

Sources of Exposure

Toxicokinetics and Biomonitoring

Biomarkers/Environmental Levels

General Populations

- 1,1,2-Trichloroethane is a man-made chemical.
- The general population can be exposed to low levels of 1,1,2-trichloroethane in air.

Occupational Populations

- Occupational exposure may occur for workers employed in the production of 1,1,2-trichloroethane, 1,1-dichloroethene, or chlorinated rubber manufacturing.

Toxicokinetics

- 1,1,2-Trichloroethane is rapidly absorbed through the respiratory tract in humans. In animals, 1,1,2-trichloroethane is rapidly absorbed through the skin and from the gastrointestinal tract.
- In animals, absorbed 1,1,2-trichloroethane is distributed throughout the body with the highest concentrations found in the fat, liver, and brain.
- The primary metabolites of 1,1,2-trichloroethane are chloroacetic acid (formed by cytochrome P-450), and S-carboxymethylcysteine and thiodiacetic acid (formed following conjugation with glutathione).
- The major route of excretion after oral exposure is the urinary excretion of metabolites; smaller amounts of 1,1,2-trichloroethane are excreted in exhaled air and feces.
- Little 1,1,2-trichloroethane was detected in the urine following inhalation exposure in humans. The half-life of 1,1,2-trichloroethane in animals exposed by inhalation exposure was 49 minutes.

NHANES Biomonitoring

- 1,1,2-Trichloroethane levels have been monitored in blood samples from the 2003–2012 National Health and Nutrition Examination Survey (NHANES) and found to be below the detection limit of 0.01 ng/mL.

Biomarkers

- 1,1,2-Trichloroethane and its metabolites can be detected blood, urine and expired air soon after exposure.

Environmental Levels

Air

- No 1,1,2-trichloroethane was detected in ambient air samples collected across the United States in 2020. Between 2016 and 2019, it was detected at low average concentrations (0.0012–0.0049 ppbv).

Water

- In 2010, 1,1,2-trichloroethane was detected in less than 0.2% of drinking water samples; over 99% were below 5 ppb.

Sediment and Soil

- 1,1,2-Trichloroethane was detected in sediment (levels not reported), but was below the detection limit in soil.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2021. Toxicological Profile for 1,1,2-Trichloroethane. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Services.

ToxGuide™

1,1,2-Trichloroethane



(CAS # 79-00-5)
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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



Chemical and Physical Information

Routes of Exposure

Relevance to Public Health (Health Effects)

1,1,2-Trichloroethane is a Liquid

- 1,1,2-Trichloroethane is a colorless liquid with a sweet odor.
- It is a synthetic compound and is an intermediate in the biodegradation of 1,1,2,2-tetrachloroethane.
- 1,1,2-Trichloroethane is primarily used as a captive intermediate in the manufacture of 1,1-dichloroethene, but may also be used as a solvent, especially in chlorinated rubber manufacture.

- Inhalation – Most likely route of exposure for the general population and workers.
- Not likely an exposure route of concern for the general population.
- Dermal – Not likely an exposure route of concern for the general population.

1,1,2-Trichloroethane in the Environment

- 1,1,2-Trichloroethane primarily enters the environment from manufacturing and processing facilities.
- In the air, 1,1,2-trichloroethane breaks down slowly via oxidization by hydroxyl radicals (estimated half-life: 49 days). It is therefore likely to spread far from where it is released.
- 1,1,2-Trichloroethane does not absorb appreciably to suspended solids, sediment, or soil.
- 1,1,2-Trichloroethane undergoes anaerobic biodegradation in groundwater and sediment. It also volatilizes from surface water.
- 1,1,2-Trichloroethane is not expected to bioconcentrate in fish.

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

Minimal Risk Levels (MRLs)

Inhalation

- An acute-duration (≤ 14 days) inhalation MRL of 0.03 ppm was derived for 1,1,2-trichloroethane.
- An intermediate-duration (15–364 days) inhalation MRL of 0.002 ppm was derived for 1,1,2-trichloroethane.
- No chronic-duration (≥ 365 days) inhalation MRL was derived for 1,1,2-trichloroethane.

Oral

- An acute-duration (≤ 14 days) oral MRL of 0.5 mg/kg/day was derived for 1,1,2-trichloroethane.
- An intermediate-duration (15–364 days) oral MRL of 0.04 mg/kg/day was derived for 1,1,2-trichloroethane.
- No chronic-duration (≥ 365 days) oral MRL was derived for 1,1,2-trichloroethane.

Health Effects

- Most health effects data for 1,1,2-trichloroethane come from animal studies.
- Inhalation exposure to 1,1,2-trichloroethane in animals results in necrosis of the olfactory epithelium.
- In animal studies, oral and inhalation exposure to 1,1,2-trichloroethane resulted in changes to liver enzymes and liver histopathology; signs of central nervous system depression (sleepiness, loss of awareness, and sedation); taste aversion; motor impairment; and decreased hemagglutination titers.
- In a reproduction study in rats, pups had decreased body weights on postnatal days 4–21.
- 1,1,2-Trichloroethane was classified as a possible human carcinogen by the U.S. Environmental Protection Agency (EPA) and as Group 3 (not classifiable as to its carcinogenicity in humans) by the International Agency for Research on Cancer (IARC).

Children's Health

- It is not known if children are more sensitive to 1,1,2-trichloroethane exposure than adults.