

# Pulmonary (Choking) Intoxicants



Pulmonary intoxicants cause severe life-threatening lung injury after inhalation. These effects are generally delayed several hours after exposure. Of particular interest are **Phosgene, Chlorine, and Ammonia** which are common industrial chemicals. If exposed, eyes and skin should be flushed with water and airway maintained. Supportive and may require advanced intensive care techniques including intubation and use of a mechanical ventilation.

Surrounding virtually every community are industrial and chemical facilities, railways, and highways systems that are heavily traveled by chemical tankers. An accident or intentional targeting of chemical facilities or modes of transport generate into a public health disaster both medically and environmentally.

For immediate assistance, call the Poison Control Center Hotline: 1-800-222-1222.

## PHOSGENE

Phosgene is used today in the manufacturing of dyes, coal tar, pesticides, and pharmaceuticals. It was widely used in World War I until mustard was introduced on the battlefield. Phosgene has a characteristic odor of freshly mown hay and is four times heavier than air. It is a gas above 47 °F, and is principally a hazard by inhalation.

The Bhopal, India Disaster of 1984, at a Union Carbide plant, involved the release of 50,000 pounds of methylisocyanate. This chemical is composed of phosgene and methylamine. There were at least 150,000 people affected, 10,000 severely injured, and 3,300 killed. The effects of the release were thought to be due to a combination of isocyanate and phosgene.

## CHLORINE

Chlorine is a significant irritant to the eyes and respiratory tract. It is widely used in the manufacture of chemicals, plastics, and paper and is commonly used in swimming pools and laboratories. Industrial exposures have produced large numbers of injuries. Chlorine is a greenish-yellow gas that has a characteristic pungent odor that is irritating to the nasal tissues. It is transported as a liquid and injures cells by reacting with water, producing hydrochloric acid (irritating) and free oxygen radicals (attack cells). It is toxic to an body surface including the eyes, skin, respiratory tract, and gastro-intestinal tract.

In seconds after the exposure, there are symptoms of irritation to the eyes, nose, and throat. This is followed by irritation of the respiratory tract with coughing, shortness of breath, wheezing, chest pain, and sputum production. Initial respiratory distress is followed in 12 to 24 hours by non-cardiogenic pulmonary edema. Sudden death is usually due to severe hypoxia and cardiac arrest.

## AMMONIA

Ammonia is a colorless, highly water-soluble, alkaline gas that has a pungent odor. It is widely used industrially in the U.S. with over 500,000 workers potentially exposed annually. It is used as an agricultural fertilizer and is used in the manufacture of explosives, dyes, and plastics.

Ammonia is rapidly absorbed by mucosal surfaces and causes damage to the eyes, oral cavity, throat, and lungs. When mixed with water, it forms a corrosive agent, ammonium hydroxide (NH<sub>4</sub>OH) that causes considerable damage in the form of liquefaction necrosis (death of living tissue).

Due to its high water solubility, ammonia penetrates rapidly into skin tissues. Household ammonia generally has a pH less than 12 and generally causes limited damage to eyes or mucosa. Anhydrous ammonia is an industrial chemical that has a very high pH and is extremely corrosive and can cause severe damage to the eyes, lungs, and skin.



**For more sources of information on this topic visit or contact:**

ST. CLAIR COUNTY HEALTH DEPARTMENT [www.scchealth.co](http://www.scchealth.co)

MICHIGAN DEPARTMENT OF HEALTH AND HUMAN SERVICES [www.michigan.gov/mdhhs](http://www.michigan.gov/mdhhs)

CENTERS FOR DISEASE CONTROL AND PREVENTION [www.cdc.gov](http://www.cdc.gov)

MICHIGAN DEPARTMENT OF COMMUNITY HEALTH TOXICS AND HEALTH HOTLINE: 1-800-648-6942

MICHIGAN OCCUPATIONAL HEALTH AND SAFETY ADMINISTRATION (MIOSHA): 517-322-1814

THE AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY: 1-888-422-8737