

THE FACTS ABOUT CHLORINE

GENERAL INFORMATION

Note to reader: This fact sheet is intended to provide general awareness and education on a specific chemical agent. For information on preparedness and response (e.g., for first responders and emergency medical personnel), please refer to the following Department resources:

Chemical Terrorism Preparedness and Response Card

(http://www.health.state.ny.us/nysdoh/bt/chemical_terrorism/pdf/chemical.pdf)

Chemical Terrorism Wall Chart

(http://www.health.state.ny.us/nysdoh/bt/chemical_terrorism/pdf/poster.pdf)

What is chlorine?

Chlorine is a chemical used in industry and in household cleaning products. Chlorine is among the ten highest volume chemicals made in the United States. At room temperature, chlorine is a gas. It has a yellow-green color, and a pungent, irritating odor similar to bleach. Usually, it is pressurized and cooled for storage and shipment as an amber-colored liquid. Chlorine does not catch fire easily, but may combine with other common substances to form explosive compounds.

How is chlorine used?

Chlorine has a variety of uses. It is used to disinfect water and is part of the sanitation process for sewage and industrial waste. During the production of paper and cloth, chlorine is used as a bleaching agent. It is also used in cleaning products, including household bleach which is chlorine dissolved in water. Chlorine is used in the preparation of chlorides, chlorinated solvents, pesticides, polymers, synthetic rubbers, and refrigerants.

How can people be exposed to chlorine?

Because of its widespread use in industrial and commercial locations, exposure to chlorine could occur from an accidental spill or release, or from a deliberate terrorist attack. The most harmful route of exposure is from breathing chlorine gas. Exposure may also result from skin contact or eye contact with chlorine gas or by swallowing chlorine-contaminated food or water.

Chlorine gas is heavier than air and will initially remain in low-lying areas unless wind or other conditions provide air movement.

What happens to chlorine in the body?

When chlorine enters the body as a result of breathing, swallowing, or skin contact, it reacts with water to produce acids. The acids are corrosive and damage cells in the body on contact.

What are the immediate health effects of chlorine exposure?

Most harmful chlorine exposures are the result of inhalation. Health effects typically begin within seconds to minutes. Following chlorine exposure, the most common symptoms are:

- Airway irritation

- Wheezing
- Difficulty breathing
- Sore throat
- Cough
- Chest tightness
- Eye irritation
- Skin irritation

The severity of health effects depend upon the route of exposure, the dose and the duration of exposure to chlorine. Breathing high levels of chlorine causes fluid build-up in the lungs, a condition known as pulmonary edema. The development of pulmonary edema may be delayed for several hours after exposure to chlorine. Contact with compressed liquid chlorine may cause frostbite of the skin and eyes.

What can you do if you think you may have been exposed to a release of chlorine?

If you have been exposed to a release of chlorine, take the following steps:

- Quickly move away from the area where you think you were exposed. If the release was indoors, go outdoors.
 - If you are near a release of chlorine, emergency coordinators may tell you to either evacuate the area or to “shelter in place.” To “shelter in place” means to remain indoors to avoid being exposed to the chemical. While indoors, shut and lock all doors and windows, turn off air conditioners, fans and heaters, and close fireplace dampers.
 - For more information on evacuation during a chemical emergency, see *Facts About Evacuation* (<http://www.bt.cdc.gov/planning/evacuationfacts.asp>). For more information on sheltering in place during a chemical emergency, see *Facts About Sheltering in Place* (<http://www.bt.cdc.gov/planning/shelteringfacts.asp>).
- Quickly remove any clothing that may have chlorine on it. If possible, clothing that is normally removed over the head (like t-shirts and sweaters) should be cut off the body to prevent additional contact with the agent.
 - Place your clothing inside a plastic bag and seal the bag tightly.
 - Do not handle the plastic bag, and wait for instructions on proper disposal.
 - Disposing of your clothing in a sealed bag helps protect you and other people from additional exposure.
 - Store the bagged clothing in a secure location away from people, especially children.
- Quickly wash any chlorine from your skin with large amounts of soap and water, and flush your eyes with large amounts of water.
 - Remove and dispose of contact lenses.
 - Wash eyeglasses with soap and water before wearing.
- If needed, seek medical attention right away.

How is chlorine exposure treated?

To limit health effects from exposure to chlorine, wash eyes and skin as quickly as possible with large amounts of water.

There is no antidote for chlorine poisoning, but chlorine's effects are treatable, and most people recover. People who experience serious health effects (such as severe eye or airway irritation, severe coughing, difficulty breathing, pulmonary edema) may need hospital care.

Will laboratory tests assist in making treatment decisions if someone has been exposed to chlorine?

Laboratory testing for chlorine exposure will not be useful in making treatment decisions. A person exposed to harmful amounts of chlorine will notice it immediately because of the unpleasant odor and the resulting skin, eye, nose and/or throat irritation. Therefore, the diagnosis and treatment of chlorine poisoning will primarily be based upon patient history and their health effects.

How can I get more information about chlorine?

Call the following numbers, or visit the websites listed among the “Sources”.

- Centers for Disease Control and Prevention Public Response Hotline (1-888-246-2675)
- Agency for Toxic Substances and Disease Registry (1-888-422-8737)
- Regional Poison Control Center (1-800-222-1222)

Sources:

Agency for Toxic Substances and Disease Registry. 2002. ToxFAQs for Chlorine. Division of Toxicology, U.S. Department of Health and Human Services. Public Health Service; Atlanta, GA.

<http://www.atsdr.cdc.gov/tfacts172.html>

Agency for Toxic Substances and Disease Registry. 2003. Medical Management Guidelines for Chlorine. Division of Toxicology, U.S. Department of Health and Human Services. Public Health Service; Atlanta, GA.

<http://www.atsdr.cdc.gov/MHMI/mmg172.html>

Centers for Disease Control and Prevention. 2003. Public Health Emergency Preparedness and Response Sheets. U.S. Department of Health and Human Services. Public Health Service; Atlanta, GA.

<http://www.bt.cdc.gov/agent/agentlistchem.asp>

Chlorine. In: Sifton DW (Ed.), *Physicians' Desk Reference Guide to Biological and Chemical Warfare Response, 1st ed.* (pp. 48-49). Montvale, NJ: Thomson/Physicians' Desk Reference, 2002.

This fact sheet is based on the most current information. It may be updated as new information becomes available.

August 5, 2004