POLYCHLORINATED BIPHENYLS (PCBs)

Agency for Toxic Substances and Disease Registry — April 1993

This fact sheet answers the most frequently asked health questions about PCBs. For more information, you may call 404-639-6000. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to polychlorinated biphenyls (PCBs) happens mostly from eating contaminated foods or breathing contaminated workplace air. High exposures to PCBs can damage the skin, eyes, and lungs. PCBs have been found in at least 349 of 1,300 National Priorities List sites identified by the Environmental Protection Agency.

What are polychlorinated biphenyls (PCBs)? Pronounced pol 'e - klo'ri - nāt - ed - bi - fe nils

PCBs are a group of industrial chemicals that share a common structure. They are oily liquids or solids, clear to light yellow in color, and with no smell or taste. They don't occur naturally in the environment. Aroclor is a popular trade name of a commercial PCB mixture.

PCBs don't burn easily. In the past, they were widely used as coolants, insulating materials, and lubricants in electrical equipment like transformers and capacitors. The U.S. stopped making them in 1977 because of the health effects associated with exposure. As levels in the environment increased, the potential for harmful effects increased.

Pre-1977 products may still contain PCBs. These include old fluorescent lighting fixtures, electrical devices or appliances with PCB capacitors, old microscope oil, and hydraulic fluids.

What happens to PCBs when they enter the environment?

- They enter air as solid or liquid aerosols or vapor and can stay in air more than 10 days.
- When in air, they can travel long distances in the wind.
- They move from air to soil and water when it snows or rains.
- Most stick tightly to soil particles; a small amount dissolves in water.
- They take several years to break down in soil.
- They are stored in the bodies of fish and seafood.
- Levels in fish can be many thousands of times higher than the levels in water.

How might I be exposed to PCBs?

- Breathing workplace air (indoor air around electrical parts or outdoor air at waste sites)
- Drinking water, skin contact with soil, or breathing air that is contaminated from nearby waste sites
- Eating fatty foods such as fish, seafood, dairy, or fatty meats contaminated with PCBs
- Breast milk from mothers exposed to PCBs.

How can PCBs affect my health?

Most of what we know about the human health effects of PCBs comes from studies on workers. Levels in the workplace are usually much higher than at other places. Workers are exposed to PCBs from breathing air and contact with their skin.

Exposures to PCBs at levels found in the workplace and over a long time may cause harmful effects to the skin (acne, rashes, and coloring of the nails and skin) and eyes (redness, burning, irritation, and discharge). PCBs in the diet of animals produced similar effects. PCBs may also irritate the nose and lungs.

Repeated skin contact to PCBs in rabbits caused liver, kidney, and skin damage. A single, large exposure to skin

caused death in rabbits. Rats and other animals that breathed very high levels of PCBs over several months had liver and kidney damage. It is not clear if these effects would happen in people at similar levels of exposure.

Rats that ate large amounts of PCBs for a short period had mild liver damage; some died. Smaller amounts over several weeks or months caused liver, stomach, and thyroid gland injuries, anemia, acne, and reduced the ability to have offspring. Similar effects occurred in different laboratory animals.

How likely are PCBs to cause cancer?

The Department of Health and Human Services (1991) has determined that PCBs may reasonably be anticipated to be carcinogens. This is based on animal studies. Studies in workers do not provide enough information to know with any certainty if PCBs cause cancer in humans.

Is there a medical test to show whether I've been exposed to PCBs?

Tests are available for PCBs in blood, body fat, and breast milk. Blood tests are the best method for detecting recent exposures to large amounts. These tests are not routinely performed at your doctor's office.

High levels in your body fluids indicate exposure to high levels of PCBs. These tests can't determine the exact amount or type of PCBs, how long you were exposed, or if you will develop harmful health effects. Most people have small but measurable amounts of PCBs in their blood, fat, and breast milk.

Has the federal government made recommendations to protect human health?

The U.S. Environmental Protection Agency (EPA) recommends PCBs levels in lakes and streams be no higher than 0.001 parts of PCB per billion parts of water (0.001 ppb) to prevent cancer. PCBs in drinking water should be no higher than 4 milligrams per liter of water (4 mg/L) for adults, and 1 mg/L for children to prevent noncancer harmful effects. EPA regulates the transport, storage, or disposal of PCBs. EPA limits the amount of PCBs in publicly owned waste water treatment plants, and requires industry to report release of 1 pound or more.

The Food and Drug Administration (FDA) requires milk, eggs, other dairy products, poultry fat, fish, shellfish, and infant foods to contain no more than 0.2-3 parts of PCBs per million parts of food (0.2-3 ppm) to prevent noncancer harmful effects.

The National Institute for Occupational Safety and Health (NIOSH) recommends workers not breathe air with more than 0.001 milligrams of PCBs per cubic meter of air (0.001 mg/m^3) for a 10-hour workday, 40-hour workweek.

The Occupational Safety and Health Administration (OSHA) requires workplace exposure limits of 0.5 mg/m^3 (54 percent chlorine) or 1 mg/m^3 (42 percent chlorine) for an 8-hour workday to protect workers from noncancer harmful health effects.

Glossary

Carcinogen: Substance that can cause cancer.
PPM: Parts per million
Milligram (mg): One thousandth of a gram.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Toxicological profile for selected polychlorinated biphenyls (PCBs). Atlanta: U.S. Department of Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Case studies in environmental medicine: PCBs toxicity. Atlanta: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns. For more information, contact: Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333 Phone: 404-639-6000.