Mercury and its Many Forms

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Broken thermometers are the cause of numerous calls to the Poison Center. Thermometers with a silver line contain elemental mercury. Thermometers with a red or blue liquid do NOT contain mercury.

There is much misinformation about mercury, its various forms and its dangers. Three different types of mercury exist, varying in their levels of toxicity. They are elemental mercury, inorganic mercury and organic mercury.

■ **Elemental mercury**

Mercury is an extremely heavy, odorless, silver colored liquid. Mercury exists as a natural element in the earth's crust. Elemental mercury is also known as metallic mercury, liquid mercury, liquid silver and quicksilver.

■ **What are sources of exposure to elemental mercury?**

Sources of elemental mercury in the home include broken mercury thermometers, broken fluorescent light bulbs, dental amalgam fillings, mercury containing latex paints, extraction of gold from ore using mercury, and contaminated clothing from workers in thermometer making plants. Elemental mercury is also used as a Mexican folk medicine to treat "empacho," a chronic stomach disorder.

■ **How toxic is elemental mercury?**

Of all the forms of mercury, elemental mercury is the most commonly swallowed form of mercury, usually from a broken thermometer. Fortunately, elemental mercury from a thermometer is not absorbed from the stomach and will not cause any poisoning in a healthy person.

In a healthy person, the slippery swallowed mercury will roll into the stomach, out in to the bowels and will be quickly eliminated without causing any symptoms. A person with severe inflammatory bowel disease or those with a fistula (hole or opening) in their gut may have problems with mercury if it is not all cleared out, resulting in prolonged exposure.

Handling liquid mercury for a very short period of time usually does not result in any problems. An allergic rash is possible, though. Mercury is not well absorbed across the skin so skin contact is not likely to cause mercury poisoning, especially with a brief one-time exposure. Even if a person has cuts in their skin, mercury is too heavy to be contained by a cut. Merely washing the wound well will wash the mercury out of the wound.

■ **Can elemental mercury be dangerous?**

Inhalation of elemental mercury vapors is the main cause of toxicity, as mercury is well absorbed by the lungs. To develop problems by inhalation you need either a large one-time exposure or a long-term exposure. A small, one-time exposure is not likely to cause problems.

■ **What are the symptoms?**

After a large, one-time inhalation exposure of mercury vapor, the lungs are the main target of mercury poisoning, although other symptoms develop as well.

Symptoms may develop within a few hours and include chills, metallic taste, mouth sores, swollen gums, nausea, vomiting, abdominal pain, diarrhea, headache, weakness, confusion, shortness of breath, cough, chest tightness, bronchitis, pneumonia and kidney damage.

**How does long-term exposure differ from a short-term exposure?**

Long-term exposure (usually work-related) of inhaled vapors is generally more dangerous than a one-time short exposure. After long-term inhalation exposure, the nervous system is the main target of toxicity. Symptoms may occur within weeks but usually develop insidiously over a period of years.

Neurologic symptoms include tremors, headaches, short-term memory loss, incoordination, weakness, loss of appetite, altered sense of taste and smell, numbness and tingling in the hands and feet, insomnia, and excessive sweating. Psychiatric effects are also seen after long-term exposure.

Acrodynia can result from repeated exposures to mercury-containing latex paint fumes. Acrodynia is usually seen in younger children. The symptoms include chills, sweating, body rash, irritability, sleeplessness, leg cramps, swelling of the cheeks, nose, hands and feet, light-sensitivity to the eyes and peeling skin layers on the palms of the hands and soles of the feet.

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**Inorganic Mercury**

Inorganic mercury compounds are known as "mercuric salts." Some of the mercuric salts include: mercuric chloride, mercuric iodide, mercuric nitrate, mercuric sulfide, yellow mercuric oxide, red mercuric oxide, ammoniated mercury, mercurous chloride and mercurous acetate.

**What are sources of inorganic mercury compounds?**

Some folk medicines from outside the United States contain high amounts of mercury that can cause mercury poisoning. Two common mercury compounds are calomel and cinnabar.

**Chinese herbal drugs with measurable amounts of mercury include:**

- Tse Koo Choy
- Qing Fen
- Zhu-Sha
- Chen-Fen

**Chinese herbal ball preparations containing both mercury and arsenic include:**

- An Gong Niu Huang Wan
- Da Huo Luo Wan
- Dendrobium Moniliforme Night Sight pills
- Niu Huang Chiang Ya Wan
- Niu Huang Chiang Hsin Wan
Indian and Mexican folk medications containing mercury include:

- Creme de Belleza-Manning
- Tainan
- Ping-tong
- Sin-chu

What are the symptoms of inorganic mercury poisoning?

Inorganic mercuric salts are corrosive and they damage the kidneys. Following ingestion, symptoms include nausea, vomiting blood, burns and tissue death in the throat and stomach, abdominal pain, bloody diarrhea, decreased urination and kidney failure.

Long-term application of mercury-containing substances causes skin redness and staining of the skin. More severe symptoms include nerve damage resulting in weakness, numbness and tingling.

Organic Mercury

What are sources of organic mercury?

Organic mercury compounds are found in a variety of products. They are used medically as fungicides and antibacterials. The most common organic mercury compounds in the home may well be mercurochrome (merbromin) and merthiolate (thimerosal), two common antiseptics. Fortunately, small ingestions by children rarely cause major problems.

What is the most common source of organic mercury poisoning?

In the general population, the main source of mercury poisoning is the ingestion of mercury-contaminated food, usually fish. When lake, river or ocean water is contaminated with methyl-mercury compounds, the mercury accumulates and magnifies in the flesh of the fish. Organic mercury concentrations can be more than 1,000 times greater in the fish than in the surrounding water. People who eat fish as a main component of their diet may be at risk. If a river or lake is known to be polluted with mercury, fish eaters are warned to decrease their weekly intake of fish.

What are the signs and symptoms of organic mercury poisoning?

Organic mercury compounds are very damaging. They are toxic by ingestion, inhalation, and skin and eye contact. These mercury compounds can attack all body systems. They can cause nausea, vomiting, lack of appetite, weight loss, abdominal pain, diarrhea, kidney failure, skin burns and irritation, respiratory distress, swollen gums and mouth sores, drooling, numbness and tingling in the lips, mouth, tongue, hands and feet, tremors and incoordination, vision and hearing loss, memory loss, personality changes and headache. Allergic reactions can also occur.

Methyl-mercury, usually from contaminated food, is very dangerous to pregnant women.
Methyl-mercury causes profound mental retardation, cerebral palsy, seizures, spasticity, tremors, and incoordination, along with eye and hearing damage in the unborn baby as a result of the mother's exposure. Organic mercury passes into the breast milk as well.

**How is mercury poisoning diagnosed and treated?**

Because the number of symptoms is so great and the variety of symptoms is so wide, anyone could pick out at least 2 or 3 symptoms at any given time. If you have any doubt and if you have been or are exposed to mercury compounds, see a physician and get tested. Testing is the only definite way to determine if mercury is the cause of the symptoms.

Mercury poisoning can be diagnosed by special blood and urine collection tests. If levels are high, there is treatment. Medication can be administered to help bind the mercury and increase elimination. Symptoms do not always correspond to blood mercury levels: Many patients with high levels do not have severe symptoms.

If mercury blood levels are going to be tested, it is important NOT to eat any seafood products for at least 30 hours before testing. Even a single meal of seafood can elevate mercury blood levels for as long as 20 to 30 hours after eating. Eating seafood will cause misleading high levels.

**How do I clean up a small spill of elemental mercury?**

Many people have called the Poison Center asking how to clean up the mercury from a broken thermo-meter. There are several different ideas on how and how not to clean up the mercury beads. Experts agree on the ways NOT to clean up a spill:

- Do not sweep the area with a broom. Sweeping breaks the mercury into smaller droplets, further contaminating the room and the broom.
- Vacuuming vaporizes the mercury and increases the concentration of mercury in the air.

**NOTE:** If you are wearing gold jewelry, either remove the jewelry or wear good protective gloves. If the liquid mercury contacts the gold jewelry, the mercury bonds permanently to the gold and ruins it.

**How to safely and correctly clean up a small spill is more complicated**

**Step One:** Using a playing card, credit card or stiff piece of paper, gather up, scrape up or roll up the beads of mercury into one big bead or ball.

**Then, several cleanup options are available:**

- **Option A:** Using an eyedropper or other squeeze-bulb dropper, carefully suck the mercury droplets up.
- **Option B:** Using a common penny, dip the penny into the mercury and let the mercury adhere or bond to the penny. This may require more than one penny.
- **Option C:** Using duct (duck) tape, place the tape over the mercury ball or beads and lift the mercury off the surface.
Step Two: Place the mercury beads, mercury-coated pennies, or tape with the mercury beads into a zip-lock plastic bag. Seal the bag securely, tape it shut, wrap it in newspaper and dispose properly.

Two other, more complicated ways for cleaning up small spills require the use of granular zinc or sulfur powder. Granular zinc can be obtained from scientific supply houses and sulfur powder can be obtained at garden supply shops.

NOTE: It is important to know that using zinc granules will permanently stain carpets a dark gray that cannot be removed. Sulfur may stain carpets black, but this can often (but not always) be removed with carpet stain cleaners.

Step One: Dust on the zinc or sulfur powder and rub in well with a disposable whisk broom.

Step Two: Sweep up as much of the mixture as possible with the whisk broom.

Step Three: Vacuum up the residual matter with a vacuum cleaner and immediately discard the vacuum cleaner bag.

Step Four: If any mercury beads remain, repeat the process until none is present.

Step Five: Discard the whisk broom after use.

Regardless of the method used for cleanup, there is very little risk of danger if the area is well ventilated. A spill of a large amount of mercury that is not immediately cleaned up can present a problem as the mercury vaporizes and is breathed in by family members.

Call: 1-800-876-4766
anytime, anyplace in California
California Poison Control System