PCBS

The Issue

Low levels of PCBs are found in the environment, and as result, in foods. The presence of these contaminants in foods and the environment means that everyone can be exposed to very low levels of PCBs.

Exposure to these low levels does not appear to affect human health. However, PCBs can accumulate in the human body and remain there for years. This edition of It's Your Health addresses concerns about health effects that may develop over time.

Background

PCBs stands for Polychlorinated Biphenyls. The name refers to any one, or any combination of 209 specific chemicals that are similar in structure. PCBs are extremely persistent. They last for many years because they do not break down easily on their own and they are difficult to destroy.

PCBs were first manufactured in 1929. For several decades, they were used widely as ingredients in many industrial materials, such as sealing and caulking compounds, cutting oils, inks and paint additives. PCBs were also used to make coolants and lubricants for certain kinds of electrical equipment, such as transformers and capacitors.

Attention began to focus on potential hazards linked to the use and disposal of PCBs, when the presence of PCBs was detected in the Great Lakes for the first time in 1966. By 1977, concern over the impact of PCBs on the environment led to a North American ban on manufacturing and importing PCBs. The ban did not cover PCBs that were already in use in electrical applications. These are being phased out now, and the federal government has set strict regulations for the handling, storage and disposal of PCBs.

Where PCBs are Found Today

Trace levels of PCBs in the environment (air and water) are found all over the world, including remote areas of Canada. Some of this was caused by accidental releases and improper disposal practices in the past, but today, contamination is due primarily to the long-range transport of PCBs by global air currents. Once PCBs get into the environment, they accumulate in the cells of animals. The highest concentrations are found in animals at the top of the food chain, including humans.

PCBs are still present in certain types of electrical equipment. Also, public concern over disposal practices has led to the storage of PCBs in many facilities around the country. In some instances, PCBs have been put into specially engineered landfills. Despite strict controls on the handling and storage of PCBs, there remains the potential for accidental releases into the environment.

How Canadians are Exposed to PCBs

Everyone is exposed to very small amounts of PCBs through food, and to a lesser extent, through air, soil and water. As a result, all Canadians have PCBs in their bodies. These low levels are unlikely to cause adverse health effects. Based on recent results from Total Diet Studies (a series of studies organized by Health Canada), the average daily dietary intake of PCBs is thought to be less than half of one microgram (one microgram = one-millionth of a gram). People who eat large amounts of sports fish, wildlife or marine mammals may be exposed to higher dietary levels of PCBs.

Canada

There is a risk of workplace exposure for people who replace or service ice old electrical equipment, and for those who transport PCBs to storage and destruction facilities or handle PCBs at these sites. Workers involved in these activities should wear protective clothing and follow prescribed decontamination procedures when they complete their work.

Canadians could also be exposed to PCBs through accidental releases, including uncontrolled fires involving PCBs. In these situations, several different things could happen:

- PCBs could be released in liquid form. They could then contaminate soil or water nearby.
- High temperatures in a fire could turn liquid PCBs into an aerosol form. If this happens, the PCBs could be inhaled. They could also be transported somewhere else by air currents.
- When PCBs are burned at high temperatures, the process can turn them into different substances called dioxins and furans, which are far more toxic than PCBs.

Health Effects of PCBs

Most of what is known about the human health effects of PCBs is based on exposures due to accidental releases or job-related activities. These exposures are much higher than the levels normally found in the environment. The adverse health effects include a severe form of acne (chloracne), swelling of the upper eyelids, discolouring of the nails and skin, numbness in the arms and/or legs, weakness, muscle spasms, chronic bronchitis, and problems related to the nervous system. In addition, the International Agency for Research on Cancer (IARC) has concluded that there is some evidence to link long-term, high-level PCB exposure in occupational settings to an increased incidence of cancer, particularly liver and kidney cancer.

The current state of knowledge suggests that low-level exposures to PCBs are unlikely to cause adverse health effects. People eating large amounts of certain sports fish, wild game and marine mammals are at increased risk for higher exposures and possible adverse health effects. People at greater risk include Aboriginal peoples, as well as anglers and hunters and their families.

Some studies dealing with long-term low-level exposures to PCBs suggest subtle effects on reproduction and on the development of new-borns and young children. Research into this subject continues. The issues are very complex because the chemical make-up of PCB mixtures varies from one exposure situation to the next, and people exposed to PCBs may have been exposed to other related contaminants at the same time. Scientists must determine the role each substance may play in causing adverse health effects.

Media reports have raised concerns about PCBs in farmed salmon. Health Canada and the Canadian Food Inspection Agency recently completed a survey of farmed and wild fish. The survey analyzed a large number of samples for PCBs. The results showed that eating salmon from the commercial food supply (whether farmed or wild) does not pose a health risk to consumers.

Minimizing Your Risk

To minimize your risk of exposure and health effects related to PCBs:

- Follow regional/provincial/territorial advice about limiting your consumption of wild game and sports fish. In addition, you can prepare game and sports fish in a way that minimizes your exposure to PCBs. Discard the inner organs and remove the skin and all visible fat. Broil, bake, boil or grill the flesh, but avoid frying as this cooking method retains the fat.

There is no need to restrict consumption of fish from the commercial food supply (e.g., fish bought in a supermarket).

- Never burn wood that has been treated or painted, since burning materials that contain PCBs can create dioxins and furans.
- If you are at risk for exposure to PCBs in the workplace, be sure to take appropriate safety precautions and follow all prescribed decontamination procedures.

The Government's Role

Health Canada and Environment Canada have taken strong and effective steps under the Canadian Environmental Protection Act (CEPA) to control the use, importation, manufacture, storage and release of PCBs.

CEPA states that PCBs are toxic, and Environment Canada is working on revisions to CEPA that would further strengthen controls over all PCBs in service or in storage anywhere in Canada.

The Government has also established regulations regarding hazardous wastes and has signed a number of international agreements, such as the Canada-US Agreement on PCBs, and the Basel Convention, which are all aimed at the safe use, storage, transport and disposal of PCBs, both nationally and internationally.

In addition, Health Canada continues to monitor the amount of PCBs in food, air and water to ensure that Canadians are not exposed to levels that pose a health risk. Health Canada also tracks and assesses ongoing research about the health effects of exposures to PCBs.

Need More Info?

For more information, contact:

Health Canada's Management of Toxic Substances Division
Room 128, Building #8
Tunney's Pasture
Ottawa, ON K1A 0L2
(613) 957-3127

Also, see the following on Health Canada's Web site:

Food safety and PCBs found in fish at
http://www.hc-sc.gc.ca/ahc-asc/media/nr-cp/2004/2004_pcb-bpc_e.html

Qs & As on PCBs in salmon and food safety at
http://www.hc-sc.gc.ca/ahc-asc/media/nr-cp/2004/2004_pcb-bpcbk1_e.html

Canadian Total Diet Study at
http://www.hc-sc.gc.ca/fn-an/surveill/total-diet/index_e.html

Advisory – Potential health hazard from burning wood and other materials coated with paint containing PCBs at :
http://www.hc-sc.gc.ca/ahc-asc/media/advisories-avis/2000/2000_88_e.html

It's Your Health – Dioxins and Furans at :
http://www.hc-sc.gc.ca/iyh-vsv/environ/dioxin_e.html

It's Your Health – Human Health and the Canadian Environmental Protection Act (CEPA): An Overview at :
http://www.hc-sc.gc.ca/iyh-vsv/environ/cepa-lcpe_e.html

See also:

Environment Canada's PCB Web site at http://www.ec.gc.ca/pcb/eng/index_e.htm

For additional articles on health and safety issues, go to the It's Your Health Web site at www.healthcanada.gc.ca/iyh

You can also call toll free at 1-866-225-0709
or TTY at 1-800-267-1245*

Catalogue # H50-3/92-2005E-PDF
ISBN # 0-662-41986-3

Original: November 2001 Updated: October 2005

Canada