

## Sources of Exposure

## Toxicokinetics and Normal Human Levels

## Biomarkers/Environmental Levels

# ToxGuide™

## for

## 1,1,2,2-Tetrachloroethane



CAS# 79-34-5

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U.S. Department of Health and  
Human Services  
Public Health Service  
Agency for Toxic Substances  
and Disease Registry  
[www.atsdr.cdc.gov](http://www.atsdr.cdc.gov)

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## General Populations

- Exposure to 1,1,2,2-tetrachloroethane may occur by inhalation of very low levels in air or ingestion of very low levels in water. These levels may be higher for people living near hazardous waste sites or facilities where this substance is used.
- 1,1,2,2-Tetrachloroethane is not commonly found in drinking water, soil, or food.
- People who live near hazardous waste sites or facilities where 1,1,2,2-tetrachloroethane is used may be exposed via inhalation of contaminated air, ingestion of contaminated drinking water, or dermal contact with contaminated soil. Exposures are also possible in areas around incinerators or cement kilns.

## Occupational Populations

- Occupational exposure to 1,1,2,2-tetrachloroethane can occur during its manufacture or use as a chemical intermediate.
- 1,1,2,2-Tetrachloroethane is normally used in closed systems, thus, the potential for exposure for workers is low.
- Occupational exposures are expected to occur primarily via inhalation and dermal contact.

## Toxicokinetics

- Limited data suggest that in humans 1,1,2,2-tetrachloroethane is well absorbed by the inhalation and oral routes of exposure.
- Limited data in laboratory animals suggest that 1,1,2,2-tetrachloroethane distributes throughout the body, preferentially into fatty tissues.
- Data in laboratory animals also indicate that 1,1,2,2-tetrachloroethane is extensively metabolized by nonenzymatic and P-450-mediated oxidative reactions.
- Most of the absorbed 1,1,2,2-tetrachloroethane is excreted as metabolites in the urine and CO<sub>2</sub> and parent compound in expired air.
- 1,1,2,2-Tetrachloroethane does not accumulate in the body.

## Normal Human Levels

- No data are available.

## Biomarkers

- No studies were located regarding levels of 1,1,2,2-tetrachloroethane or its metabolites in human tissues and fluids associated with effects.
- 1,1,2,2-Tetrachloroethane metabolites are not specific biomarkers of exposure to 1,1,2,2-tetrachloroethane.
- 1,1,2,2-Tetrachloroethane can be measured in blood and urine, but this is useful only if the test is done soon after exposure.

## Environmental Levels

### *Air*

- ≤8 ppt in 75% of 1,010 urban/suburban sites in the U.S. in 1988. From trace levels to 57 ppb in major U.S. cities.

### *Sediment and Soil*

- Mean 0.06 mg/kg in 6 out of 635 soil samples in the U.S. in a 1999–2006 monitoring report.

### *Water*

- Mean 0.6 ppb in 4% of 12,476 water samples (surface and ground water) in the U.S. in a 1999–2006 monitoring report.

## Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2008. Toxicological Profile for 1,1,2,2-Tetrachloroethane. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Services.

## Chemical and Physical Information

## Routes of Exposure

## Relevance to Public Health (Health Effects)

### 1,1,2,2-Tetrachloroethane is a Liquid

- 1,1,2,2-Tetrachloroethane is a manufactured substance.
- 1,1,2,2-Tetrachloroethane is a colorless dense liquid that does not burn easily.
- 1,1,2,2-Tetrachloroethane is volatile and has a sweet odor.
- It dissolves in water and is miscible with most organic solvents.
- In the past, it was used as a chemical intermediate, as a solvent and degreaser, and in paints and pesticides.
- 1,1,2,2-Tetrachloroethane is currently used only as a chemical intermediate in the manufacture of other chemicals.

- Inhalation – Route of exposure for the general population (very low levels), people near waste sites and workers involved in the manufacture or use of 1,1,2,2-tetrachloroethane.
- Oral – Route of exposure at or near waste sites via ingestion of contaminated media.
- Dermal – Route of exposure for workers involved in the manufacture and use of 1,1,2,2-tetrachloroethane and for people near waste sites via skin contact with contaminated media.

### 1,1,2,2-Tetrachloroethane in the Environment

- Most 1,1,2,2-tetrachloroethane released into the environment moves to the air or groundwater.
- 1,1,2,2-Tetrachloroethane in soil does not tend to attach to soil particles.
- Much of 1,1,2,2-tetrachloroethane released to surface water evaporates to the air; the remaining portion is broken down in the water.
- Similar reactions take place in soil and sediments.
- The half-lives in groundwater and air are approximately 1 year and 2 months, respectively.
- 1,1,2,2-Tetrachloroethane does not accumulate in fish, other animals, or in plants.

Health effects are determined by the dose (how much), the duration (how long), and the route of exposure.

### Minimal Risk Levels (MRLs)

#### Inhalation

- No acute-, intermediate-, or chronic-duration inhalation MRLs were derived for 1,1,2,2-tetrachloroethane.

#### Oral

- No acute-duration oral MRL was derived for 1,1,2,2-tetrachloroethane.
- An MRL of 0.5 mg/kg/day has been derived for intermediate-duration oral exposure (15–364 days).
- No chronic-duration oral MRL was derived for 1,1,2,2-tetrachloroethane.

### Health Effects

- Acute inhalation or ingestion of high levels of 1,1,2,2-tetrachloroethane can cause weakness, fatigue, dizziness, unconsciousness, and possible death.
- Animal studies have clearly demonstrated that the central nervous system and liver are the main targets of 1,1,2,2-tetrachloroethane toxicity following acute- and intermediate-duration inhalation and oral exposure.
- In animals, hepatic effects are prevalent at lower levels and include increases in serum enzymes and liver fat content, fatty degeneration, and hepatocellular necrosis.
- Based on no data in humans and positive results in a mouse study, the EPA has classified 1,1,2,2-tetrachloroethane as a possible human carcinogen.

### Children's Health

- It is not known whether children are more susceptible to 1,1,2,2-tetrachloroethane poisoning than adults.
- Children exposed to 1,1,2,2-tetrachloroethane probably would experience the same effects as adults.