Houston Department of Health and Human Services

NERVE AGENTS

FACT SHEET

What are nerve agents?

Nerve agents are man-made chemical warfare agents. The "G-type" agents - tabun (GA), sarin (GB), and soman (GD) - are colorless and tasteless liquids that can be mixed with water.

- Sarin is odorless and evaporates rapidly.
- Soman has a slight camphor-like odor.
- Tabun has a slightly fruity odor.
- VX is an amber-colored, oily liquid. As a gas, it is odorless and evaporates slowly.

How do nerve agents hurt people?

Nerves control bodily functions and movements. Nerve agents can damage the normal functioning of the nervous system, resulting in overstimulation of muscles and glands and uncontrolled movements. If the muscles and glands tire out, this can eventually lead to paralysis or death.

The extent of injury from exposure to these chemicals depends on the amount you are exposed to, how long you are exposed, and how you come in contact with the agent.

How might people be exposed to nerve agents?

Nerve agents can be used by terrorists. An accidental release from military storage or a laboratory could also cause exposure. Nerve agents can be released as a liquid or vapor. People are exposed to these chemicals only when they come into contact with them. This can happen by touching contaminated surfaces or breathing contaminated air. If a nerve agent is released into food or water, people can be exposed by eating or drinking it. In addition, people can come into skin contact with contaminated water. Clothing soaked with nerve agents can release vapor for about 30 minutes after exposure; this can lead to exposure of other people.

What are the signs and symptoms of exposure to a nerve agent?

People may not know if they have been exposed to a nerve agent because some of these agents have no odor. Even in very small quantities, nerve agents are highly toxic if breathed in, swallowed, or contacted with the skin or eyes. A tiny drop of nerve agent on the skin, for example, can cause sweating and muscle twitching where the chemical touched the skin.

- **Signs of nerve agent exposure include the following:**
  - Eye symptoms
  - Watery eyes
  - Small, pinpoint pupils
  - Eye pain
  - Blurred vision

  - Respiratory (breathing-related) symptoms
  - Runny nose
  - Cough
  - Chest tightness
  - Rapid breathing

  - Gastrointestinal (stomach-related) symptoms
  - Diarrhea
  - Increased urination
  - Nausea, vomiting, and/or abdominal pain

  - Nervous system symptoms
  - Drooling and excessive sweating
  - Confusion
  - Drowsiness
  - Weakness
  - Headache

  - Circulatory (heart-related) symptoms
  - Slow or fast heart rate
  - Abnormally low or high blood pressure

- **Exposure to a large amount of a nerve agent by any route may result in these additional health effects:**
  - Loss of consciousness
  - Convulsions (uncontrolled muscle spasms/seizures)
  - Paralysis
  - Respiratory failure possibly leading to death

Showing the signs and symptoms listed above does not necessarily mean that a person has been exposed to a nerve agent; these symptoms can also be caused by other conditions.

What are the long-term health effects of exposure to a nerve agent?

Mild or moderately exposed people usually recover completely. Fatigue, irritability, nervousness, and memory defects may last for as long as 6 weeks after recovery from exposure. It is not known whether exposure to nerve agents causes cancer or reproductive effects in humans. Severely exposed people are not likely to survive.

What should I do if I'm exposed to a nerve agent?

1. *Get fresh air as fast as you can.* Immediately leave the area where the nerve agent was released. If the nerve agent is released in an open space, it will spread out rapidly. If it is released indoors, get out of the building. People should keep in mind that nerve agents are heavier than air, so vapors will collect in lower areas.
2. *Quickly remove any clothing that has liquid nerve agent on it.* If possible, any clothing that has to be pulled over the head should be cut off the body.
3. *Rinse the eyes.* If eyes are burning or vision is blurred, rinse the eyes with clean water for 10-15 minutes.
4. *Wash the skin as soon as possible.* If a nerve agent gets on to the skin, wash with large amounts of soap and water. Do not rub the skin forcefully to avoid pressing the chemical into the skin.
5. *If swallowed, do NOT induce vomiting or drink any fluids.*
6. *Dial 911.* Explain what has happened and seek medical attention right away.

How is nerve agent poisoning treated?

First and most importantly, victims should be removed from the exposure, decontaminated (clothing removed, eyes rinsed, and the body washed), and given medical treatment as soon as possible. Nerve agent poisoning is treated with antidotes and with supportive medical care. Antidotes are most useful if given as soon as possible after exposure.

Is there a medical test to show whether I've been exposed to a nerve agent?

Yes. There are medical tests that can determine whether you have been exposed to a nerve agent. One such test measures the levels of a substance in the blood known as cholinesterase, which is needed for the proper functioning of the nervous system. Exposure to nerve agents may lower cholinesterase levels. Levels can stay low for months following an exposure.

However, cholinesterase levels in the blood can be low for reasons other than nerve agent exposure.

How can nerve agents affect children?

Children exposed to nerve agents are likely to experience the same harmful effects as those experienced by exposed adults. Children generally are more vulnerable than adults to the effects of any harmful chemical. It is not known whether exposure to nerve agents can cause developmental effects.

What are the effects of nerve agents on pets?

Pets exposed to a nerve agent are likely to experience similar toxic effects as those experienced by humans. If possible, remove the chemical from your pet(s) with soap and water. Be sure to protect yourself from getting exposed by wearing gloves and protective clothing. Contact a veterinarian or the ASPCA Animal Poison Control Center (1-888-426-4435).

Is there anything specific that Houstonians can do to prepare for a possible chemical terrorism event?

Emergency management officials recommend an "all-hazards" approach to emergency preparedness, which means that one plan can be used for several kinds of emergencies. Creating a household disaster plan, assembling an emergency supply kit, and putting together a bag of supplies you can grab on the go (a "go-bag") will provide you with the tools you need for almost any emergency, including a chemical release. For more information on developing family disaster plans or assembling emergency supply kits, visit READYAmerica (http://www.ready.gov/america/index.html).

The City of Houston Department of Health and Human Services, along with other government agencies and health institutions, will do everything possible to protect the health of all persons who live, work, or are visiting in Houston. During any public health emergency, health officials will provide instructions through TV and radio on how best to protect yourself and your loved ones. If a chemical release does occur in Houston, stay tuned to the news media. Do NOT immediately rush to hospital emergency rooms. You may not be in immediate danger, and hospitals have to treat those who need immediate care. Furthermore, many treatments will be provided in non-hospital settings (emergency clinics) that would be established in multiple locations throughout the city.

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What if fears about terrorism are having a serious impact on my family and work life?

After the events of September 11th, 2001 it is reasonable for individuals to feel anxious about their personal safety. However, if anxiety stops you from doing things that you would normally do, it might be helpful to speak with a professional counselor. Your healthcare provider can make a referral, or you can get help by calling Crisis Hotline at 713-HOTLINE (468-5463 - English) or 713-526-8088 (Spanish), or United Way Help Line at 211.

Additional information can be found at:

- **U.S. Centers for Disease Control and Prevention**
  http://www.bt.cdc.gov/agent/agentlistchem-category.asp - nerve

- **Agency for Toxic Substances and Disease Registry**
  http://www.atsdr.cdc.gov/

Adapted from New York City Department of Health and Mental Hygiene