

Metallic Mercury - ToxFAQs™

Under the authority of the Superfund Amendments and Reauthorization Act of 1986 (SARA), the Agency for Toxic Substances and Disease Registry (ATSDR) works to prevent or mitigate adverse human health effects and diminished quality of life resulting from exposure to hazardous substances in the environment. To do this, ATSDR provides expert support to federal, state, and local health officials. ATSDR also provides information concerning chemical hazards to primary care physicians and individual citizens upon request.

HIGHLIGHTS: Mercury is a naturally-occurring element. The simplest form of mercury is metallic, or liquid, mercury. It is used in a number of products sold commercially, as well as in some medical devices and industrial processes. While this form of mercury is not readily absorbed into the human body by touch or through the digestive tract, it does vaporize at room temperatures and inhalation of these vapors can be harmful to your health. If spilled in the home, metallic mercury can pose a danger to you and your family if not properly cleaned up and removed.

What is metallic mercury?

Mercury is a naturally occurring metal. It is the only metal on earth which is liquid at room temperatures. Metallic mercury is the pure form of mercury. It is a shiny, silver-white, odorless liquid, much heavier than water. Metallic mercury is used in oral thermometers, barometers, sphygmomanometers (devices used to test blood pressure), wall thermostats for heating and cooling, fluorescent light bulbs/tubes, some batteries, electric light switches, some indoor gas meter regulators (in houses built before the 1960's), and for a variety of other purposes. It is also used in some ethnic religious and cultural practices, and is the form of mercury that is commonly used in middle and high school chemistry labs. Metallic mercury is the form of mercury that many adults remember rubbing on coins as children to make them shine; and it is because of this practice that many people do not realize the true danger of being exposed to metallic mercury. It is truly a "wolf in sheep's clothing."

How can I be exposed to metallic mercury?

People can be exposed to metallic mercury when glass thermometers or other devices containing mercury are broken, or when mercury is brought into the home (most often by children) from schools, abandoned industrial sites, or other sites where it may be stored. If not promptly and properly cleaned up and disposed of, it can be spread by walking (tracking), sweeping, or vacuuming, thereby presenting a potential health threat. Tracking throughout the house or into automobiles or school buses has spread mercury contamination in many instances in the past.

While the health risk is not great at the time of a spill, it will increase over time if the mercury is not properly removed. At air temperatures found in homes, mercury evaporates slowly. Mercury vapors are heavier than air and tend to remain near the floor or mercury source, but can get into the ventilation system and be spread throughout the

home. Outdoors, mercury vapors tend to go away quickly, but indoors (particularly with windows closed), mercury vapors will accumulate in the air. People can absorb metallic mercury into their bodies when they breathe the vapors. Because of the amount of time spent at home, this means of exposure to mercury can be a concern, especially for young children and pregnant women.

How can mercury enter my body?

Metallic mercury is absorbed into the body primarily by breathing the airborne vapors. Metallic mercury cannot go through intact skin very well, so touching the beads is less of a problem than breathing the vapors. If you swallow the metal mercury (which is certainly not recommended), it passes through your body almost completely without being absorbed. Therefore, in almost all circumstances, breathing the mercury vapors in the air is the only real source of entry of metallic mercury into the human body.

How can metallic mercury affect my health?

The nervous system is sensitive to metallic mercury. Exposure to very high levels of metallic mercury vapor can cause brain, kidney, and lung damage and may seriously harm a developing fetus. Exposure to mercury vapor concentrations high enough to produce such serious effects might also cause coughing, chest pains, nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation. Exposure to lower levels of airborne mercury for prolonged periods of time would produce more subtle effects, such as irritability, sleep disturbances, excessive shyness, tremors, coordination problems, changes in vision or hearing, and memory problems. Most of the effects of mercury resulting from prolonged lower-level exposure are reversible, once exposure is terminated and the mercury has left your body.

Metallic Mercury

How can mercury affect children?

Very young children are more sensitive than adults to the effects of mercury. Children 5 years of age and younger are considered to be particularly sensitive to the effects of mercury on the nervous system, since their central nervous system is still developing.

Some children exposed to high mercury vapor levels develop a reversible condition called acrodynia, in which the palms of the hands and soles of the feet often become reddened and tender, before beginning to peel. Children with acrodynia may also have mood swings, increased irritability, difficulty sleeping, and muscle or joint pains. Exposure levels high enough to cause acrodynia might also cause coughing or pain in the chest area. Acrodynia is usually, but not always, associated with urine mercury concentrations of 100 micrograms (or more) of mercury per liter of urine.

When pregnant women are exposed to mercury, the mercury can pass from the mother's body to the developing fetus; it can also be passed to a nursing infant through breast milk. However, since breast feeding itself has significant health benefits, a physician should be consulted before stopping breast feeding because the mother may have been exposed to mercury.

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

Tests are available to measure mercury levels in the body. Blood or urine samples are used to test for exposure to metallic mercury. Once exposure has stopped, the mercury level in the blood begins to drop rapidly, so blood tests are useful only for continuing or very recent exposures. Blood mercury levels in the general U.S. population are usually less than 5 micrograms of mercury per liter of whole blood, but blood mercury levels are not considered a good predictor of toxic effects. Since the metallic mercury that is absorbed into the body is excreted almost exclusively in the urine, urine samples provide the best indicator of exposure to this form of mercury. Urine samples may be either collected over a 24-hour period, or may be taken once (preferably soon after awakening in the morning) and adjusted for a substance called creatinine, which occurs naturally in the urine. Urine mercury concentrations over

10 micrograms per liter would indicate that a person has been exposed to higher mercury levels than the average population. However, that does not imply that health effects will necessarily result.

What should I do if I break a thermometer or find mercury spilled in my home?

There are a number of methods that you can use to deal with a broken thermometer or if you discover metallic mercury in your home. In general, the process is to first remove as much liquid mercury as you can and then try to remove any vapors.

However, in no case should a broom or vacuum cleaner be used to remove liquid mercury.

The following excerpt from the joint ATSDR and EPA National Alert on Continuing Patterns of Metallic Mercury Exposure discusses cleanup. First, remove children from the area of the spill. Clean up the bead of metallic mercury by carefully rolling it onto a sheet of paper or sucking it up with an eye dropper. After picking up the metallic mercury, put it into a plastic bag or airtight container. The paper or eye dropper should also be bagged and disposed of properly, according to guidance provided by environmental officials or your local health department. Try to ventilate the room to the outside and close it off from the rest of the home. Use fans to speed the ventilation. If larger amounts of metallic mercury are found (for example, a jar), make sure that the metallic mercury is in an airtight container and call your local health department for instructions in how to safely dispose of it.

If the larger amount is spilled, leave the area and contact your local health department and fire authorities. Do not simply throw it away, but instead seek professional guidance.

There are a lot of other sources that describe how to do cleanups, including perhaps your local health or environmental authorities or poison control center. Some communities have kits with instructions available in retail outlets, usually hardware or home improvement stores. Detailed instructions are available on the Internet from various sources. One resource you could try is Health Care Without Harm at: Health Care Without Harm, Center for Health, Environment and Justice, P.O. Box 6806, Falls Church, VA 22040. Phone: 1-703-237-2249. E-mail: noharm@iatp.org. Internet: <http://www.noharm.org>.

Where can I get more information?

For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30329-4027.

Phone: 1-800-232-4636.

ToxFAQs™ Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaqs/index.asp>.

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.