



Irritant Gases

Information for Healthcare Facilities

Adapted with permission from the Kansas Poison Control.

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Causative Agent

Ammonia, chlorine, Phosgene, sulfur dioxide

Hospital Precautions

Standard Precautions. A positive-pressure, self-contained breathing apparatus (SCBA) or air-purifying full-face respirator (APR) is recommended in response situations.

Transmission

Persons exposed only to gases pose no risk of secondary contamination to others. However, clothing or skin soaked with solutions containing these products may be corrosive to rescuers and may secondarily release harmful gas.

Decontamination

Remove and double-bag contaminated clothing and personal belongings. Flush symptomatic or contaminated exposed skin and hair with plain water for 3 to 5 minutes. Wash thoroughly with soap and water. Rinse eyes thoroughly for 20 minutes with copious amounts of water.

Mechanism

Irritant gases result in local tissue, corrosive effects, mucous membrane irritation, and respiratory tract irritation by reacting with water to form acids and free oxygen radicals.

Routes

Inhalation is the primary route; also dermal, ocular, mucosal membranes, ingestion.

Symptoms/ Onset

Onset of symptoms varies based on the water solubility of the gas.

- Highly water soluble: Ammonia, sulfur dioxide, bromine show immediate irritation to upper respiratory tract and mucous membranes.
- Intermediately water soluble: Chlorine gas has immediate irritation with increased risk of pulmonary edema after several hours and requires additional observation time of 6-8 hours in symptomatic patients
- Slightly water soluble: Phosgene may be asymptomatic or minor upper respiratory tract irritation. Delayed pulmonary edema >48 hours can occur in large exposures.

Symptoms include conjunctivitis, rhinitis, pharyngitis, lacrimation, burning sensation in the throat, mouth, nose, eyes, cough, shortness of breath, chest pain, nausea, vomiting, dizziness, and headache. Symptoms can progress to upper airway edema, laryngospasm, severe pulmonary edema, pneumonia, persistent hypoxemia, and respiratory failure. Exposure to liquefied phosgene or chlorine can result in frostbite injury.

Treatment

There is no antidote. Supportive care is mainstay of treatment. Oxygen (humidified is preferred) therapy should be used in patients with dyspnea, wheezing, or pulse oximetry reading of SaO₂ of less than 94%. Chest radiographs should be obtained in symptomatic patients with respiratory symptoms. If bronchospasm and wheezing occur, consider bronchodilators (inhaled albuterol or other beta-agonists). Nebulized bicarbonate 3.75% can be used in severe cases for symptom relief. Irrigate eyes with large volume of water or saline until ocular pH returns to normal.

There is no known prophylaxis for exposure to irritant gases.

Advanced Hazmat Life Support-Provider Manual. 4th ed. Arizona Board of Regents. Advanced Hazmat Life Support International Headquarters-Tuscan, Arizona. 2023.

REFERENCES

Chlorine. Centers for Disease Control. Updated September 6, 2024. Available from: [Chlorine | Chemical Emergencies | CDC](#).

Chlorine – Emergency Department/Hospital Management. Chemical Hazards Emergency Medical Management. Updated March 23, 2026. Available from: [ChlorineEmergencyDepartment/Hospital Management](#)