

Trichloroethylene (TCE) and Water

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What is TCE?

TCE is a nonflammable, colorless liquid that evaporates easily into air. TCE was widely used as a solvent for degreasing metal parts during the manufacture of a variety of products. In 2020, Minnesota passed legislation to restrict most permitted facility uses of TCE, effective June 2022. TCE can also be found in consumer products, including some wood finishes, adhesives, paint removers, and stain removers.

How can I be exposed to TCE?

TCE that spilled or was dumped on the ground can pollute soil and groundwater. If enough TCE is released, it can move down through the soil and into groundwater where it may pollute private and public drinking water wells. Although it is a commonly found contaminant in groundwater, most Minnesotans receive drinking water from a public utility or a private well that is not affected by TCE. In addition, public water systems are periodically tested for TCE.

Since TCE easily moves from water to air, breathing TCE that evaporates from contaminated water can contribute significantly to exposures, especially during showering/bathing or other activities such as cooking or running the dishwasher. Small amounts can also be absorbed through the skin.

Health Risk Limits

Minnesota Department of Health (MDH) uses Health Risk Limits (HRLs) to protect people's health from drinking water contaminants. MDH develops HRLs to protect those most vulnerable (e.g., most sensitive or most highly exposed) to the potentially harmful effects of a contaminant. Using drinking water that has concentrations of TCE higher than the HRLs may pose a risk of adverse health effects to some people. The concentration of TCE that is considered a risk to health depends on many variables, such as the amount of water a person drinks, their size, their age, and whether they have other health conditions, such as an immune condition.

MDH Health Risk Limits

Duration	HRL (µg/L) *	Health Endpoint
Acute (1 day)	Not developed	--
Short-term (>1 day up to 30 days)	0.4	Developmental; Immune
Subchronic (>30 days up to 10% of a lifetime)	0.4	Developmental; Immune
Chronic (>10% of a lifetime)	0.4**	Developmental; Immune
Cancer (0-70 years)	2	Cancer

*HRLs are shown in micrograms per liter (µg/L) units. This is the same as parts per billion (ppb).

**The most vulnerable subpopulation is infants and children whose immune systems are still actively developing and who have higher water consumption rates. To protect this vulnerable subpopulation the chronic HRL is set at 0.4 µg/L.

Potential Health Effects

Information about the health effects from TCE comes from studies of laboratory animals and studies of people who contacted TCE in their home or work environment. MDH has concluded that the main health concerns from TCE exposures are the following:

- Immune system development and immune effects such as hypersensitivity or risks for autoimmune disease;
- Heart defects in the developing fetus if the mother is exposed in the first trimester; and
- Increased risk of cancer (kidney and liver cancer and Non-Hodgkin Lymphoma) from long-term exposure.

Higher TCE exposures can also harm the central nervous system, kidney, liver, and male reproductive system.

Understanding Concentrations in Drinking Water

HRLs are developed to protect the most vulnerable exposed subpopulation. The lowest HRL (0.4 µg/L) is based on effects that occur during development and is protective for higher water consumption rates of infants and young children.

Concentrations in Drinking Water

Health Risk Limit	Description
0.4 µg/L	This level protects all people exposed to TCE in drinking water at any time during their life, from conception through old age. This value is based on developmental immune effects for bottle-fed infants and young children.
2 µg/L	▪ Protects pregnant women and the developing fetus. ▪ Protects against cancer for all people who are exposed for an entire lifetime, from conception through old age. ▪ Protects healthy adults who are only exposed to TCE after age 18.

Reducing Exposure

Activated carbon filtration can remove TCE from drinking water effectively. There are two type of filters: systems that treat water for a sink or refrigerator (point-of-use filter) and those that treat all water entering the home (whole-house filter). A whole-house filter also reduces exposures TCE from showering/bathing, cooking, dishwashing, or other uses. Increasing ventilation may also reduce the amount of TCE in air that evaporated from household water.

More information

[MDH Technical and Application Information for TCE](https://www.health.state.mn.us/communities/environment/risk/guidance/gw/tceaddedguidance.html)

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To obtain this information in a different format, call: 651-201-4897.