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Terrorist Use of Toxins and Poisons: Information for Healthcare Providers

(U//FOUO) On November 9, 2010, the Department of Homeland Security (DHS) and Federal Bureau of Investigation (FBI) released a document entitled “Potential for Small-Scale Attacks Using Toxins and Poisons.” This document states, “Terrorists continue to express broad interest in toxins and poisons that could be used to contaminate food or water supplies, or spread through skin contact.”ⁱ Al-Qa’ida in the Arabian Peninsula (AQAP) advocated the use of poisons in attacks against the West in its English language magazine *Inspire*. In view of ongoing threats to the United States from AQAP, this information is being provided to ensure appropriate preparedness measures can be taken.

What Should I Do Now?

- Familiarize yourself with indicators of an attack with toxins and poisons, treatment protocols, and alerting/notification procedures. The Chemical Hazards Emergency Medical Management (CHEMM) website (<http://chemm.nlm.nih.gov>) contains detailed information, links, and tools for chemical emergency preparedness and response. Information on botulism can be found on the CDC website <http://www.cdc.gov/nczved/divisions/dfbmd/diseases/botulism/>.
- Share this document and attached Roll Call Release with colleagues *with a valid need to know*, including emergency department, hospital emergency operations, and pre-hospital personnel. A separate fact sheet is available for laboratory personnel.
- Register on the HSIN-HPH portal for additional threat-related information, using the following link: <https://connect.hsin.gov/hph/event/registration.html>

Emergency Contacts

- Regional Poison Control Centers: **1-800-222-1222** CDC (for botulinum antitoxin): **770-488-7100**
- Health Department Point of Contact (Fill in): _____
- State Health Departments: <http://www.cdc.gov/mmwr/international/relres.html>
- Local Health Departments: <http://www.naccho.org/about/LHD/index.cfm>

Cyanide

- (U) Cyanide is a rapidly acting, potentially deadly chemical that can exist in various forms.ⁱⁱ
- (U//FOUO) There are three primary exposure pathways that violent extremists are likely to use in an attack: inhalation, ingestion, and dermal. Non-gaseous forms such as cyanide salts can be used by themselves as poisons or reacted with other chemicals in improvised devices to produce hydrogen cyanide and cyanogen chloride gas.ⁱⁱⁱ
- Early symptoms of cyanide poisoning include weakness, dizziness, lightheadedness, rapid breathing, rapid heart rate, nausea, vomiting, feeling of neck constriction and suffocation, confusion, restlessness, and anxiety. Accumulation of fluid in the lungs may complicate severe poisonings. Rapid breathing is often followed by respiratory depression/respiratory arrest. Severe cyanide poisonings progress to stupor, coma, low blood pressure, slow heart rate, convulsions, fixed and dilated pupils, metabolic acidosis, and death. The central nervous system (CNS) is the most sensitive target organ of cyanide poisoning. In serious poisonings, the skin is cold, clammy, and diaphoretic. Severe signs of hypoxia in the absence of blue discoloration of the skin suggest cyanide poisoning.
- Antidotes include sodium thiosulfate, amyl nitrite, and sodium nitrite.^{iv} Hydroxycobalamin is a recently approved antidote with a lower risk of adverse effects such as hypotension.
- For clinical guidance, please see <http://emergency.cdc.gov/agent/cyanide/>
- For management guidelines specific to hydrogen cyanide, please see:
 - Pre-hospital: http://chemm.nlm.nih.gov/cyanide_prehospital_mmg.htm
 - Hospital: http://chemm.nlm.nih.gov/cyanide_hospital_mmg.htm

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Ricin

- (U) Ricin is a poison found naturally in castor beans. If enough castor beans are chewed and swallowed, the released ricin can cause injury. Ricin can be made from the waste material left over from processing castor beans. It can be in the form of a powder, a mist, or a pellet, or it can be dissolved in water or weak acid.^v
- (U//FOUO) The highest-risk ricin bioterrorism attack scenarios involve attacks through inhalation and ingestion exposure pathways.^{vi}
- Contact of ricin with the skin, eyes, or mucous membranes can cause severe irritation and inflammation. The health effects caused by ricin depend on the route of exposure and the amount of ricin to which the patient/victim is exposed. Ingestion of ricin produces severe vomiting and diarrhea which may result in serious dehydration and multi-system organ failure affecting the gastrointestinal (GI) tract, kidneys, liver and pancreas; these effects are potentially fatal. Inhalation of ricin may cause cough, fever, fluid accumulation in the lungs and progressive shortness of breath leading to respiratory failure. Inhalation of ricin may also result in an allergic reaction resulting in nasal passage congestion, dryness and soreness of the throat, swelling of the eyelids and lips, bronchial irritation and possibly asthma.
- There is no antidote for ricin toxicity.^{vii} Medical therapy includes symptomatic and supportive care.
- For clinical guidance, please see <http://emergency.cdc.gov/agent/ricin/clinicians/index.asp>

Botulinum Toxin

- (U//FOUO) Botulinum toxin is one of the most lethal toxins. It is produced by the anaerobic, spore-forming bacterium *Clostridium botulinum*, which is found in soil. Botulinum toxin causes a rare, muscle-paralyzing disease called botulism. Botulism is not contagious and the toxin cannot penetrate intact skin. Natural causes of botulism include ingestion of pre-formed toxin in food and *in situ* production of toxin, either through a wound contaminated with *C. botulinum* or through colonization of the intestines of an infant (or rarely adult) with *C. botulinum*. A manmade exposure pathway for the toxin is inhalation. Ingestion and inhalation exposure are the most likely pathways for use in a botulinum toxin attack.^{viii} Neurologic signs and symptoms are similar regardless of exposure pathway.
- In foodborne botulism, symptoms begin within 6 hours to 10 days (most commonly between 12 and 36 hours) of eating toxin-containing food. Symptoms of botulism include double vision, blurred vision, drooping eyelids, slurred speech, difficulty swallowing, dry mouth, and bilateral muscle weakness that moves down the body, usually affecting the muscles of the face and neck first, then the upper arms, lower arms, thighs, calves, etc. Sensation and mental function remain intact. Paralysis of breathing muscles can cause a person to stop breathing and die, unless mechanical ventilation is provided.
- Antitoxin is most effective in reducing symptom severity if administered early in the course of disease. Clinicians evaluating a suspected case of botulism should immediately seek consultation and antitoxin release from CDC by contacting 770-488-7100.

ⁱ DHS and FBI. (U//FOUO) Potential for Small-Scale Attacks Using Toxins and Poisons. 9 Nov 2010. Available at <https://cs.hsin.gov> [Registration required].

ⁱⁱ CDC. Facts About Cyanide. URL: <http://www.bt.cdc.gov/agent/cyanide/basics/facts.asp>. Updated 27 Jan 2004.

ⁱⁱⁱ DHS and FBI. (U//FOUO) Cyanide: Easily Obtainable Chemical of Interest to Terrorists. 18 Feb 2010.

^{iv} CDC. Cyanogen Chloride. Emergency Response Safety and Health Database. Reviewed 12 May 2011.

^v CDC. Facts About Ricin. URL: <http://www.bt.cdc.gov/agent/ricin/facts.asp>. Updated 5 Mar 2008.

^{vi} DHS. (U//FOUO) Infrastructure Protection Note: Ricin. 23 April 2010.

^{vii} CDC. Ricin. Emergency Response Safety and Health Database. Reviewed 12 May 2011.

^{viii} DHS. (U//FOUO) Infrastructure Protection Note: Botulinum Toxin (Small-Scale Attacks). 23 Apr 2010.