

This fact sheet answers the most frequently asked health questions (FAQs) about sulfur mustard blister agents H/HD and HT. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to sulfur mustard agents H/HD and HT can occur due to accidental release from a military storage facility. Exposure to sulfur mustards can burn the skin and eyes, cause blisters, and cause respiratory effects such as coughing and bronchitis. Higher levels may cause death. Sulfur mustard agent H/HD has been identified at 3 of the 1,585 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are sulfur mustards agents H/HD and HT?

Sulfur mustards H/HD and HT are manufactured compounds. They are colorless when pure, but are typically yellow to brown oily liquids with a slight garlic or mustard odor. Agent H contains about 20-30% impurities. The nearly pure substance is called HD. HT is a mixture of 60% HD and 40% of another substance called agent T. They do not dissolve much in water, but dissolve easily in oils, fats, and other solvents. They are stable at ambient temperatures.

Sulfur mustards were introduced as chemical warfare agents during World War I. More than a dozen countries have sulfur mustard agents in their chemical arsenals. Destruction of U.S. stockpiles of chemical agents, including sulfur mustards, was mandated by the Chemical Weapons Convention to take place before April 2007.

What happens to sulfur mustards agents H/HD and HT when they enter the environment?

- Sulfur mustards agents H/HD and HT could enter the environment from an accidental release.
- When released to air, sulfur mustards will be broken down by substances that are found in the air, but they may persist in air for a few days before being broken down.

- Sulfur mustards will be broken down in water quickly, but small amounts may evaporate.
- Sulfur mustards may remain in dry soil, but will be broken down gradually in moist soil, and some might evaporate.
- Sulfur mustard agents H/HD and HT do not accumulate in the food chain.

How might I be exposed to sulfur mustard agents H/HD and HT?

- The general population will not be exposed to sulfur mustard agents H/HD and HT unless an accidental release were to occur at military sites where they are stored.
- Sulfur mustards are no longer produced in the United States.
- People who might be exposed to chemical weapons or who work at military sites where these compounds are stored have the potential of being exposed to these chemicals.

How can sulfur mustard agents H/HD and HT affect my health?

The primary routes of potential human exposure to sulfur mustards are inhalation and dermal contact. Sulfur mustards are chemical warfare agents that can cause skin burns and

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blisters and damage to the respiratory airways. Sulfur mustards burn your skin and cause blisters within a few days of exposure. Exposure is particularly harmful around sweaty parts of the body. It is also more harmful to the skin on hot, humid days, or in tropical climates. Sulfur mustards make your eyes burn, your eyelids swell, and cause you to blink a lot.

If you breath sulfur mustards, it can cause coughing, bronchitis, and long-term respiratory disease. If you are exposed to large amounts of sulfur mustards, you can eventually die from it.

Sulfur mustards did not affect reproduction in rats that breathed it. We do not know if sulfur mustards can affect people's ability to reproduce.

How likely are sulfur mustard agents H/HD and HT to cause cancer?

The Department of Health and Human Services (DHHS) has determined that blister agent H/HD is a known human carcinogen. The International Agency for Research on Cancer (IARC) has classified agent H/HD as carcinogenic to humans. Studies in humans indicate that long-term exposure to sulfur mustards may lead to cancer of the upper respiratory airways.

How can sulfur mustard agents H/HD and HT affect children?

There are no studies of children exposed to sulfur mustard agents H/HD or HT. Children exposed to sulfur mustard agents H/HD or HT are likely to experience the same toxic effects experienced by exposed adults. In general, children may be more vulnerable to corrosive agents than adults

because of the smaller diameter of their airways.

Sulfur mustards did not cause birth defects in rats that breathed it. We do not know if these substances can cause birth defects or other developmental effects in humans.

How can families reduce the risk of exposure to sulfur mustard agents H/HD and HT?

It is unlikely that the general population will be exposed to sulfur mustard agents H/HD or HT.

Is there a medical test to show whether I've been exposed to sulfur mustard agents H/HD and HT?

There is no effective medical test to determine if you have been exposed to sulfur mustards. A breakdown product of sulfur mustards can be measured in urine, but this chemical can also be found in people who have not been exposed to sulfur mustards.

Has the federal government made recommendations to protect human health?

An Airborne Exposure Limit (as recommended by the Surgeon General's Working Group, U.S. Department of Health and Human Services) of 0.003 milligrams of H/HD or HT per cubic meter of air (0.003 mg/m³) has been established as a time-weighted average (TWA) for the workplace.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

