

1. PUBLIC HEALTH STATEMENT

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

The Environmental Protection Agency (EPA) identifies the most serious hazardous waste sites in the nation. These sites are then placed on the National Priorities List (NPL) and are targeted for long-term federal clean-up activities. 1,1,2,2-Tetrachloroethane has been found in at least 329 of the 1,678 current or former NPL sites. Although the total number of NPL sites evaluated for this substance is not known, the possibility exists that the number of sites at which 1,1,2,2-tetrachloroethane is found may increase in the future as more sites are evaluated. This information is important because these sites may be sources of exposure and exposure to this substance may harm you.

When a substance is released either from a large area, such as an industrial plant, or from a container, such as a drum or bottle, it enters the environment. Such a release does not always lead to exposure. You can be 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 1,1,2,2-tetrachloroethane, many factors will determine whether you will 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 any other chemicals you are exposed to and your age, sex, diet, family traits, lifestyle, and state of health.

1.1 WHAT IS 1,1,2,2-TETRACHLOROETHANE?

1,1,2,2-Tetrachloroethane is a synthetic, colorless, dense liquid that does not burn easily. It is volatile and has a penetrating, sweet odor similar to chloroform. Its production has decreased significantly in the United States. In the past, it was used in large amounts to produce other chemicals and as an industrial solvent. 1,1,2,2-Tetrachloroethane was also used to separate fats

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and oils from other substances, to clean and degrease metals, and in paints and pesticides. Less toxic chemicals are now available to replace this solvent, and large-scale commercial production has stopped, although some production still occurs. Its present use appears to be as a chemical intermediate, and information about this use is limited. For more information, see Chapters 4 and 5.

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

Most 1,1,2,2-tetrachloroethane released into the environment eventually moves into the air or groundwater. If released on the land, it does not tend to attach to soil particles. When released to surface water, much of the chemical will evaporate back to the air, while the remainder may break down due to reactions with water. Similar reactions can take place in soils and sediments. Most of 1,1,2,2-tetrachloroethane is expected to disappear from groundwater and air in about 1 year. 1,1,2,2-Tetrachloroethane degrades by losing chlorine atoms. The resulting chemicals may also pose a health hazard. It has been estimated that 1,1,2,2-tetrachloroethane should not build up significantly in the bodies of fish or other aquatic organisms. For more information, please see Chapters 5 and 6.

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

In the past, average levels of 1,1,2,2-tetrachloroethane in air have usually been below 10 parts per trillion (ppt) (10 parts in 1,000,000,000,000 parts). However, average concentrations as high as 57 parts per billion (ppb) (57 parts in 1,000,000,000 parts) have been measured in city air. More recent information on the levels of this substance in air is not available. Current levels are expected to be lower since this substance is no longer used commercially. 1,1,2,2-Tetrachloroethane has been found in surface water and groundwater at many locations across the United States; however, the levels of this chemical are too low to be measured at most of these locations (scientists cannot accurately determine how much is present). The average levels of 1,1,2,2-tetrachloroethane are around 0.6 ppb in water samples at locations where it is

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measurable. Based on available information, 1,1,2,2-tetrachloroethane is not commonly found in drinking water, soil, or food.

Most people are not expected to be exposed very much to 1,1,2,2-tetrachloroethane since the levels of this chemical are usually very low in the environment and it is no longer used by the general public. Higher levels of 1,1,2,2-tetrachloroethane have been found in groundwater at a few locations in the United States. Individuals who use or drink the groundwater from these locations may have higher exposures to 1,1,2,2-tetrachloroethane. People who live near hazardous waste sites and industrial buildings where 1,1,2,2-tetrachloroethane is used may be exposed to this chemical by breathing in contaminated air, by touching contaminated soil, or by drinking contaminated water.

When a chemical such as 1,1,2,2-tetrachloroethane is used in making other chemicals, it is generally contained in closed automatic systems, which are not open to the air. Therefore, workers are not usually exposed to high levels of 1,1,2,2-tetrachloroethane. A national survey conducted in 1981–1983 estimated that 4,143 workers were exposed to 1,1,2,2-tetrachloroethane. However, the use of this chemical has decreased since 1983, so the number of exposed workers may now be much lower. More recent data are not available.

In addition to exposures in air and drinking water, people may be exposed to 1,1,2,2-tetrachloroethane from spills and other accidents or normal operations in workplaces. The compound has been used as a solvent for many operations. If you are exposed to such spills or involved in such work, you are most likely to be exposed by breathing in vapors of the chemical or from skin contact.

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

1,1,2,2-Tetrachloroethane can enter the body when a person breathes air containing the chemical or when the chemical comes into contact with a person's skin. If you accidentally drank water containing it, 1,1,2,2-tetrachloroethane would be absorbed into your body. 1,1,2,2-Tetrachloroethane is converted to more harmful products in animals and probably in humans. Most of it

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leaves the body within a few days through the breath or through the urine. For more information, see Chapter 3.

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

Scientists use many tests to protect the public from harmful effects of toxic chemicals and to find ways for treating persons who have been harmed.

One way to learn whether a chemical will harm people is to determine how the body absorbs, uses, and releases the chemical. For some chemicals, animal testing may be necessary. Animal testing may also help identify health effects such as cancer or birth defects. Without laboratory animals, scientists would lose a basic method for getting information needed to make wise decisions that protect public health. Scientists have the responsibility to treat research animals with care and compassion. Scientists must comply with strict animal care guidelines because laws today protect the welfare of research animals.

1,1,2,2-Tetrachloroethane is not life-threatening unless you intentionally or accidentally drink more than a few spoonfuls at one time or spill a large amount so that you breathe it and get it on your skin. Breathing concentrated fumes of 1,1,2,2-tetrachloroethane (enough so that you notice its sickeningly sweet smell) can rapidly cause fatigue, vomiting, dizziness, and possibly unconsciousness. Most people recover from these effects once they are in fresh air. Breathing, drinking, or having 1,1,2,2-tetrachloroethane come into contact with your skin may cause liver damage, stomachaches, or dizziness if you are exposed long enough to high amounts. The health effects on people from long-term exposure to small amounts of 1,1,2,2-tetrachloroethane are not known.

It is not known whether 1,1,2,2-tetrachloroethane causes cancer in people. In a long-term study, 1,1,2,2-tetrachloroethane caused an increase in liver tumors in mice, but not in rats. The International Agency for Research on Cancer (IARC) has determined that 1,1,2,2-tetrachloroethane cannot be classified as to its ability to cause cancer in humans, while the EPA has determined that the chemical is a possible human carcinogen. Not enough information is

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available to determine whether exposure to the chemical will cause reproduction problems or birth defects in people. For more information on health effects, see Chapter 3.

1.6 HOW CAN 1,1,2,2-TETRACHLOROETHANE AFFECT CHILDREN?

This section discusses potential health effects in humans from exposures during the period from conception to maturity at 18 years of age.

Children exposed to large amounts of 1,1,2,2-tetrachloroethane probably would be affected in the same manner as adults (see Section 1.5). It is not known whether the health of children may be more strongly affected than that of adults following exposure to 1,1,2,2-tetrachloroethane. It is possible that children are less strongly affected than adults because the ability of their body to convert 1,1,2,2-tetrachloroethane into more harmful products is immature. No information was located regarding the detection of 1,1,2,2-tetrachloroethane in breast milk or in developing fetuses of mothers exposed to the chemical. However, based on similarities to other chlorinated hydrocarbons such as 1,1,1-trichloroethane, it is expected that 1,1,2,2-tetrachloroethane could be transferred across the placenta from an exposed mother to a developing fetus.

1.7 HOW CAN FAMILIES REDUCE THE RISK OF EXPOSURE TO 1,1,2,2-TETRACHLOROETHANE?

If your doctor finds that you have been exposed to substantial amounts of 1,1,2,2-tetrachloroethane, ask whether your children might also have been exposed. Your doctor might need to ask your state health department to investigate.

Families are not likely to be exposed to amounts of 1,1,2,2-tetrachloroethane that are high enough to be a health concern because the chemical is no longer used in household products. It is possible that some old household products (such as cleaners, degreasers, and paints) contain small amounts of 1,1,2,2-tetrachloroethane; these products should be kept out of reach from children.

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

There are no specific medical tests to determine whether you have been exposed to 1,1,2,2-tetrachloroethane. Urine and blood tests are available, but are common to several other types of chemicals and would not specifically indicate exposure to 1,1,2,2-tetrachloroethane. The symptoms of 1,1,2,2-tetrachloroethane poisoning (stomachaches, fatigue, and dizziness) are common to many diseases, and so these symptoms are not very useful in determining whether you were exposed to this particular chemical. 1,1,2,2-Tetrachloroethane can affect the liver and medical tests can determine whether the liver is working properly. However, liver disease may have many causes; therefore, the presence of liver disease is not a reliable indicator for exposure to 1,1,2,2-tetrachloroethane. For more information, see Chapters 3 and 7.

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

The federal government develops regulations and recommendations to protect public health. Regulations *can* be enforced by law. The EPA, the Occupational Safety and Health Administration (OSHA), and the Food and Drug Administration (FDA) are some federal agencies that develop regulations for toxic substances. Recommendations provide valuable guidelines to protect public health, but *cannot* be enforced by law. The Agency for Toxic Substances and Disease Registry (ATSDR) and the National Institute for Occupational Safety and Health (NIOSH) are two federal organizations that develop recommendations for toxic substances.

Regulations and recommendations can be expressed as “not-to-exceed” levels, that is, levels of a toxic substance in air, water, soil, or food that do not exceed a critical value that is usually based on levels that affect animals; they are then adjusted to levels that will help protect humans. Sometimes these not-to-exceed levels differ among federal organizations because they used different exposure times (an 8-hour workday or a 24-hour day), different animal studies, or other factors.

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Recommendations and regulations are also updated periodically as more information becomes available. For the most current information, check with the federal agency or organization that provides it. Some regulations and recommendations for 1,1,2,2-tetrachloroethane include the following:

The EPA has decided that no more than 0.17 micrograms of 1,1,2,2-tetrachloroethane per liter of water (0.17 ppb or approximately 1 drop in an above-ground pool) should be in lakes and streams, although no national drinking water standards have been set. To protect workers during an 8-hour shift, OSHA has set a limit of 5 parts per million (ppm) of 1,1,2,2-tetrachloroethane in workroom air. NIOSH and the American Conference of Governmental Industrial Hygienists (ACGIH) recommend that the amount in workroom air be limited to 1 ppm in an 8- to 10-hour work shift.

1.10 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 contact ATSDR at the address and phone number below.

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

Toxicological profiles are also available on-line at www.atsdr.cdc.gov and on CD-ROM. You may request a copy of the ATSDR ToxProfiles™ CD-ROM by calling the toll-free

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information and technical assistance number at 1-800-CDC-INFO (1-800-232-4636), by e-mail at cdcinfo@cdc.gov, or by writing to:

Agency for Toxic Substances and Disease Registry
Division of Toxicology and Environmental Medicine
1600 Clifton Road NE
Mailstop F-32
Atlanta, GA 30333
Fax: 1-770-488-4178

Organizations for-profit may request copies of final Toxicological Profiles from the following:

National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
Phone: 1-800-553-6847 or 1-703-605-6000
Web site: <http://www.ntis.gov/>