

NERVE AGENTS: Health Care Information

The nerve agents, **Tabun** (GA), **Sarin** (GB), **Soman** (GD), and **VX**, are potent liquid organophosphate compounds that may be used as weapons of mass destruction. They may be deployed via spray container, intentional spill, crop duster or explosive device. Nerve agents, similar to organophosphate pesticides, bind to acetylcholinesterase, causing a buildup of acetylcholine at nerve terminals leading to cholinergic crisis.

Recognition and Triage: Nerve agents produce muscarinic symptoms that appear as an increase of fluid production throughout the body (**salivation, lacrimation, rhinorrhea sweating, diarrhea, vomiting, pulmonary edema**) as well as **bradycardia** and **miosis** (small pupils). Nerve agents also produce nicotinic symptoms (**tachycardia, muscle fasciculations paralysis**) and CNS symptoms (**seizure, coma**). Patients may be triaged as follows:

Immediate: Coma, seizures, fasciculations, pulmonary edema or paralysis

Delayed: Excessive salivation/sweating/vomiting or weakness

Minor: Asymptomatic or only eye symptoms (miosis)

Personal Protective Equipment (PPE) (at the health care site): Personnel who decontaminate patients should wear splash-proof PPE (waterproof outer garment and chemical-resistant gloves) and a filtered-air respirator. Personnel treating decontaminated patients require no PPE other than universal precautions. Clothing and secretions, including diarrhea and vomitus, should be handled with chemical-resistant gloves, splash-proof PPE and a filtered air respirator.

Decontamination (at the health care site): Sufficient decontamination includes removal of **ALL** clothing and jewelry and thorough washing of the skin and hair with water for 3 to 5 minutes and until agent is visibly gone. Some agents, including VX, may be difficult to decontaminate and require decontamination for longer periods of time.

Diagnosis and Treatment: The diagnosis is made clinically with recognition of the typical clinical features and can be confirmed by sending a **25mL urine sample** to the Oregon State Health Lab. Send 3 mL of blood in a lavender-top tube for RBC cholinesterase activity on all patients with exposure. Treatment includes **decontamination, oxygen, atropine, pralidoxime and a benzodiazepine**.

ATROPINE: Patients in extremis (muscle fasciculation/paralysis, seizures, cardiac arrest) can be treated with atropine in 2 mg IV increments (or 6 mg IM atropine). Patients with any pulmonary edema or hypoxemia should be treated with **1 to 2 mg (children 0.02 mg/kg) atropine IV or IM**. This dose may be repeated every 5 to 10 minutes until the pulmonary edema has resolved. (10 to 20 mg or more may be necessary). Atropine should be titrated to drying of lung secretions, not to heart rate or eye findings. Atropine may also be used in smaller doses as symptomatic care to dry secretions in patients with significant lacrimation, diaphoresis, salivation or rhinorrhea, or abdominal cramping. Parenteral atropine should not be used to treat miosis. Miosis is usually from a topical exposure and can be treated with ophthalmic atropine or homatropine drops.

PRALIDOXIME (2-PAM): Patients with muscle paralysis or fasciculations should be treated with **pralidoxime (2-pam), 1 to 2 grams (children 25 to 50 mg/kg) via IV over 10 to 20 minutes or 1 to 2 grams IM**. This dose may be repeated in 1 hour if fasciculations or weakness have not resolved. Patients who are treated with pralidoxime should be given a **maintenance infusion at 200 to 500mg / hour (children 5 to 10 mg/kg/hour)**.

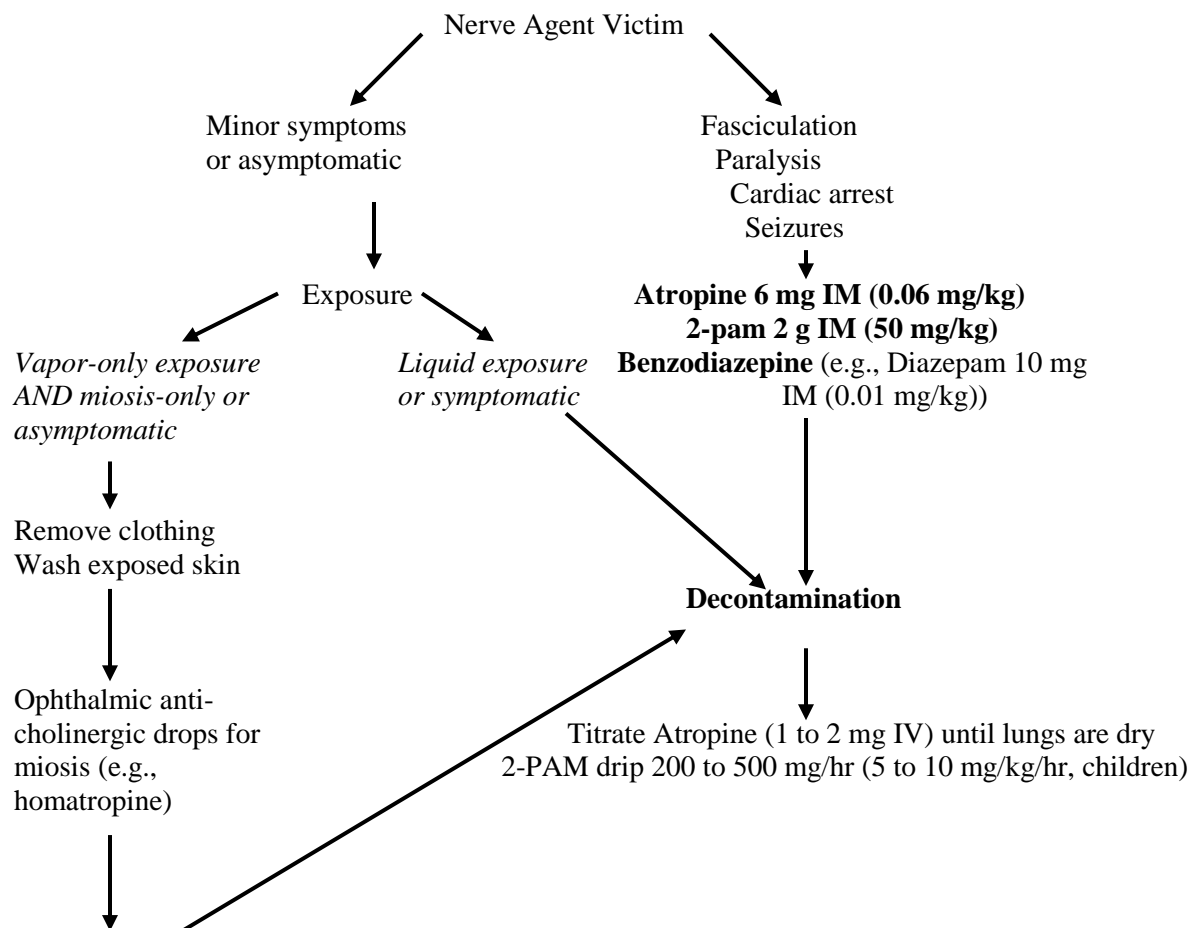
BENZODIAZEPINES: Patients with seizures, coma or fasciculations should be treated with standard doses of intravenous benzodiazepines in addition to atropine. Phenytoin or fosphenytoin will not stop or prevent these seizures.

Patient Monitoring: Continuous monitoring of heart rate, blood pressure, pulse oximetry and end-tidal carbon dioxide are necessary for critically ill patients.

This information is current as of the date faxed and for the patient specified ONLY. Do not use this information for other patients without contacting the Poison Center at 1-800-222-1222.

Disposition Criteria (when to send the patient home): Patients who are initially mildly symptomatic may progress to severe systemic toxicity over 1 to 2 hours with liquid exposures. Patients who have mild or no symptoms (e.g., only eye symptoms treated with ophthalmic drops) after 2 hours may be discharged with instructions to return if symptoms appear.

Triage and Treatment:



Observe: If patients develop symptoms, then decontaminate and treat.

Reporting/Coordination Link: Call the **Poison Center (1 800 222 1222)** for information on specific patients. Contact the local or state public health authority (**Oregon Public Health Hotline: 1 800 805 2313**) to report a mass casualty incident.

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Please review the CDC Collection Protocol, which should be included with this FAX.