CBRN Hazards: Nerve Agents

Part 2 of 2: Treatment and Decontamination

Antidotes exist (atropine, pralidoxime, benzodiazepines); administration is time-critical.

Treatment and Decontamination

- **Contact the Ontario Poison Centre for case-specific clinical guidance: 1-800-268-9017.**
- **Recap:** Nerve agents are organophosphorus compounds developed as chemical warfare agents. All nerve agents inhibit acetylcholinesterase (AChE), the enzyme that breaks down acetylcholine. See companion fact sheet for exposure, onset, clinical features and diagnostic testing.
- **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. Wash skin, hair with copious water and soap.

Treatment

- In a case of known or suspected chemical exposure, consider nerve agent poisoning if patient presents with miosis, bronchospasm, hypersalivation, and altered consciousness. Do not wait confirmation to initiate treatment.

Airway

- Administer atropine immediately if respiratory symptoms are present (see dosing below)
- Intubate early in severe poisoning. Anticipate difficult airway conditions: excessive secretions require aggressive suctioning before and during intubation.
- Avoid succinylcholine; organophosphorus inhibition of plasma cholinesterase prolongs neuromuscular blockade unpredictably. Use rocuronium instead.

Atropine

- Atropine is the primary antidote. It only reverses muscarinic effects; it does not reverse neuromuscular paralysis or CNS effects.
- Titrate atropine to drying of secretions, relief of bronchospasm and resolution of bradycardia and hypotension. Once atropinised, maintain with infusion of 10–20% of loading dose/hour, titrated to effect.

Population	Initial dose of atropine	Repeat dosing
Adult	2–4 mg IV/IM	Double the dose every 5 minutes, titrating to effect
Paediatric	0.02–0.05 mg/kg IV/IM	Double the dose every 5 minutes, titrating to effect

Pralidoxime (2-PAM)

- Pralidoxime reactivates acetylcholinesterase. Give as early as possible in presence of severe or neuromuscular symptoms; efficacy decreases with time. Pralidoxime administration should not delay atropine administration.

Population	Initial dose of 2-PAM	Maintenance
Adult	30 mg/kg IV over 15-30 minutes (max 2 grams)	8-10 mg/kg/hr infusion (max 650 mg/hr)
Paediatric	30 mg/kg IV over 15-30 minutes (max 2 grams)	10–20 mg/kg/hr infusion (max 650 mg/hr)

Benzodiazepines

- Seizures should be treated with benzodiazepines.

Population	Dose of benzodiazepines
Adult	Midazolam 5-10 mg IV/IM; or diazepam 5-10 mg IV; or lorazepam 2-4 mg IV; repeat prn
Paediatric	Midazolam 0.15 mg/kg IV/IM (max 10 mg); or diazepam 0.2–0.5 mg/kg IV (max 10 mg); or lorazepam 0.1 mg/kg IV (max 4 mg); repeat prn

Supportive care

- **Bronchospasm:** atropine is the primary treatment; inhaled bronchodilators may be used as adjuncts.
- **Hypotension:** IV crystalloid; vasopressors if no response.
- **Bradycardia:** atropine (above); additional doses as needed.

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.