



Trichloroethylene

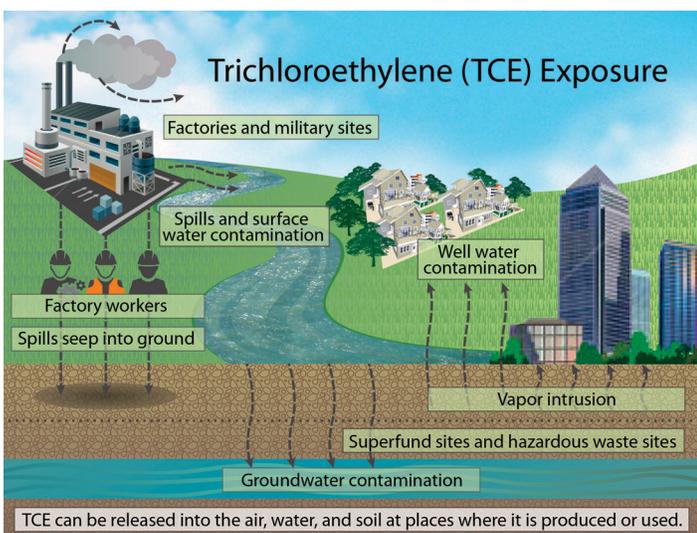
What is trichloroethylene and how is it used?

Trichloroethylene, also known as TCE, is a colorless, volatile liquid that is produced in large volumes for commercial use.

It is primarily used in two ways — to make hydrofluorocarbon chemicals, especially refrigerants, and as a solvent to remove grease from metal parts, although this use is declining. Additionally, it is used for spot removal in dry cleaning operations and is found in some aerosol cleaning products that consumers may purchase for home and auto maintenance.

How are people exposed to trichloroethylene?

There are many ways people can be exposed to TCE. It can be released into the air, water, and soil at places where it is produced or used. It breaks down slowly, so it remains in the environment for long periods of time. TCE can move readily through soil and make its way into underground drinking water sources. Because of its widespread use as a metal degreasing agent to maintain military equipment, it has been found in the groundwater at many military sites. Notably, TCE and other chemicals have been found in



Key Points



- Upgraded to known to be a human carcinogen
- Industrial solvent used primarily to make hydrofluorocarbon chemicals
- Elevated risk of kidney cancer in exposed people

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Carcinogens

the water supply wells at the military base in Camp Lejeune, North Carolina. The wells were contaminated by leaking underground storage tanks, industrial area spills, and waste disposal sites.

The general population can be exposed to TCE by inhaling the chemical in indoor and outdoor air, drinking contaminated water, or eating foods that may have been washed or processed with TCE-contaminated water. People who live or work in buildings near sites that make or dispose of TCE, such as Superfund sites, may experience higher levels of indoor TCE due to vapor intrusion. Vapor intrusion is when volatile chemicals, such as TCE, migrate into buildings from the soil.

Workers involved in commercial degreasing activities are mainly exposed by inhaling vapors or by dermal, or skin, exposure to the vapors or liquid.





Overall, there seems to be a decrease in exposure to TCE in the general population, based on trends seen in blood levels. Also, the amount of TCE being released into the environment has been declining.

What evidence is there that trichloroethylene exposure causes cancer?

Based on numerous human studies that show a causal association between exposure to TCE and an increased cancer risk, as well as similar findings in animals, TCE is being upgraded to *known to be a human carcinogen*. It was first listed in the Report on Carcinogens in 2000 as *reasonably anticipated to be a human carcinogen*.

Kidney cancer

Nearly 20 human studies were used to evaluate the relationship between TCE exposure and kidney cancer. The studies, conducted in various regions of the world and in different occupational settings, consistently found increased risk for kidney cancer from TCE. The strongest findings were found in the studies with the best methods. Workers exposed to the highest levels of TCE were at highest risk for liver cancer. It is unlikely that smoking or other factors contributed to the increases in cancer.

Animal and mechanistic studies provided biological plausibility to the human findings. TCE caused tumors in rats and mice at several different sites in the body, including the kidney.

Non-Hodgkin Lymphoma

There is limited evidence in humans showing an association between TCE and non-Hodgkin lymphoma, a cancer that affects the body's white blood cells. Although there are many human studies and some positive associations in several well-designed studies, the evidence is less consistent than for kidney cancer. The mechanism by which TCE might cause lymphoma is not completely understood.

What are some things I can do to reduce exposure to TCE?

Workers and employers should practice good occupational health behaviors, which may include wearing protective gear and properly using respirators, and reducing exposure time to TCE. Everyone should avoid drinking water known to be contaminated with TCE. Children should be prevented from playing in areas where TCE has been found in the soil. Always follow instructions on product labels to minimize exposure to harmful chemicals.

Where do I go for more information?

National Toxicology Program

<http://ntp.niehs.nih.gov/ntp/roc/content/profiles/trichloroethylene.pdf>

Agency for Toxic Substances and Disease Registry

<http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=30>

National Institute for Occupational Safety and Health

<http://www.cdc.gov/niosh/topics/trichloroethylene/>

U.S. Environmental Protection Agency

<https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/trichloroethylene-tce>



National Toxicology Program

U.S. Department of Health and Human Services

The Report on Carcinogens is prepared by the National Toxicology Program, an interagency group coordinated by the U.S. Department of Health and Human Services.

The full report is available at
<http://ntp.niehs.nih.gov/go/roc14>.