

TO: Health Care Providers in Caledonia & Essex Counties

FROM: Health Commissioner Mark Levine, MD

PCE and TCE Contamination of State Office Building in St. Johnsbury, VT

Background

Chemicals associated with dry cleaning – tetrachloroethylene (PCE), trichloroethylene (TCE), and chloroform – were detected at high levels in soil gas below the foundation of buildings located at 67-72 Eastern Avenue in St. Johnsbury, Vermont. These buildings are leased by the State of Vermont to provide office space for employees of the Agency of Human Services and their clients.

State officials were notified of the soil gas test results on March 30, 2017. Department of Health and Department of Environmental Conservation experts reviewed the results. Employees were notified and sent home the same day, and have since been moved to alternate locations.

Indoor air testing on March 31 confirmed the presence of these chemicals inside the building:

- The highest PCE detection in indoor air was 25 $\mu\text{g}/\text{m}^3$.
- The highest TCE detection in the indoor air was 33 $\mu\text{g}/\text{m}^3$.
- The highest detection of chloroform in the indoor air was 0.325 $\mu\text{g}/\text{m}^3$.

Of these three chemicals, PCE and TCE are of greatest concern. Chloroform is carcinogenic only at concentrations that are high enough to cause cell death and regeneration. The highest levels of PCE and TCE that were recorded in the building are above the Vermont Department of Health's levels of concern.

Acute health effects of PCE and TCE

At high exposure, PCE and TCE can cause central nervous system effects such as headaches, dizziness, sleepiness, lack of coordination, or effects on vision, hearing, and balance. Levels of PCE and TCE currently reported in the buildings are lower than what would be expected to cause these acute health effects.

Chronic health effects of PCE and TCE

Non-cancer effects: PCE and TCE can affect the central nervous system, kidney, liver, immune system, male reproductive system, and the developing fetus. Typically, these endpoints are considered a result of chronic exposure.

Effects of TCE were observed on the fetus, which presents a concern for pregnant women, particularly during the first eight weeks of pregnancy, when the fetal heart is developing. The exposure time associated with this health effect in humans is unknown: it could be hours, days or weeks. The Health Department's level of concern for TCE, based on EPA's Reference Concentration, is protective of the most sensitive population, the developing fetus.

Some people who work directly with TCE in an occupational setting developed scleroderma, an autoimmune disorder of the skin.

Cancer: The U.S. EPA has classified PCE as "likely to be carcinogenic to humans by all routes of exposure" and TCE as "carcinogenic to humans by all routes of exposure". The human evidence of carcinogenicity from epidemiologic studies of PCE and TCE exposure is strongest for non-Hodgkin lymphoma (NHL), kidney cancer, multiple myeloma, and bladder cancer. Associations between other types of cancer and PCE and TCE exposure in humans have also been reported.

The detections of PCE and TCE in the St. Johnsbury buildings are orders of magnitude lower than what has been observed in epidemiological studies where measurable increases of cancer are seen. Studies have shown significant increases in NHL and kidney cancers in people who were exposed to levels of TCE ranging from 10,000 $\mu\text{g}/\text{m}^3$ to $> 5,000,000 \mu\text{g}/\text{m}^3$.

The chances of developing health effects due to PCE or TCE depend on how much you were exposed to, and for how long. It is impossible to know what the chemical exposure in the building was in previous years. Cancer often takes years to develop.

Metabolism and Biomonitoring

Much of the PCE and TCE that is inhaled is exhaled without metabolizing. Once a person is removed from the source of the exposure, their body will break these chemicals down within a few days. PCE and TCE can accumulate in fat due their lipid solubility, but once exposure stops they will be excreted from the fat within a few days. There is no procedure that can get PCE and TCE out of the body.

Blood and urine can be tested for PCE and TCE and their biological metabolites, but we do not recommend these tests once people have been removed from the exposure for multiple days. These blood and urine tests are not routine, and the results will not predict the potential for health effects.

Medical Screening

We encourage people to talk with their physician about any health concerns they think could be related to this exposure. A person's exposure does not mean they will experience health effects as a result. Routine tests including blood chemistry, complete blood count, and urinalysis may help detect early problems, but will most likely have low sensitivity. Testing should be

considered on a case-by-case basis after integrating exposure history, patient symptoms, and known medical history and other risk factors.

Women who are pregnant should be under the care of a provider. An ultrasound can help detect changes to a developing fetus.

Breastfeeding

PCE and TCE can pass into breast milk. However, we do not discourage anyone from breastfeeding, including women who worked in the building.

For more information –

- **If you have a patient you think is experiencing health effects due to TCE or PCE exposure**, please call us at 1-800-439-8550. Having an exposure does not mean that a person will develop health problems as a result.
- **For detailed summaries of the toxicology and epidemiology studies on PCE and TCE:**

EPA IRIS Summaries –

https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nمبر=106

https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nمبر=199

ATSDR Toxicological Profiles –

<https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=173&tid=30>

<https://www.atsdr.cdc.gov/toxprofiles/TP.asp?id=265&tid=48>

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