none"> <li>• Severe irritation</li> <li>• Redness and blisters of the skin</li> <li>• Tearing, conjunctivitis, corneal damage</li> <li>• Mild respiratory distress to marked airway damage</li> <li>• May cause death</li> </ul>	<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> <li>• Bleach solutions should NOT be used on people; diluted bleach (1 part household bleach to 9 parts water) can be used on eyeglasses, equipment and other hard surfaces</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>• Give oxygen if there is difficulty breathing</li> <li>• Supportive care</li> </ul>	<ul style="list-style-type: none"> <li>• Possible pulmonary edema</li> <li>• Sulfur mustard has an asymptomatic latent period</li> <li>• There is no antidote or treatment for mustard</li> <li>• Lewisite has immediate burning pain, blisters later</li> <li>• Specific antidote British Anti - Lewisite (BAL) may decrease <u>systemic</u> effects of Lewisite, but its availability is very limited</li> <li>• Phosgene oxime causes immediate pain</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; onset may be delayed (30 to 60 minutes) depending on the agent</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>	<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>• Remove heavy clothing</li> <li>• Evaluate mental status</li> <li>• Use restraints as needed</li> <li>• Monitor core temperature carefully</li> <li>• Supportive care</li> <li>• Sedation with benzodiazepines may be required</li> </ul>	<ul style="list-style-type: none"> <li>• Hyperthermia and self-injury are largest 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 considered</li> </ul>

## Attachment 1

### STATE MODEL PROTOCOL - MICHIGAN NERVE AGENT/ORGANOPHOSPHATE PESTICIDE EXPOSURE TREATMENT PROTOCOL

**Purpose:** This Protocol is intended for EMS personnel at all levels to assess and treat patients exposed to nerve agents and organophosphate pesticides. The protocol includes the use of the Mark I Antidote Kits and the Atropen autoinjector for personnel trained in the use of these devices and authorized by the local medical control authority.

#### **M B S P I. Chemical Agents**

- A. Agents of Concern
  - 1. Military Nerve Agents including: Sarin (GB), Soman (GD), Tabun (GA), VX
  - 2. Organophosphate Pesticides (OPP) including Glutathione, Malathion, Parathion, etc.
- B. Detection: The presence of these agents can be detected through a variety of monitoring devices available to most hazardous materials response teams and other public safety agencies.

#### **II. Patient Assessment**

- A. SLUDGEM Syndrome
  - a. **S** Salivation / Sweating / Seizures
  - b. **L** Lacrimation (Tearing)
  - c. **U** Urination
  - d. **D** Defecation / Diarrhea
  - e. **G** Gastric Emptying (Vomiting) / GI Upset (Cramps)
  - f. **E** Emesis
  - g. **M** Muscle Twitching or Spasm
- B. Threshold Symptoms: These are symptoms that may allow rescuers to recognize that they may have been exposed to one of these agents and include:
  - 1. Dim vision
  - 2. Increased tearing / drooling
  - 3. Runny nose
  - 4. Nausea/vomiting
  - 5. Abdominal cramps
  - 6. Shortness of breath

**NOTE:** Many of the above may also be associated with heat related illness.

- C. Mild Symptoms and Signs:
  - 1. Threshold Symptoms *plus*:
  - 2. Constricted Pupils\*
  - 3. Muscle Twitching
  - 4. Increased Tearing, Drooling, Runny Nose
  - 5. Diaphoresis
- D. Moderate Symptoms and Signs:
  - 1. Any or All of Above *plus*
  - 2. Constricted Pupils\*
  - 3. Urinary Incontinence
  - 4. Respiratory Distress with Wheezing
  - 5. Severe Vomiting
- E. Severe Signs
  - 1. Any or All of Above *plus*
  - 2. Constricted Pupils\*
  - 3. Unconsciousness
  - 4. Seizures
  - 5. Severe Respiratory Distress

\*NOTE: Pupil constriction is a relatively unique finding, occurs early and persists after antidote treatment. The presence of constricted pupils with SLUDGEM findings indicates nerve agent / OPP toxicity.

## M B S P

### III. Personal Protection

- A. Be Alert for secondary device in potential terrorist incident
- B. Personal Protective Equipment (PPE)
  - 1. Don appropriate PPE as directed by Incident Commander.
  - 2. Minimum PPE for Non-Hot Zone (i.e., DECON Zone)
    - i. Powered Air Purifying Respirator or Air Purifying Respiratory with proper filter
    - ii. Chemical resistant suit with boots
    - iii. Double chemical resistant gloves (butyl or nitrile)
    - iv. Duct tape glove suit interface and other vulnerable areas
- B. Assure EMS personnel are operating outside of Hot Zone
- C. Avoid contact with vomit if ingestion suspected – off gassing possible
- D. Assure patients adequately decontaminated *prior* to transport
  - 1. Per Decontamination Protocol
  - 2. Removal of outer clothing provides significant decontamination.
  - 3. Clothing should be removed before transport
  - 4. Do NOT transport clothing with patient
- D. Alert hospital(s) as early as possible

**MBSP**

**IV. Patient Management (After Evacuation and Decontamination)**

- A. Evaluate and maintain the airway, provide oxygenation and support ventilation as needed.  
NOTE: Anticipate need for extensive suctioning
- B. Antidote administration per Mark I Kit Dosing Directive – See Below
- C. Establish vascular access
- D. Atropine 2-6 mg IV/IM per Mark I Kit Dosing Directive if Mark I Kit is not available (each Mark I Kit contains 2 mg of atropine)
- E. Treat seizures per Seizure Protocol
- F. Monitor EKG

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<b>Mark I Kit Dosing Directive</b>			
<b>Clinical Findings</b>	<b>Signs/Symptoms</b>	<b>Required Conditions</b>	<b>Mark I Kits To Be Delivered</b>
<b>Threshold Symptoms</b>	<ul style="list-style-type: none"> <li>• Dim vision</li> <li>• Increased tearing</li> <li>• Runny nose</li> <li>• Nausea/vomiting</li> <li>• Abdominal cramps</li> <li>• Shortness of breath</li> </ul>	Threshold Symptoms <i>-and-</i> Positive evidence of nerve agent or OPP on site	1 Mark I Kit (self-rescue)
<b>Mild Symptoms and Signs</b>	<ul style="list-style-type: none"> <li>• Increased tearing</li> <li>• Increased salivation</li> <li>• Runny nose</li> <li>• Sweating</li> <li>• Nausea/vomiting</li> <li>• Abdominal cramps</li> <li>• Diarrhea</li> </ul>	Medical Control Order	1 Mark I Kit
<b>Moderate Symptoms and Signs</b>	<ul style="list-style-type: none"> <li>• Constricted pupils</li> <li>• Difficulty breathing</li> <li>• Severe vomiting</li> </ul>	Constricted Pupils	2 Mark I Kits
<i>Severe Signs</i>	<ul style="list-style-type: none"> <li>• Constricted pupils</li> <li>• Unconsciousness</li> <li>• Seizures</li> <li>• Severe difficulty breathing</li> </ul>	Constricted Pupils	3 Mark I Kits
<b>Pediatric Patient with Non-Severe Signs/Symptoms</b>	<i>As Above</i>	Constricted Pupils	Age >8 years old: <ul style="list-style-type: none"> <li>• As Above</li> </ul> Age <8 years old <ul style="list-style-type: none"> <li>• Per Medical Control</li> </ul>
<b>Pediatric Patient with Severe</b>	<ul style="list-style-type: none"> <li>• Constricted pupils</li> <li>• Unconsciousness</li> </ul>	Constricted Pupils	Age > 8 years old: <ul style="list-style-type: none"> <li>• 2-3 Mark I Kits</li> </ul>

<b>Signs/Symptoms</b>	<ul style="list-style-type: none"> <li>• Seizures</li> <li>• Severe difficulty breathing</li> </ul>		<p>Age 1-to-8 years old:</p> <ul style="list-style-type: none"> <li>• 1 Atropen or</li> <li>• 1 Mark I Kit</li> </ul> <p>Age &lt;1 years old:</p> <ul style="list-style-type: none"> <li>• Per Medical Control</li> </ul>
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**CONTACT MEDICAL CONTROL**

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**IV. Post-Medical Control**

- A. Additional Atropine 2 mg IV/IM for continued secretions (0.05 mg/kg for pediatrics)
- B. Seizure Prophylaxis per Seizure Protocol for patients with severe signs

## Attachment 2

### STATE MODEL PROTOCOL - MICHIGAN CYANIDE EXPOSURE TREATMENT PROTOCOL

**Purpose:** This Protocol is intended for EMS personnel at all levels to assess and treat patients exposed to cyanide. The protocol includes the use of inhaled amyl nitrite by trained personnel who are authorized by their local medical control authority. Additionally, the protocol allows trained and authorized paramedics to administer sodium nitrite and sodium thiosulfate when these medications are available.

#### **M B S P**

#### **I. Chemical Agents**

##### **B. Agents of Concern Include:**

1. Cyanide
2. Hydrogen Cyanide
3. Potassium / Sodium Cyanide
4. Cyanogen Chloride

**B** Detection: The presence of these agents can be detected through specialized environmental monitoring equipment available to hazardous materials response teams.

##### **C. Modes of Exposure**

1. Inhalation (including smoke inhalation)
2. Ingestion
3. Skin absorption unlikely

#### **II. Assessment**

##### **A. Shortness of breath**

1. Possibly accompanied by chest pain
2. Generally not associated with cyanosis (blue skin/membranes)
3. Pulse oximetry levels usually normal
4. Usually associated with increased respiratory rate and depth
5. Potential for rapid respiratory arrest

**B.** Confusion, decreased level of consciousness, coma

**C.** Seizures

**D.** Headache, dizziness, vertigo (sense of things spinning)

**E.** Pupils dilate (late)

#### **III. Personal Protection**

**A.** Be Alert for secondary device in potential terrorist incident

**B.** Personal Protective Equipment (PPE) as directed by Incident Commander.

- C. Assure EMS personnel are operating outside of Hot Zone
- D. Avoid contact with vomit if ingestion suspected – off gassing possible
- E. Decontamination of victims usually not indicated unless additional unknown chemical(s) suspected

MBSB

IV. Patient Management (After Evacuation)

- A. Evaluate and maintain the airway, provide oxygenation and support ventilation as needed.
- B. **Note: Patients in respiratory arrest (i.e., not breathing but still having a pulse) have been found to respond to antidote therapy and should receive positive pressure ventilation when operationally feasible.** This is in contrast to most triage systems that would categorize non-breathing patients as non-survivable.

CONTACT MEDICAL CONTROL

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- C. Amyl Nitrite Per Amyl Nitrite Procedure\*
  - 1. Requires symptomatic patient(s) *and*
  - 2. Positive evidence of cyanide exposure through environmental monitoring or credible operational intelligence.
- D. Alert receiving hospital ASAP to prepare additional antidotes
- E. Establish vascular access
- F. Cardiac monitoring
- G. Sodium Nitrite 10 ml (300 mg) IV over 5 minutes if available and cyanide exposure confirmed and with medical control order\* for critical patients
  - 1. For pediatric patients: 0,15 ml/kg IV over >5 minutes
  - 2. Monitor BP carefully and slow administration for hypotension
- H. Sodium Thiosulfate 50 ml (12.5 g) IV over 10 minutes if available and cyanide exposure confirmed and with medical control order\* for critical patients
  - 1. For pediatric patients: 1.65 ml/kg (12.5 g/50 ml solution) IV over 10 minutes
  - 2. Generally administered after sodium nitrite
  - 3. If cyanide exposure not confirmed, may receive order for Sodium Thiosulfate without Sodium Nitrite

\* NOTE: A single medical control order in a mass casualty incident may be applied to all symptomatic patients.

These medications are not required to be carried on EMS vehicles and may be available through special response units.

**IN ALL CASES OF POISONING OR USE OF THESE ANTIDOTES CONTACT THE POISON CENTER AT 800.222.1222**

## **REFERENCES AND RESOURCES**

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

[http://ccc.apgea.army.mil/products/textbook/HTML\\_Restricted/index.htm](http://ccc.apgea.army.mil/products/textbook/HTML_Restricted/index.htm)

<http://chemdef.apgea.army.mil/textbook/contents.asp>

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

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>

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.

<http://ccc.apgea.army.mil/products/handbooks/RedHandbook/001TitlePage.htm>

U.S. Army Soldier and Biological Chemical Command (SBCCOM). 2000. Guidelines for Mass Casualty Decontamination During a Terrorist Chemical Agent Incident.

[http://hld.sbcom.army.mil/downloads/cwirp/cwirp\\_guidelines\\_mass\\_casualty\\_decon.pdf](http://hld.sbcom.army.mil/downloads/cwirp/cwirp_guidelines_mass_casualty_decon.pdf)

U.S. Army Soldier and Biological Chemical Command (SBCCOM). 2002. Guidelines for Cold Weather Mass Decontamination During a Terrorist Chemical Agent Incident.

[http://hld.sbcom.army.mil/downloads/cwirp/cwirp\\_cold\\_weather\\_mass\\_decon.pdf](http://hld.sbcom.army.mil/downloads/cwirp/cwirp_cold_weather_mass_decon.pdf)