



PUBLIC HEALTH STATEMENT

1,2-DICHLOROETHENE

CAS#: 540-59-0 (mixture)
156-59-2 (cis)
156-60-5 (trans)

Division of Toxicology

August 1996

This Public Health Statement is the summary chapter from the Toxicological Profile for 1,2-Dichloroethene. It is one in a series of Public Health Statements about hazardous substances and their health effects. A shorter version, the ToxFAQs™ is also available. This information is important 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. For more information, call the ATSDR Information Center at 1-888-422-8737.

This public health statement tells you about 1,2-dichloroethene and the effects of exposure.

The Environmental Protection Agency (EPA) identifies the most serious hazardous waste sites in the nation. These sites make up the National Priorities List (NPL) and are the sites targeted for long-term federal cleanup activities. Cis-1,2-dichloroethene has been found in at least 146 of the 1,430 current or former NPL sites. Trans-1,2-dichloroethene has been found in at least 563 of the 1,430 current or former NPL sites. In 336 of the NPL sites, 1,2-dichloroethene was found but the isomer was not specified. However, it's unknown how many NPL sites have been evaluated for this substance. As more sites are evaluated, the sites with 1,2-dichloroethene may increase. This information is important because exposure to this substance may harm you and because these sites may be sources of exposure.

When a substance is released from a large area, such as an industrial plant, or from a container, such

as a drum or bottle, it enters the environment. This release does not always lead to exposure. You are exposed to a substance only when you come in contact with it. You may be exposed by breathing, eating, or drinking the substance or by skin contact.

If you are exposed to 1,2-dichloroethene, many factors determine whether you'll be harmed. These factors include the dose (how much), the duration (how long), and how you come in contact with it. You must also consider the other chemicals you're exposed to and your age, sex, diet, family traits, lifestyle, and state of health.

1.1 WHAT IS 1,2-DICHLOROETHENE?

1,2-Dichloroethene is also called 1,2-dichloroethylene. It is a highly flammable, colorless liquid with a sharp, harsh odor. You can smell very small amounts of 1,2-dichloroethene in air (beginning at a level of about 17 parts per million or ppm). There are two forms of 1,2-dichloroethene; one form is called cis-1,2-dichloroethene and the other is called trans-1,2-dichloroethene. Sometimes both forms are present as a mixture. 1,2-Dichloroethene is used most often to produce solvents and in chemical mixtures.

1,2-Dichloroethene enters the environment through industrial activity of people. This chemical has been found in air, water, and soil. 1,2-Dichloroethene is released to the environment from chemical factories that make or use this chemical, from landfills and hazardous waste sites containing this chemical, from chemical spills, from burning of objects made of vinyl, and from breakdown of other chlorinated chemicals.

DEPARTMENT of HEALTH AND HUMAN SERVICES, Public Health Service
Agency for Toxic Substances and Disease Registry

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1.2 WHAT HAPPENS TO 1,2-DICHLOROETHENE WHEN IT ENTERS THE ENVIRONMENT?

1,2-Dichloroethene evaporates rapidly. When released to moist soil surfaces or to lakes, rivers, and other bodies of water, most of it evaporates into the air. Once in the air, it usually takes about 5-12 days for half of any amount of it to break down (half-life in air). 1,2-Dichloroethene that is below soil surfaces in landfills or hazardous waste sites may dissolve in water, seep deeper into the soil, and possibly contaminate groundwater. Some 1,2-dichloroethene may escape as a vapor. Once in groundwater, it takes about 13-48 weeks for half of a given amount to break down (half-life in water). There is a slight chance that small amounts of the 1,2-dichloroethene found in landfills will eventually break down into vinyl chloride, which is believed to be a more hazardous chemical.

1.3 HOW MIGHT I BE EXPOSED TO 1,2-DICHLOROETHENE?

You might be exposed to 1,2-dichloroethene by breathing contaminated air or by drinking contaminated tap water. If the tap water in your home is contaminated, you could also be breathing 1,2-dichloroethene vapors while cooking, bathing, or washing dishes. There are no known products you can buy that contain 1,2-dichloroethene. People who are most likely to be exposed live near landfills and hazardous waste sites that contain this chemical, work at factories where this chemical is made or used, work at 1,2-dichloroethene contaminated landfills, or work as firefighters. Job-related exposure results from breathing in 1,2-

dichloroethene from workplace air or from touching contaminated chemicals or materials. According to a survey conducted between 1981 and 1983 by the National Institute for Occupational Safety and Health (NIOSH), an estimated 215 people in the United States may have been exposed to 1,2-dichloroethene while working.

People who live in cities or suburbs are more likely to be exposed than people living in rural areas. Most people who are exposed to 1,2-dichloroethene through air or water are exposed to very low levels, in the range of parts per million (ppm) to parts per billion (ppb).

1.4 HOW CAN 1,2-DICHLOROETHENE ENTER AND LEAVE MY BODY?

1,2-Dichloroethene can enter the body through your lungs when you breathe air contaminated with it, through your stomach and intestines when you eat food or drink water contaminated with it, or through your skin upon contact with the chemical.

When 1,2-dichloroethene enters the body, the blood and other tissues absorb it. It is broken down to other compounds in the liver. Animal studies have looked at how quickly the compound enters and leaves the body and what may happen to it in the body. These animal studies describe effects at levels far greater than those levels at which most people would be exposed. No studies show specifically how 1,2-dichloroethene enters a person's body and how it is changed or removed by the body.

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1.5 HOW CAN 1,2-DICHLOROETHENE AFFECT MY HEALTH?

Breathing high levels of trans-1,2-dichloroethene can make you feel nauseous, drowsy, and tired. Breathing very high levels of its vapor can kill you. When animals breathed high levels of trans-1,2-dichloroethene for short or longer periods of time, their livers and lungs were damaged. The effects were more severe with longer exposure times. Animals that breathed very high levels of trans-1,2-dichloroethene had damaged hearts. Animals given extremely high doses of cis- or trans-1,2-dichloroethene by mouth died. Lower oral doses of cis-1,2-dichloroethene caused effects on the blood, such as decreased numbers of red blood cells, and effects on the liver.

The long-term human health effects after exposure to low concentrations of 1,2-dichloroethene are not known. Results of a recent animal study suggest that an exposed fetus may not grow as quickly as one that is not exposed. No studies have been done to see whether cancer in people or animals is caused by exposure to 1,2-dichloroethene; exposure has not been shown to affect fertility in people or animals.

1.6 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO 1,2-DICHLOROETHENE?

Methods are available to measure concentrations of 1,2-dichloroethene in blood, urine, and tissues. However, these methods are not routinely used to determine whether a person has been exposed to this compound, because the expected breakdown products resulting from exposure to 1,2-

dichloroethene may also result from exposure to other chemicals.

1.7 WHAT RECOMMENDATIONS HAS THE FEDERAL GOVERNMENT MADE TO PROTECT HUMAN HEALTH?

The federal government has developed regulatory standards and guidelines to protect people from possible health effects of 1,2-dichloroethene in water and air. The EPA has established water quality guidelines to protect both aquatic life and people who eat fish and shellfish. The EPA Office of Drinking Water has set a drinking water regulation that states that water delivered to any user of a public water system shall not exceed 0.07 milligrams per liter (mg/L) for cis-1,2-dichloroethene and 0.1 mg/L for trans-1,2-dichloroethene. For very short-term exposures (1 day) for children, EPA advises that concentrations in drinking water should not be more than 4 mg/L for cis-1,2-dichloroethene or 20 mg/L for trans-1,2-dichloroethene. For 10-day exposures for children, EPA advises that drinking water concentrations should not be more than 3 mg/L for cis-1,2-dichloroethene or 2 mg/L for trans-1,2-dichloroethene. For industrial or waste disposal sites, any release of 1,000 pounds or more must be reported to the EPA.

The National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH) have established guidelines for occupational exposure to cis- or trans-1,2-dichloroethene. Average concentrations should not exceed 200 ppm in the air.

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1.8 WHERE CAN I GET MORE INFORMATION?

If you have any more questions or concerns, please contact your community or state health or environmental quality department or:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, Mailstop F-32
Atlanta, GA 30333

Information line and technical assistance:

Phone: 888-422-8737
FAX: (770)-488-4178

ATSDR can also tell you the location of occupational and environmental health clinics. These clinics specialize in recognizing, evaluating, and treating illnesses resulting from exposure to hazardous substances.

To order toxicological profiles, contact:

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Phone: 800-553-6847 or 703-605-6000

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 1996. Toxicological profile for 1,2-dichloroethene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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