



## Mercury

Mercury is an element and a metal that is found in air, water, and soil. It exists in three forms that have different properties, usage, and toxicity. The three forms are called elemental (or metallic) mercury, inorganic mercury compounds, and organic mercury compounds.

**Elemental mercury** is liquid at room temperature. It is used in some thermometers, dental amalgams, fluorescent light bulbs, some electrical switches, mining, and some industrial processes. It is released into the air when coal and other fossil fuels are burned.

**Inorganic mercury compounds** are formed when mercury combines with other elements, such as sulfur or oxygen, to form compounds or salts. Inorganic mercury compounds can occur naturally in the environment. Inorganic mercury compounds are used in some industrial processes and in the making of other chemicals. Outside the United States, inorganic mercury salts have been used in cosmetic skin creams.

**Organic mercury compounds** are formed when mercury combines with carbon. Microscopic organisms in water and soil can convert elemental and inorganic mercury into an organic mercury compound, methylmercury, which accumulates in the food chain. Thimerosal and phenylmercuric acetate are other types of organic mercury compounds made in small amounts for use as preservatives.

### How People Are Exposed to Mercury

**Elemental mercury:** People may be exposed when they breathe air containing elemental mercury vapors. Vapors may be present in such workplaces as dental offices, smelting operations, and locations where mercury has been spilled or released. In the body, elemental mercury can be converted to inorganic mercury.

**Inorganic Mercury:** People may be exposed if they work where inorganic mercury compounds are used.

**Organic Mercury:** People may be exposed when they eat fish or shellfish contaminated with methylmercury. Methylmercury can pass through the placenta, exposing the developing fetus.

### How Mercury Affects People's Health

**Elemental mercury:** The human health effects from exposure to low environmental levels of elemental mercury are unknown. Very high mercury vapor concentrations can quickly cause severe lung damage. At low vapor concentrations over a long time, neurological disturbances, memory problems, skin rash, and kidney abnormalities may occur.

**Inorganic Mercury:** When eaten in large amounts, some inorganic mercury compounds can be very irritating and corrosive to the digestive system. If repeatedly eaten or applied to the skin over long period of time, some inorganic mercury compounds can cause effects similar to what is seen with long term mercury vapor exposure, including neurological disturbances, memory problems, skin rash, and kidney abnormalities.

**Organic Mercury:** Large amounts of methylmercury eaten over weeks to months have caused damage to the nervous system. Infants born to women who were poisoned with methylmercury had developmental abnormalities and cerebral palsy.

### **Levels of Mercury in the U.S. Population**

In the *Fourth National Report on Human Exposure to Environmental Chemicals (Fourth Report)*, CDC scientists measured total mercury in the blood of 8,373 participants aged one year and older who took part in the National Health and Nutrition Examination Survey (NHANES) during 2003–2004. Total blood mercury is mainly a measure of methyl mercury exposure. In the same 2003–2004 NHANES, CDC scientists measured mercury in the urine of 2,538 participants aged six years and older. Mercury in the urine is a measure of inorganic mercury exposure. By measuring mercury in blood and in urine, scientists can estimate the amount of mercury that has entered people's bodies.

- CDC scientists found measureable mercury in most of the participants. Both blood and urine mercury levels tend to increase with age.
- Defining safe levels of mercury in blood continues to be an active research area. In 2000, the National Research Council of the National Academy of Sciences determined that a level of 85 micrograms per liter ( $\mu\text{g/L}$ ) in cord blood was associated with early neurodevelopmental effects. The lower 95% confidence limit of this estimate was 58  $\mu\text{g/L}$ . All blood mercury levels for persons in this *Report* were less than 33  $\mu\text{g/L}$ .
- Blood and urine mercury in the U.S. population were similar to levels seen in other developed countries.

Finding a measurable amount of mercury in blood or urine does not mean that levels of mercury cause an adverse health effect. Biomonitoring studies on levels of mercury provide physicians and public health officials with reference values so that they can determine whether people have been exposed to higher levels of mercury than are found in the general population. Biomonitoring data can also help scientists plan and conduct research about exposure and health effects.

### **For More Information:**

- Agency for Toxic Substances and Disease Registry  
**A Warning about Continuing Patterns of Metallic Mercury Exposure**  
<http://www.atsdr.cdc.gov/alerts/970626.html>

## **ToxFAQs for Mercury**

<http://www.atsdr.cdc.gov/cabs/mercury/index.html>

- CDC Emergency Preparedness and Response  
**Mercury**  
<http://emergency.cdc.gov/agent/mercury/>
- Environmental Protection Agency  
**Mercury: Basic Information**  
<http://www.epa.gov/mercury/about.htm>
- Food and Drug Administration  
**What You Need to Know About Mercury in Fish and Shellfish**  
<http://www.fda.gov/Food/FoodSafety/Product-SpecificInformation/Seafood/FoodbornePathogensContaminants/Methylmercury/ucm115662.htm>

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The Centers for Disease Control and Prevention (CDC) protects people's health and safety by preventing and controlling diseases and injuries; enhances health decisions by providing credible information on critical health issues; and promotes healthy living through strong partnerships with local, national, and international organizations.