# Chlorine, Biochemical Terrorism

## WHAT IS CHLORINE?

- Chlorine is an element used in industry and found in some household products.
- Chlorine is sometimes in the form of a poisonous gas. Chlorine gas can be pressurized and cooled to change it into a liquid so that it can be shipped and stored. When liquid chlorine is released, it quickly turns into a gas that stays close to the ground and spreads rapidly.
- Chlorine gas can be recognized by its pungent, irritating odor, which is like the odor of bleach. The strong smell may provide an adequate warning to people that they have been exposed.
- Chlorine gas appears to be yellow-green in color.
- Chlorine itself is not flammable, but it can react explosively or form explosive compounds with other chemicals such as turpentine and ammonia.

## WHERE CHLORINE IS FOUND AND HOW IT IS USED?

- Chlorine was used during World War I as a choking (pulmonary) agent.
- Its most important use is as a bleach in the manufacture of paper and cloth, but it is also used to make pesticides (insect killers), rubber, and solvents.
- Chlorine is used in drinking water and swimming pool water to kill harmful bacteria. It is also as used as part of the sanitation process for industrial waste and sewage.
- Household chlorine bleach can release chlorine gas if it is mixed with other cleaning agents.

## HOW PEOPLE CAN BE EXPOSED TO CHLORINE?

- People's risk for exposure depends on how close they are to the place where the chlorine was released.
- If chlorine gas is released into the air, people may be exposed through skin contact, eye contact, or breathing air that contains chlorine.
- If chlorine liquid is released into water, people may be exposed by touching or drinking water that contains chlorine.
- If chlorine liquid comes into contact with food, people may be exposed by eating the contaminated food.
- Chlorine gas is heavier than air, so it would settle in low-lying areas.

## HOW CHLORINE WORKS

The extent of poisoning caused by chlorine depends on the amount of exposure, how the person was exposed, and the length of time of exposure.

When chlorine gas comes into contact with moist tissues such as the eyes, throat, and lungs, an acid is produced that can damage these tissues.

## IMMEDIATE SIGNS AND SYMPTOMS OF CHLORINE EXPOSURE

During or immediately after exposure to dangerous concentrations of chlorine, the following signs and symptoms may develop:

- Coughing
- Chest tightness
- Burning sensation in the nose, throat, and eyes
- Watery eyes
- Blurred vision
- Nausea and vomiting
- Burning pain, redness, and blisters on the skin if exposed to gas, skin injury similar to frostbite if exposed to liquid chlorine
- Difficulty breathing or shortness of breath (may appear immediately if high concentrations of chlorine gas are inhaled, or may be delayed if low concentrations of chlorine gas are inhaled)
- Fluid in the lungs (pulmonary edema) may develop within 2 to 4 hours
- Showing these signs or symptoms does not necessarily mean that a person has been exposed to chlorine.

## WHAT THE LONG-TERM HEALTH EFFECTS ARE

- Long-term complications from chlorine exposure are not found in people who survive a sudden exposure unless they suffer complications such as pneumonia during therapy.
- Chronic bronchitis may develop in people who develop pneumonia during therapy.

## HOW PEOPLE CAN PROTECT THEMSELVES, AND WHAT THEY SHOULD DO IF THEY ARE EXPOSED TO CHLORINE

- Leave the area where the chlorine was released and get to fresh air. Quickly moving to an area where fresh air is available is highly effective in reducing exposure to chlorine.
- If the chlorine release was outdoors, move away from the area where the chlorine was released. **Go to the highest ground possible, because chlorine is heavier than air and will sink to low-lying areas.**
- If the chlorine release was indoors, get out of the building.
- If you think you may have been exposed, remove your clothing, rapidly wash your entire body with soap and water, and get medical care as quickly as possible.

## REMOVING AND DISPOSING OF CLOTHING:

- Quickly take off clothing that has liquid chlorine on it. Any clothing that has to be pulled over the head should be cut off the body instead of pulled over the head. If possible, seal the clothing in a plastic bag. Then seal the first plastic bag in a second plastic bag. Removing and sealing the clothing in this way will help protect you and other people from any chemicals that might be on your clothes.
- If you placed your clothes in plastic bags, inform either the local or state health department or emergency personnel upon their arrival. Do not handle the plastic bags.
- If you are helping other people remove their clothing, try to avoid touching any contaminated areas, and remove the clothing as quickly as possible.

## WASHING THE BODY:

- As quickly as possible, wash your entire body with large amounts of soap and water. Washing with soap and water will help protect people from any chemicals on their bodies.
- If your eyes are burning or your vision is blurred, rinse your eyes with plain water for 10 to 15 minutes. If you wear contacts, remove them before rinsing your eyes, and place them in the bags with the contaminated clothing. Do not put the contacts back in your eyes. You should dispose of them even if you do not wear disposable contacts. If you wear eyeglasses, wash them with soap and water. You can put the eyeglasses back on after you wash them.
- If you have *ingested* (swallowed) chlorine, do not induce vomiting or drink fluids.

## HOW CHLORINE EXPOSURE IS TREATED

- Seek medical attention right away. **Dial 911 and explain what has happened.**
- No antidote exists for chlorine exposure. Treatment consists of removing the chlorine from the body as soon as possible and providing supportive medical care in a hospital setting.

*Most of this information is courtesy of US Government CDC*. In times of an emergency much of this material may not apply when it comes to specialized care and testing. These are guidelines to help you when that care is not available. Some of this information is very technical and difficult to understand, but hopefully someone will be available for help in treatment and understanding.

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