



**Disaster and Terrorism Response:
Emergency Preparedness Tools for Pharmacists and
Health-System Pharmacy Departments
FACT SHEET**

PULMONARY AGENTS

EXAMPLES: Battlefield agents—Phosgene. Commercial agents—chlorine gas, chlorine-containing products such as bleach (sodium hypochlorite).

MECHANISM OF ACTION: The toxic effects of commonly implicated pulmonary agents are frequently due to hydrochloric acid. Phosgene—in the presence of moisture (such as the respiratory tract) it is hydrolyzed to hydrochloric acid. Chlorine gas is hydrolyzed to hydrochloric acid. In the presence of an acid, bleach is converted to chlorine gas. Hydrochloric acid is a profound mucous membrane irritant.

CLINICAL EFFECTS: There may be a clinical latent period after exposure to phosgene. Eventually, as hydrochloric acid is produced, pulmonary edema may develop. In a concentration-dependent fashion, chlorine gas produces mucous membrane irritation – the greater the concentration, the more rapid the onset of symptoms. It may take as long as 24 hours for pulmonary edema to develop. The development of pulmonary edema within four hours of exposure is an indicator of a poor prognosis.

The following clinical effects may be manifest following exposure to these agents:

- Ocular irritation
- Lacrimation
- Conjunctivitis
- Sore throat
- Dyspnea
- Pulmonary edema

TREATMENT: There is no antidote. The cornerstones of initial patient management include:

- Termination of exposure
- Personal protection of the caregiver
- Immediate decontamination of the victim
- Supportive care, with attention to respiratory support

For 24/7 assistance in the emergency management of an actual or suspected chemical terrorism exposure, contact a Certified Regional Poison Information Center at 1-800-222-1222.

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