CEHC FACT SHEETS: Polychlorinated Biphenyls (PCBs)

What are polychlorinated biphenyls (PCBs)?
Polychlorinated biphenyls (PCBs) are a group of man-made chemicals that were used widely as coolants and insulators in transformers, electrical equipment, fluorescent lighting, and air conditioners. They were also used in plastics, paints, and other building materials. They resist burning and persist a long time, making them ideal for these uses.

PCBs were used in building materials from the 1940s until 1977 when they were banned because of how long they last in the environment and concerns about their effects on human health. Many of these materials, including caulk, are still present in older buildings.

For a 30-year period ending in 1976, PCBs were discharged into the upper Hudson River, primarily from electrical manufacturing plants in Hudson Falls and Fort Edward, New York. These pollutants collected in the sediment and entered the food chain contaminating fish and shellfish in the entire length of the river below Hudson Falls. As a consequence of this contamination, the Hudson River from above Albany to lower Manhattan has been declared by the U.S. EPA to be the nation’s longest Superfund site. Fish and shellfish from the Hudson River and New York Harbor have had elevated levels of PCBs for many years.

How does PCB exposure occur?
PCBs made over forty years ago are still found in the environment today, thus animals and people continue to get exposed. Most Americans have PCBs in their bodies since they are not easily broken down or excreted. Consumption of contaminated fish and shellfish is the most important route of human exposure. PCBs are fat-soluble and they accumulate in the marine food chain reaching very high concentrations in long-lived predator fish high on the food chain such as striped bass and bluefish, and in predatory bottom-feeding species, such as crabs, eels and lobsters.

Children are exposed by eating fish and other fatty foods, such as dairy products or meat, which contain high concentrations of PCBs. Infants can also be exposed through breast milk, but the health risk is small and should not discourage mothers from breastfeeding, unless specifically recommended by a physician. Younger children who spend time crawling and playing on the ground where PCBs may have settled in dust are more likely to have dermal exposure. Also, their hand-to-mouth activity increases their likelihood of ingestion. Less common is exposure via inhalation, but small amounts of solid PCBs can change into gas and become airborne. PCBs readily cross the placenta from mother to fetus, so prenatal exposures also can occur.

When building materials containing building materials get old, they break apart and produce contaminated dust. These materials can also slowly emit low levels of PCBs into the air. In most cases, the health risk from intact building materials is very small; therefore there is no need to
remove PCB-containing materials if they are intact. However, these materials must be removed if they begin to deteriorate. The most important time to avoid contamination is when a building is being renovated and materials with PCBs are being removed. See the link to the New York State protocol below for more information on safe removal of PCB-containing materials.

What are the health effects of PCB exposure?
Babies exposed to high levels of PCBs during pregnancy may have low birth weight, decreased intelligence, darkening of the skin, behavioral problems, developmental delay, and slowed growth. An example of this type of exposure happened in Japan in the 1960s when mothers ate PCB-contaminated cooking oil. Children exposed to extremely high levels of PCBs may develop acne and discoloration of the skin, upset stomach, numbness and tingling of the lower legs and possibly liver damage. These effects were seen in a community in Italy following an industrial accident at a chemical plant in 1976.
Prenatal exposure to PCBs has been shown to decrease children’s intelligence, memory, and attention span and to result in poor school performance. The negative effects of early exposure to PCBs appear permanent, but can be offset in part by a nurturing home environment. PCB exposure during infancy and childhood has not been seen to cause these effects.

The EPA has determined that PCBs are probably cancer causing. Adults exposed to high levels in their work, such as electricians, have been found to have a higher rate of cancer of the liver and biliary tract, but cancer in those people is still a rare event.

What are the current standards for PCBs?
The Food and Drug Administration sets regulations on the amounts of PCBs that are allowed in commercial food products. In fish, the level is set at 2 parts per million (ppm).

How is PCB exposure diagnosed?
Tests are available to measure the levels of PCBs in the blood and breast milk. Because PCBs are common in the environment, most people will show some level. The problem, though, is that there are no reference values that define a “normal” level of exposure to PCBs. Thus, your physician will not be able to tell you the meaning of a PCB level in your blood or breast milk beyond the fact that it is present. A test that shows PCBs in your blood will not explain how long the exposure lasted or if there will be health effects from the exposure.

The American Academy of Pediatrics does not recommend routine testing of breast milk for PCBs. The benefits of nursing greatly outweigh the risks associated with exposure to PCBs after birth. We strongly encourage women to continue breastfeeding. Breast milk, even when it contains measurable levels of PCBs, is still far and away the best food for babies.

How is PCB exposure treated?
There is no known treatment to reduce PCB levels in the body, so it is most important to minimize exposure. For children exposed to PCBs during pregnancy, the best action is to provide a healthy and stimulating home and school setting, have their development followed closely by a pediatrician, and provide early intervention services if there is any concern that development is not proceeding normally.
How can PCB exposure be prevented?

- Avoid eating fish caught from contaminated waters. Health advisories list areas considered unsafe for fishing due to contamination with PCBs.

- Schools and homes should be cleaned using wet wiping techniques (wet mops or wet cloth) with detergents to remove PCB residue and dust and reduce spreading of dust.

- For buildings constructed before 1977, alert building managers to loose or cracked building materials for proper removal. Any removal of old PCB-containing materials must be done by certified abatement workers who have been trained to do the job safely.

- Do not allow children to play with old electrical appliances or transformers.

- Until soil testing has shown no PCB contamination near old buildings, encourage children to play away from these areas.

- Wash children’s hands and toys often with soap and water to prevent children from eating contaminated dust and soil.