



## FACT SHEET

### Facts About Soman

#### What soman is

- Soman 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 the kinds of harmful effects they cause. However, nerve agents are much more potent than organophosphate pesticides.
- Soman was originally developed as an insecticide in Germany in 1944.
- Soman is also known as "GD."
- Soman is a clear, colorless, tasteless liquid with a slight camphor odor (for example, Vicks Vapo-Rub®) or rotting fruit odor. It can become a vapor if heated.

#### Where soman is found and how it is used

- It is possible that soman or other nerve agents were used in chemical warfare during the Iran-Iraq War in the 1980s.
- Soman is not found naturally in the environment.

#### How people can be exposed to soman

- Following release of soman into the air, people can be exposed through skin contact, eye contact, or inhalation (breathing in the soman).
- Soman mixes easily with water, so it could be used to poison water. Following release of soman into water, people can be exposed by drinking contaminated water or getting contaminated water on their skin.
- Following contamination of food with soman, people can be exposed by eating the contaminated food.
- A person's clothing can release soman for about 30 minutes after contact with soman vapor, which can lead to exposure of other people.
- Soman breaks down slowly in the body, meaning that repeated exposures to soman and/or other nerve agents can have a cumulative effect (build up in the body).
- Because soman vapor is heavier than air, it will sink to low-lying areas and create a greater exposure hazard there.

#### How soman works

- The extent of poisoning caused by soman depends on the amount of soman 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 soman, and within a few minutes to up to 18 hours after exposure to the liquid form.
- 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.

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- Compared with other nerve agents, soman is more volatile than VX but less volatile than sarin. The higher a chemical's volatility, the more likely it will evaporate from a liquid into a vapor and disperse into the environment. People can be exposed to the vapor even if they do not come in contact with the liquid form.
- Because of its high volatility, soman is an immediate but short-lived threat and does not last a long time in the environment.
- Because soman is more volatile than the nerve agent VX (the most potent nerve agent), it will remain on exposed surfaces for a shorter period of time compared with VX.

## Immediate signs and symptoms of soman exposure

- Although soman has a camphor or fruity odor, the odor may not be noticeable enough to give people sufficient warning against a toxic exposure.
- People exposed to a low or moderate dose of soman 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 soman 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 soman.

## What the long-term health effects are

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.

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### How people can protect themselves, and what they should do if they are exposed to soman

- Recovery from soman exposure is possible with treatment, but the antidotes available must be used quickly (within minutes) to be effective. Therefore, the best thing to do is avoid exposure:
  - Leave the area where the soman 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 soman vapor.
    - If the soman release was outdoors, move away from the area where the soman was released. Go to the highest ground possible, because soman is heavier than air and will sink to low-lying areas.
    - If the soman 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.
- *Removing and disposing of clothing:*
  - Quickly take off clothing that has liquid soman 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.
- *Washing the body:*
  - As quickly as possible, wash any liquid soman 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 soman 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.

### How soman exposure is treated

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

### How people can get more information about soman

People can contact one of the following:

- Regional poison control center (1-800-222-1222)
- Centers for Disease Control and Prevention
  - Public Response Hotline (CDC)
    - (800) 232-4636 (English and Spanish)
    - TTY (888) 232-6358
  - [Emergency Preparedness and Response Web site \(http://www.bt.cdc.gov/\)](http://www.bt.cdc.gov/)
  - E-mail inquiries: [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov)
  - Mail inquiries:  
Public Inquiry c/o BPRP

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Bioterrorism Preparedness and Response Planning  
Centers for Disease Control and Prevention  
Mailstop C-18  
1600 Clifton Road  
Atlanta, GA 30333

- Agency for Toxic Substances and Disease Registry (ATSDR) (1-888-422-8737)
  - E-mail inquiries: [atsdric@cdc.gov](mailto:atsdric@cdc.gov)
  - Mail inquiries:  
Agency for Toxic Substances and Disease Registry  
Division of Toxicology  
1600 Clifton Road NE, Mailstop E-29  
Atlanta, GA 30333
- Agency for Toxic Substances and Disease Registry (ATSDR) (1-888-422-8737)
  - E-mail inquiries: [atsdric@cdc.gov](mailto:atsdric@cdc.gov)
  - Mail inquiries:  
Agency for Toxic Substances and Disease Registry  
Division of Toxicology  
1600 Clifton Road NE, Mailstop E-29  
Atlanta, GA 30333

*This fact sheet is based on CDC's best current information. It may be updated as new information becomes available.*

*Last reviewed on 03/07/03*

*The Centers for Disease Control and Prevention (CDC) protects people's health and safety by preventing and controlling diseases and injuries; enhances health decisions by providing credible information on critical health issues; and promotes healthy living through strong partnerships with local, national, and international organizations.*

## **Facts About Soman**

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For more information, visit [www.bt.cdc.gov/chemical](http://www.bt.cdc.gov/chemical), or call CDC at 800-CDC-INFO (English and Spanish) or 888-232-6348 (TTY).