

THE FACTS ABOUT NERVE AGENTS

GENERAL INFORMATION

Note to reader: This fact sheet is intended to provide general awareness and education on specific chemical agents. For information on preparedness and response (e.g., for first responders and emergency medical personnel), please refer to the following Department resources:

Chemical Terrorism Preparedness and Response Card

(http://www.health.state.ny.us/nysdoh/bt/chemical_terrorism/pdf/chemical.pdf)

Chemical Terrorism Wall Chart

(http://www.health.state.ny.us/nysdoh/bt/chemical_terrorism/pdf/poster.pdf)

What are nerve agents?

Nerve agents are chemicals that affect the nervous system. The health effects are similar to those produced by some pesticides. The main nerve agents are the chemicals sarin (GB), soman (GD), tabun (GA) and VX. These agents are man-made and have been manufactured for use in chemical warfare. These agents are known to be present in military stockpiles of several nations, including the United States.

What are the properties of nerve agents?

Some properties of nerve agents include:

- Nerve agents are liquids at room temperature; VX is more oily than the others.
- Nerve agents can mix with water and most other solvents.
- Sarin evaporates nearly as fast as water, but other nerve agents evaporate more slowly. VX evaporates most slowly, like motor oil.
- The vapor of nerve agents is heavier than air, so vapors tend to stay close to the ground, floors or to low-lying areas.
- Nerve agents are either odorless or have only a slight odor.

How can people be exposed to nerve agents?

Nerve agents do not occur naturally. The public could be exposed to nerve agents if there is a terrorist attack or an accidental release from a military storage facility.

How do the nerve agents act on the body?

A nerve uses chemical signals to transmit messages to organs and tissues in the body. Nerve agents block normal functioning of these chemicals at nerve endings. The nerve then sends too many signals. This constant signaling of the nerve can cause overload in parts of the body.

What are the specific signs and symptoms of nerve agent poisoning?

Nerve agents are highly toxic, and even small amounts can cause health effects if they are inhaled, ingested or if they contact skin or eyes. Health effects occur more rapidly (within seconds to minutes) from inhalation and ingestion exposure than from skin or eye exposure. Minor skin exposures can take a number of hours to cause effects.

Regardless of the route of exposure, nerve agents can cause the following characteristic effects: pinpoint pupils of the eye

- excessive production of mucous, tears, saliva and sweat
- headache
- stomach pain, nausea and vomiting
- chest tightness and shortness of breath
- loss of bladder and bowel control
- muscle twitching
- seizures
- coma
- death

What can you do if you think someone may have been exposed to nerve agents?

If you have been exposed to release of nerve agents, take the following steps:

- Quickly move away from the area where you think you were exposed. If the release was indoors, go outdoors.
 - If you are near a release of nerve agents, emergency coordinators may tell you to either evacuate the area or to "shelter in place." To "shelter in place" means to remain indoors to avoid being exposed to the chemical. While indoors, shut and lock all doors and windows, turn off air conditioners, fans and heaters, and close fireplace dampers.
 - For more information on evacuation during a chemical emergency, see *Facts About Evacuation* (<http://www.bt.cdc.gov/planning/evacuationfacts.asp>). For more information on sheltering in place during a chemical emergency, see *Facts About Sheltering in Place* (<http://www.bt.cdc.gov/planning/Shelteringfacts.asp>).
- Quickly remove any clothing that may have nerve agent on it. If possible, clothing that is normally removed over the head (like t-shirts and sweaters) should be cut off the body instead to prevent additional contact with the agent.
 - Place your clothing inside a plastic bag and seal the bag tightly.
 - Do not handle the plastic bag, and wait for instructions on proper disposal.
 - Disposing of your clothing in a sealed bag helps protect you and other people from additional exposure.
 - Store the bagged clothing in a secure location away from people, especially children.
- Quickly wash any nerve agent from your skin with large amounts of soap and water, and flush your eyes with large amounts of water.
 - Remove and dispose of contact lenses.
 - Wash eyeglasses with soap and water before wearing.
 - Do not use bleach to remove nerve agents from your skin.
- If needed, seek medical attention right away.

How is nerve agent exposure treated?

Nerve agent poisoning can be treated by medical professionals. Usually, two antidotes (atropine and pralidoxime chloride) are given to stop the effects of the nerve agents. Both of these antidotes are available to medical professionals as spring-loaded syringes (Mark I Kits). These syringes quickly inject the antidotes into muscular areas like the thigh or buttock. Repeated use of antidotes may be needed to treat some nerve agent victims. It might also be necessary to give nerve agent victims other drugs to control seizures or other effects.

Will laboratory tests assist in making treatment decisions if someone has been exposed to nerve agents?

Exposure to nerve agents can be detected in both urine and blood through laboratory testing. However, the results are not needed to determine appropriate medical treatment and may harm the patient if treatment is delayed. A patient exposed to nerve agents should not expect medical personnel to do these tests.

How can I get more information about nerve agents?

Call the following numbers, or visit the websites listed among the "Sources".

- Centers for Disease Control and Prevention Public Response Hotline: (1-888-246-2675)
- Agency for Toxic Substances and Disease Registry: (1-888-422-8737)
- Regional Poison Control Center: (1-800-222-1222)

Sources:

Agency for Toxic Substances and Disease Registry. 2002. ToxFAQs for Nerve Agents. Division of Toxicology, U.S. Department of Health and Human Services. Public Health Service; Atlanta, GA.

<http://www.atsdr.cdc.gov/toxfaq.html>

Agency for Toxic Substances and Disease Registry. 2003. Medical Management Guidelines for Nerve Agents. Division of Toxicology, U.S. Department of Health and Human Services. Public Health Service; Atlanta, GA.

<http://www.atsdr.cdc.gov/MHMI/mmg166.html>

Centers for Disease Control and Prevention. 2003. Public Health Emergency Preparedness and Response Sheets. U.S. Department of Health and Human Services. Public Health Service; Atlanta, GA.

<http://www.bt.cdc.gov/Agent/Agentlistchem.asp>

U.S. Army Medical Research Institute of Chemical Defense (USAMRICD). 2000. Medical Management of Chemical Casualties Handbook, Third Edition. Chemical Casualty Care Division. Aberdeen Proving Grounds: Aberdeen, MD.

<https://ccc.apgea.army.mil/sarea/products/handbooks/MMCC/mmccthirdeditionjul2000.pdf>

This fact sheet is based on the most current information. It may be updated as new information becomes available.

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