

**To:** Vermont Health Care Professionals  
**Date:** October 9, 2024  
**From:** Mark Levine, MD, Health Commissioner

## **Health Outcomes: Exposure to PCBs in School Indoor Air**

### **Summary**

By law, Vermont schools are required to test for PCBs in indoor air. PCBs are a group of persistent chemicals that are carcinogenic and have a wide range of short-term health effects.

### **Requested Actions**

**Exposure to PCBs should be documented in a patient's medical history and be placed on the Problem List.** Providers should take into account the patient's complete medical history, lifestyle and risk factors, including genetics, when determining whether and how to screen for specific health outcomes that may be related to PCB exposure.

Other considerations include:

- There is no specific treatment to reduce or reverse PCB accumulation.
- Liver function tests may be informative for people who were exposed to PCBs, as part of routine medical care.
- Patients should avoid further PCB exposure as well as other hepatotoxic substances, including ethanol.

PCBs have been implicated as a potential cause of cancer in humans. Screening tests are available for breast cancer and melanoma.

### **Background**

Polychlorinated biphenyls (PCBs) are a group of 209 persistent, humanmade chemicals that were commonly used in building materials and electrical equipment before 1980. PCBs can move from the building materials into the indoor air. Inhalation of indoor air is the primary route of exposure to PCBs from building materials.

Schools in Vermont may have PCBs in their building materials. By law, Vermont public and approved independent schools built or renovated before 1980 are required to test their indoor air for PCBs. The Health Department works with the schools to assist with interpreting their PCB indoor air test results.

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About half the required schools in Vermont have been tested for PCBs in the indoor air. The levels of PCBs in school air range from none detected to over 2,000 ng/m<sup>3</sup>.

To prioritize the need for action including investigation of PCB sources, the Health Department developed Vermont School Action Levels:

- 30 ng/m<sup>3</sup> for pre-kindergarten
- 60 ng/m<sup>3</sup> for kindergarten through 6<sup>th</sup> grade
- 100 ng/m<sup>3</sup> for 7<sup>th</sup> grade through adult

To reduce exposure to PCBs, the Health Department recommends rooms over the Vermont Immediate Action Levels not be used as primary classrooms:

- 90 ng/m<sup>3</sup> for pre-kindergarten
- 180 ng/m<sup>3</sup> for kindergarten through 6<sup>th</sup> grade
- 300 ng/m<sup>3</sup> for 7<sup>th</sup> grade through adult

[Find results for the tested schools.](#) If you would like to discuss data for specific schools, call 1-800-439-8550.

### **Short-term health effects of PCBs**

The likelihood of having a health effect from PCB exposure depends on how much a person was exposed to, and for how long.

### **Non-cancer effects:**

PCBs can affect the immune, reproductive, nervous and endocrine systems. Findings from studies have indicated:

- PCB exposure in neonates led to a smaller thymic volume, indicating possible impaired immunologic development.
- Studies that examined reproductive end points found indications that exposure to PCBs is associated with menstrual disturbances and effects on male fertility.
- Neurobehavioral alterations have been reported in newborns exposed to PCBs in utero.
- Studies show that high levels of PCBs in pregnant people can have an impact on their children being born early, their children's birth weight, short-term memory, and learning.
- The epidemiological studies suggest a link between exposure to PCBs and thyroid hormone toxicity in humans. Both positive and negative associations between PCB

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levels and TSH, T<sub>4</sub> and T<sub>3</sub> are reported, perhaps due to the varying toxicities of the 209 PCBs.

- Some studies report an increase in type 2 diabetes in people who had elevated levels of PCBs in their blood due to fish consumption.
- Many other health effects are reported with varying consistency in studies. These studies are summarized in the Agency for Toxic Substances and Disease Registry Toxicological Profile (link is in the Additional Resources section).

### **Chronic health effects of PCBs**

PCBs are carcinogenic to humans, as determined by the International Agency for Research on Cancer. Studies have shown that:

- In humans, PCBs can cause malignant melanoma.
- Positive associations have been observed for non-Hodgkin lymphoma, breast cancer, and liver cancer.

### **Acute health effects of PCBs**

Short-term exposure to excessive amounts of PCBs (acute effects) can lead to chloracne, decreased liver function, respiratory problems, neurological effects, and gastrointestinal effects. These types of acute effects due to high levels of exposure were reported in occupational studies of people who work directly with PCBs and are generally rare.

### **Biomonitoring**

PCBs are a group of 209 chemicals, with varying half-lives, ranging from a week to infinity. The highest PCB concentrations are found in adipose tissue. There are no treatments or procedures that can rid the body of PCBs.

PCBs can be measured in the serum at some commercial reference laboratories. Most people in the U.S. have detectable levels of some of the 209 PCBs in their serum. A serum test cannot discern how much people were exposed to at school, versus how much came from their diet, nor will it predict an individual's health outcome or help direct an individual's medical care. For those reasons, **we do not recommend blood testing for people who spent time in Vermont schools.**

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### **Breastfeeding/Chestfeeding**

PCBs can pass into breastmilk. However, we do not discourage anyone from breastfeeding, including people who worked in a Vermont school with PCB levels at or above the Vermont School Action Levels.

**If you have a patient you think is experiencing health effects due to PCB exposure**, please call the Health Department at 1-800-439-8550. Having an exposure does not mean that a person will develop health problems as a result.

### **Additional Resources**

**For more information:** [Polychlorinated Biphenyls \(PCBs\) in Schools](#)

**For detailed summaries of the toxicology and epidemiology studies on PCBs:**

- [International Agency for Research on Cancer](#)
- [Agency for Toxic Substances and Disease Registry case study on PCBs](#)
- [Agency for Toxic Substances and Disease Registry Toxicological Profile](#)
- [Agency for Toxic Substances and Disease Registry Clinician Brief on PCBs](#)

If you have any questions, please email [AHS.VDHEnvHealth@Vermont.gov](mailto:AHS.VDHEnvHealth@Vermont.gov).

To be removed from the HAN or have your information updated please email the Vermont HAN Coordinator at: [vtan@vermont.gov](mailto:vtan@vermont.gov).

### **HAN Message Type Definitions**

**Health Alert:** Conveys the highest level of importance; warrants immediate action or attention.

**Health Advisory:** Provides important information for a specific incident or situation; may not require immediate action.

**Health Update:** Provides updated information regarding an incident or situation; unlikely to require immediate action.

**Info Service Message:** Provides general correspondence from the Vermont Department of Health, which is not necessarily considered to be of an emergent nature.

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