

Trichloroethylene (TCE) and Tetrachloroethylene (PCE) Exposures and Vapor Intrusion

INFORMATION FOR HEALTH PROFESSIONALS

This information is about very low-level exposures to TCE and PCE due to vapor intrusion. The advice may not apply to acute, large exposures to these chemicals. In such cases, please contact the Minnesota Poison Control System at 1-800-222-1222.

TCE and PCE are industrial solvents that are common groundwater contaminants. Because they are volatile, they rise toward the surface as vapors and can contaminate air inside buildings—a process called vapor intrusion.

The Minnesota Pollution Control Agency (MPCA) oversees investigations at hundreds of contaminated sites to determine if people are, or may be, breathing indoor air contaminated by vapor intrusion. The Minnesota Department of Health (MDH) helps inform occupants of affected buildings about potential exposures and health risks.

Patients notified of a vapor intrusion investigation may ask health care providers about health concerns from TCE and PCE.

About Health Risks

Concentrations of TCE/PCE that are typically encountered in indoor air due to vapor are well below levels where health effects have been demonstrated in people. The concentrations are often slightly above the Intrusion Screening Values (ISVs) in the table.

Values	TCE ($\mu\text{g}/\text{m}^3$)	PCE ($\mu\text{g}/\text{m}^3$)
Residential ISV	2.1	3.4
Workplace ISV	7	33
MN OSHA Regulatory Limits	270,000	170,000

The ISVs are action values developed by MPCA using MDH toxicity guidance. They are intentionally very protective and are used to decide when to mitigate vapor intrusion problems. The ISVs are also much lower than the occupational standards for workplaces where the chemicals are used.

Animal studies show developmental effects, such as increases in heart defects and effects on the developing immune system, may occur with TCE exposures. Animal studies also indicate that TCE can cause decreased thymus weight and histological changes in the kidneys. Because of the potential for developmental effects, MDH often recommends quick action to reduce or eliminate potential TCE exposures to pregnant women and young children when vapor intrusion is occurring. Nevertheless, there is no conclusive evidence from epidemiologic studies that TCE/PCE exposure causes developmental effects in humans.

Exposures to TCE/PCE may increase the risk of certain types of cancers (TCE: kidney, possibly non-Hodgkin's lymphoma, and liver; PCE: possibly bladder, non-Hodgkin's lymphoma, multiple myeloma, liver, and

leukemias) based on high concentrations in occupational and animal studies (tens to hundreds of thousands of times higher than typical vapor intrusion exposures).

What to Know Before Talking with Your Patients

- TCE and PCE are industrial degreasers. PCE is also a common dry cleaning solvent, and wearing freshly dry cleaned clothes can be a source of exposure. Both can be found in some consumer products, including adhesives, paint and stain removers, and parts cleaners.
- In most vapor intrusion scenarios, a lack of exposure information makes it very difficult to assess health risk. Amounts of TCE/PCE that people actually breathe over time are usually unknown and impossible to estimate accurately. It is often cost-effective to mitigate vapor intrusion based on potential for exposures and on vapor concentrations measured only below the foundation.
- MDH and MPCA employ a public health approach to protect populations from environmental exposures and prevent health impacts. MDH believes it is important to notify people about potential exposures and encourages the reduction of exposures out of an abundance of caution.

Health Care Provider Recommendations

- Provide reassurance.
- There is currently no recommendation for any additional medical testing to confirm exposure.
- Refer patient to MDH (see below) for environmental testing results and information about (or ways to reduce) potential exposure.
- Additional recommendations if patient is pregnant:
 - The risk of fetal heart defects from TCE exposure is theoretical and is presumed to be highest in the first 8 weeks of pregnancy.
 - There is no need for fetal echocardiography for potential TCE exposures.
 - No alterations in regular prenatal care are required.
 - Empower your patients to focus on the “controllable” aspects of their pregnancies that will increase good fetal health outcomes.
 - Active living
 - Healthy food choices
 - Smoking cessation
 - Abstaining from alcohol and drugs
 - Attending regular prenatal care

Resources

- Minnesota Poison Control System at 1(800)-222-1222.
- Minnesota Department of Health, Site Assessment and Consultation Unit at 651-201-4897 or health.hazard@state.mn.us
- Susan Buchanan, MD, MPH, Region 5 Pediatric Environmental Health Specialty Unit (PEHSU), University of Illinois at Chicago (not limited to pediatric patients) at 866-967-7337 or [sbucha3@uic.edu](mailto:sbuch3@uic.edu)
- Agency for Toxic Substances and Disease Registry (ATSDR):
 - TCE: <https://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=30>
 - PCE: <https://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=48>