



IT'S YOUR HEALTH



Mercury and Human Health

The Issue

Although mercury is released naturally from rocks, soil and volcanoes, human activities have boosted levels in the atmosphere. Canadians can be exposed to mercury from many sources, including food and the use of dental amalgam fillings.

Background

Mercury is used in, and released from, a variety of industrial processes and commercial products. Since the 1970s, environmental concerns have resulted in a reduction in the use and processing of mercury around the world.

Mercury exists in three different forms:

- Elemental mercury — this silvery, shiny, volatile liquid gives off a colourless, odourless vapour at room temperature
- Inorganic mercury — compounds formed when elemental mercury combines with other elements such as sulphur, chlorine or oxygen to create compounds known as mercury salts
- Organic mercury — compounds, such as methyl mercury, that are formed when elemental mercury combines with carbon

Mercury is a global contaminant because it is toxic, does not break down in the environment and can build up in living things. In its vapour form, mercury can be carried long distances on wind currents, staying in the atmosphere for long periods of time.

Mercury can change from one form to another in the environment. For example, some types of bacteria and fungi can change mercury into its most toxic form, methyl mercury. Methyl mercury tends to accumulate to some degree in all fish, but especially in predatory fish such as shark, swordfish, certain species of tuna (which are generally sold fresh or frozen), escolar, marlin and orange roughy, as well as in marine mammals. Predatory freshwater fish such as pike, bass and walleye may also have elevated methyl mercury levels. Since fish is also an excellent source of high-quality protein and omega-3 fatty acids and is low in saturated fat, the benefits and risks of eating fish must be considered carefully.

Sources of Mercury

Mercury comes from a range of natural sources such as volcanoes, soils, undersea vents, mercury-rich geological zones and forest fires, as well as from fresh water lakes, rivers and the oceans. However, human activity has increased the amount of mercury in the environment in several ways, including through a variety of combustion and industrial processes like

coal-fired power generation, metal mining and smelting and waste incineration.

Mercury is also leached from flooded soil at new hydroelectric dam sites, or from any flooded area. This process can add to mercury levels in freshwater aquatic food chains in those areas.

Products such as button batteries, fluorescent tube lights, fever thermometers, thermostats, switches and relays, barometers and dental fillings may contain mercury; however, mercury-free alternatives exist in most cases. Highly diluted quantities of mercury are used in some homeopathic medicines. However, when prepared according to regulated manufacturing practices, mercury in homeopathic medicines is considered safe. Mercury is also used in various traditional medicines from around the world. Disposing of these products can cause mercury to leach from landfills or be emitted from burning waste, adding to the amount of mercury in the environment.

Because mercury is toxic and has an impact on human and environmental health, even small mercury spills should be considered hazardous and cleaned up with caution. Liquid elemental mercury, commonly found in household thermometers, thermostats and barometers, quickly forms a poisonous, colourless and odourless vapour when spilled. If inhaled, this vapour is rapidly absorbed through the lungs. Children are especially at risk because mercury vapours, which are heavier than air, often linger near the floor where children crawl and play. Your local public health office can give you information on how to clean up small mercury spills.

Health Effects of Mercury Exposure

The health effects of mercury exposure depend on its chemical form (elemental, inorganic or organic), the route of exposure (inhalation, ingestion or skin contact), and the level of

exposure. Vapour from liquid elemental mercury and methyl mercury are more easily absorbed than inorganic mercury salts and can, therefore, cause more harm. You should try to reduce your exposure to all forms of mercury whenever possible.

Elemental Mercury

The health effects of elemental mercury depend on the length and type of exposure. For example, if you were to accidentally swallow liquid elemental mercury from a broken fever thermometer, little mercury would be absorbed. However, if you were to inhale the vapour from that mercury spill, it would be more easily absorbed into your body, potentially causing health problems. At higher concentrations, mercury vapour can cause damage to the mouth, respiratory tract and lungs, and can lead to death from respiratory failure. Long-term exposure to low concentrations causes symptoms similar to those of methyl mercury.

Inorganic Mercury Compounds

Inorganic mercury can cause kidney failure and gastrointestinal damage. Mercury salts are irritating, and can cause blisters and ulcers on the lips and tongue. Rashes, excessive sweating, irritability, muscle twitching, weakness and high blood pressure are other symptoms of elevated exposures.

Organic Mercury Compounds (such as Methyl mercury)

Mercury can change from one form to another in the environment. Methyl mercury tends to accumulate to some degree in all fish, but especially in the predatory fish noted above. Methyl mercury is absorbed through the digestive tract and distributed throughout the body. It readily enters the brain, where it may remain for a long period of time. In a pregnant woman, it can also cross the placenta into the fetus, building up in the fetal brain and other tissues. Methyl mercury can also be passed to the infant through breast milk.

A child's developing nervous system is particularly sensitive to methyl mercury. Depending on the level of exposure, the effects can include a decrease in I.Q., delays in walking and talking, lack of coordination, blindness and seizures. In adults, extreme exposure can lead to health effects such as personality changes, tremors, changes in vision, deafness, loss of muscle coordination and sensation, memory loss, intellectual impairment, and even death.

The Risks of Mercury Poisoning

In general, Canadians are not at risk from mercury poisoning. However, people exposed to elevated levels of mercury may experience health problems ranging from rashes to birth defects, even death in cases of extreme poisoning.

People who consume large amounts of fish, marine mammals and wild game as part of their daily diet increase their risk. The developing fetus and children of women who have consumed large amounts of fish and marine mammals during pregnancy are the most susceptible to health problems. However, exposure to methyl mercury from fish consumption is generally so low that it is difficult to measure any potential adverse health effects, even when using very sensitive methods to analyse changes in cognitive skills. Any such health effects may be offset by the nutritional benefits of fish consumption. Children, who tend to put things in their mouths, may increase their intake of mercury through soil and contaminated objects.

In regions such as the Arctic, the traditional diet may include large quantities of fish and/or marine mammals at certain times of the year. However, this traditional diet has many nutritional and socio-cultural benefits, which must be weighed against the potential risks.



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If you are concerned about mercury exposure, samples of hair, blood and urine can be taken in a doctor's office or health clinic and tested.

Minimizing Your Risk

Elemental mercury from dental fillings does not generally pose a health risk. There is, however, a fairly small number of people who are hypersensitive to mercury. While Health Canada does not recommend that you replace existing mercury dental fillings, it does suggest that when the fillings need to be repaired, you may want to consider using a product that does not contain mercury.

Pregnant women, people allergic to mercury and those with impaired kidney function should avoid mercury fillings. Whenever possible, amalgam fillings should not be removed when you are pregnant because the removal may expose you to mercury vapour. When appropriate, the primary teeth of children should be filled with non-mercury materials.

Follow Health Canada's fish consumption advice in order to enjoy the health benefits of eating fish while controlling exposure to mercury. Predatory fish such as shark, swordfish, fresh and frozen tuna, escolar, marlin and orange roughy have higher levels of mercury and should be consumed only occasionally. Certain groups (young children, women who are or may become pregnant) should also limit their consumption of canned albacore (white) tuna. There are no recommended restrictions for other types of retail fish and Canada's Food Guide provides examples of healthy fish choices. See the Need More Info? section below for links

to Health Canada's advice on fish consumption.

Also, consult your provincial or territorial government for any sport fish advice if you consume fish caught from local waters.

The Government of Canada's Role

The Government of Canada is working in a number of areas to reduce the use and release of mercury into the environment. In 2000, the Canadian Council of Ministers of the Environment developed several Canada-wide standards to reduce mercury release to the environment. Standards have been, or are being, developed for certain mercury-containing products and for mercury emissions from selected industries. The Government has also helped set up the Northern Contaminants Program and the National First Nations Environmental Contaminants Program.

In addition, Health Canada specifies and enforces limits for mercury in homeopathic medicines, traditional medicines, and all other finished natural health products. Health Canada also establishes science-based standards for mercury in retail fish and issues retail fish consumption advisories. The Canadian Food Inspection Agency enforces Health Canada's standards for mercury in retail fish.

Although Canada will continue to reduce mercury releases, efforts must also be made elsewhere. Much of the mercury deposited on our lakes and soil comes from other countries. Canada is taking an

active role in regional and international efforts to reduce mercury in the environment globally. The Government is working with the USA and Mexico through the North American Commission for Environmental Cooperation to address mercury issues under the North American Regional Action Plan on Mercury.

Need More Info?

See the following Health Canada Web sections:

Mercury in Fish - Consumption Advice: Making Informed Choices about Fish at:
www.hc-sc.gc.ca/fn-an/securit/chem-chim/environ/mercur/cons-adv-etud-eng.php

Eating Well with Canada's Food Guide, at:
www.healthcanada.gc.ca/foodguide

Healthy Pregnancy, at:
www.hc-sc.gc.ca/hl-vs/preg-gros/index-eng.php

The Safety of Dental Amalgam, at:
www.hc-sc.gc.ca/dhp-mps/md-im/applic-demande/pubs/dent_amalgam-eng.php

National First Nations Environmental Contaminants Program, at:
www.hc-sc.gc.ca/fniah-spnia/pubs/services/_home-domicile/2000_cp-pc_rev-exam/20_prog_en_viro_contam-eng.php

Mercury, Your Health and the Environment, at:
www.hc-sc.gc.ca/ewh-semt/pubs/contaminants/mercur/index-eng.php

Also, visit the following Environment Canada Web sections:

Mercury and the Environment at:
www.ec.gc.ca/MERCURY/EN/index.cfm

Mercury and the Environment - Fish Consumption, at:
www.ec.gc.ca/MERCURY/EN/fc.cfm

Cleaning up Small Mercury Spills, at:
www.ec.gc.ca/MERCURY/EN/cu.cfm?

For additional information, go to: United Nations Environment Program at: www.unep.org

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*