

VX (Nerve agent)

What is it?

VX is a human-made chemical warfare agent classified as a nerve agent. Nerve agents are the most toxic and rapidly acting of the known chemical warfare agents. They are similar to pesticides (insect killers) called organophosphates in terms of how they work and what kinds of harmful effects they cause. However, nerve agents are much more potent than organophosphate pesticides.

- VX was originally developed in the United Kingdom in the early 1950s.
- VX is odorless and tasteless.
- VX is an oily liquid that is amber in color and very slow to evaporate. It evaporates about as slowly as motor oil.

Its use

It is possible that VX or other nerve agents were used in chemical warfare during the Iran-Iraq War in the 1980s.

VX is not found naturally in the environment.

Exposure

Following release of VX into the air, people can be exposed through skin contact, eye contact, or inhalation (breathing in the VX mist).

Though VX does not mix with water as easily as other nerve agents do, it could be released into water. Following release of VX into water, people can be exposed by drinking contaminated water or getting contaminated water on their skin.

Following contamination of food with VX, people can be exposed by eating the contaminated food.

VX is primarily a liquid exposure hazard, but if it is heated to very high temperatures, it can turn into small amounts of vapor (gas).

A person's clothing can release VX for about 30 minutes after contact with VX vapor, which can lead to exposure of other people.

VX breaks down slowly in the body, meaning that repeated exposures to VX and/or other nerve agents can have a cumulative effect (build up in the body).

Because VX vapor is heavier than air, it will sink to low-lying areas and create a greater exposure hazard there.

How does VX work?

The extent of poisoning caused by VX depends on the amount of VX to which a person was exposed, how the person was exposed, and the length of time of the exposure.

Symptoms will appear within a few seconds after exposure to the vapor form of VX, and within a few minutes to up to 18 hours after exposure to the liquid form.

VX is the most potent of all nerve agents. Compared with the nerve agent sarin (also known as GB), VX is considered to be much more toxic by entry through the skin and somewhat more toxic by inhalation.

It is possible that any visible VX liquid contact on the skin, unless washed off immediately, would be lethal.

All the nerve agents cause their toxic effects by preventing the proper operation of the chemical that acts as the body's "off switch" for glands and muscles. Without an "off switch," the glands and muscles are constantly being stimulated. They may tire and no longer be able to sustain breathing function.

VX is the least volatile of the nerve agents, which means that it is the slowest to evaporate from a liquid into a vapor. Therefore, VX is very persistent in the environment. Under average weather conditions, VX can last for days on objects that it has come in contact with. Under very cold conditions, VX can last for months.

Because it evaporates so slowly, VX can be a long-term threat as well as a short-term threat. Surfaces contaminated with VX should therefore be considered a long-term hazard.

Immediate signs and symptoms

People may not know they were exposed to VX because it has no odor.

People exposed to a low or moderate dose of VX by inhalation, ingestion (swallowing), or skin absorption may experience some or all of the following symptoms within seconds to hours of exposure:

- Runny nose
- Watery eyes
- Small, pinpoint pupils
- Eye pain
- Blurred vision
- Drooling and excessive sweating
- Cough
- Chest tightness
- Rapid breathing
- Diarrhea
- Increased urination
- Confusion
- Drowsiness
- Weakness
- Headache

- Nausea, vomiting, and/or abdominal pain
- Slow or fast heart rate
- Abnormally low or high blood pressure
- Even a tiny drop of nerve agent on the skin can cause sweating and muscle twitching where the agent touched the skin.
- Exposure to a large dose of VX by any route may result in these additional health effects:
 - Loss of consciousness
 - Convulsions
 - Paralysis
 - Respiratory failure possibly leading to death

Showing these signs and symptoms does not necessarily mean that a person has been exposed to VX.

Long-term health effects

Mild or moderately exposed people usually recover completely. Severely exposed people are not likely to survive. Unlike some organophosphate pesticides, nerve agents have not been associated with neurological problems lasting more than 1 to 2 weeks after the exposure.

Protection

Recovery from VX exposure is possible with treatment, but the antidotes available must be used quickly to be effective. Therefore, the best thing to do is avoid exposure: Leave the area where the VX was released and get to fresh air. Quickly moving to an area where fresh air is available is highly effective in reducing the possibility of death from exposure to VX vapor.

If the VX release was outdoors, move away from the area where the VX was released. Go to the highest ground possible, because VX is heavier than air and will sink to low-lying areas.

If the VX release was indoors, get out of the building.

If people think they may have been exposed, they should remove their clothing, rapidly wash their entire body with soap and water, and get medical care as quickly as possible.

1. Removing and disposing of clothing:

Quickly take off clothing that has liquid VX on it. Any clothing that has to be pulled over the head should be cut off the body instead of pulled over the head. If possible, seal the clothing in a plastic bag. Then seal the first plastic bag in a second plastic bag. Removing and sealing the clothing in this way will help protect people from any chemicals that might be on their clothes.

If clothes were placed in plastic bags, inform either the local or state health department or emergency personnel upon their arrival. Do not handle the plastic bags.

If helping other people remove their clothing, try to avoid touching any contaminated areas, and remove the clothing as quickly as possible.

2. *Washing the body:*

As quickly as possible, wash any liquid VX from the skin with large amounts of soap and water. Washing with soap and water will help protect people from any chemicals on their bodies.

Rinse the eyes with plain water for 10 to 15 minutes if they are burning or if vision is blurred.

If VX has been ingested (swallowed), do not induce vomiting or give fluids to drink.

Seek medical attention right away. Dial 911 and explain what has happened.

Treatment

Treatment consists of removing VX from the body as soon as possible and providing supportive medical care in a hospital setting. Antidotes are available for VX. They are most useful if given as soon as possible after exposure.