

CBRN Hazards: Riot Control Agents

There is no antidote. Treatment is symptomatic and supportive. Decontamination is the most important intervention.

Agent Overview

Riot control agents (RCAs) are chemical irritants used for crowd control. They are not true gases. All act on peripheral sensory receptors to cause pain and irritation.

Agent	Acronym	Chemical Name	Chemical Form
Tear Gas	CS	2-Chlorobenzylidene malononitrile	Aerosolized solid
Mace	CN	2-Chloroacetophenone	Aerosolized solid
Tear Gas, DBO	CR	Dibenzo[b,f][1,4]oxazepine	Aerosolized solid
Pepper Spray	OC	Oleoresin capsicum	Pressurized liquid

Exposure and Onset

Routes of exposure:

- **Inhalation:** primary route; drives most respiratory symptoms
- **Ocular:** direct contact with aerosol or spray
- **Dermal:** contact with aerosol, liquid, or contaminated surfaces
- **Ingestion:** swallowing contaminated secretions

Onset and duration: Symptoms begin within seconds to 1–2 minutes of exposure and typically resolve within 15–30 minutes of removal from the source. Rhinorrhea and headache may persist up to 24 hours. Dermal blistering and contact dermatitis may persist for days to weeks. Rarely, delayed pulmonary edema may develop.

Clinical Features

- **Respiratory:** Rhinorrhea, sneezing, chest tightness, cough, oropharyngeal burning, dyspnea, bronchospasm, delayed onset pulmonary edema.
- **Ocular:** Lacrimation, blepharospasm, conjunctival injection, pain, photophobia, periorbital edema, corneal abrasion.
- **Dermal:** Burning, erythema, edema, blistering, superficial burns, contact dermatitis (may be delayed 12–24 hrs).
- **Gastrointestinal:** Nausea, vomiting, diarrhea (from ingestion of contaminated secretions), hypersalivation.
- **Other:** Headache, dizziness, anxiety, panic, tachycardia, syncope
- **Serious complications to identify early:** Laryngospasm requiring airway intervention; pulmonary edema (may be delayed); exacerbation of asthma or Chronic Obstructive Pulmonary Disease.
- **Canister impact injuries:** Assess independently of chemical exposure. Launched canisters cause blunt and penetrating trauma: skull fractures, intracranial hemorrhage, orbital wall fractures, ocular injuries, and testicular trauma have been documented. Do not attribute all findings to chemical irritation.

Diagnostic Tests

- Diagnosis is clinical. No confirmatory test is available in the emergency department.
- Exposure is diagnosed by history and clinical findings.
- Slit-lamp exam with fluorescein staining when persistent ocular symptoms or any visual complaints after irrigation.
- Chest x-ray if persistent symptoms despite initial management or delayed appearance of respiratory symptoms.
- **Note:** Most patients with isolated RCA exposure require no investigations. Reserve workup for those with persistent, severe, or atypical symptoms, or suspected canister impact injury.

Treatment and Decontamination

- **Contact the Ontario Poison Centre for case-specific clinical guidance: 1-800-268-9017.**
- **Staff protection:** Follow institutional CBRN/HazMat PPE protocols before any patient contact. When treating non-decontaminated patients, wear gloves, gown, eye protection, and a surgical mask at minimum. For decontaminated patients, use universal precautions. Where possible, treat in a well-ventilated area.
- **Patient decontamination (perform first):** Remove all clothing and footwear immediately; double bag and seal. If ocular symptoms, remove contact lenses and irrigate eyes with copious water or saline for 15–20 minutes. Gently wash skin with copious water and soap. **Repeat irrigation if persistent dermal or ocular symptoms.**
- **Respiratory:** Treat bronchospasm with a bronchodilator (e.g., salbutamol). Laryngospasm and pulmonary edema are rare; manage with standard treatments.
- **Ocular:** Topical anesthetic if needed to facilitate irrigation. Ophthalmology referral for persistent symptoms or abnormal slit-lamp findings.
- **Dermal/pain:** Treat chemical burns as thermal burns. Provide analgesia as needed; topical corticosteroids if persistent dermatitis.

This fact sheet is part of a just-in-time resource series for first receivers and was co-authored by Public Health Ontario (PHO) and Ontario Poison Centre (OPC). Contact OPC for 24/7 clinical guidance: 1-800-268-9017. See the [CBRN Reference List](#) for the full list of references used in these fact sheets.

The information in this document is current as of June 2026.