

# Thermometer Fact Sheet

## What is the problem with mercury fever thermometers?

Very small amounts of mercury can do significant damage. One gram of mercury is enough to contaminate all the fish in a lake with a surface area of 20 acres. A typical mercury thermometer contains approximately 0.7 grams of mercury (700 milligrams), but larger thermometers can contain as much as three grams. Both short term and long term exposure to mercury can cause serious health problems for humans and wildlife.

## How toxic is mercury?

Mercury affects the nervous system and can impair the way we hear, talk, see, walk, feel and think. Humans are exposed to mercury through contaminated air, water or food or directly through the skin. In fact, long before we had scientific facts to prove mercury's toxicity, there was evidence that mercury poisoning resulted in nerve damage. In the 1800's hat makers were exposed to mercury during the wool felting process. The strange and unpredictable behavior of Lewis Carroll's "Mad Hatter" in Alice of Wonderland was a portrayal of hat makers who had gone "mad" from mercury poisoning.

## Does one broken fever thermometer really pose a health risk to the consumer?

Yes, it can if not cleaned up properly. Every year, there are 15,000 phone calls to poison control centers about broken mercury thermometers. When a mercury thermometer breaks, the liquid silver-colored metal can spill onto the floor or carpet. Breaking one fever thermometer is unlikely to threaten the health of the consumer if the spilled mercury is cleaned up properly. However, if the consumer fails to clean up mercury either because he or she is unaware that it has broken or because it is difficult to gain access to the mercury (for instance because it has seeped

through a carpet), then the mercury will eventually evaporate into the air and reach dangerous levels in indoor air. The risks increase if the consumer attempts to clean up a mercury spill with a vacuum cleaner, or if the mercury is heated. The danger of significant mercury exposure is greatest in a small, poorly ventilated room.

## Actual Case Studies<sup>1</sup>

- In one case, exposure resulted when 1.1 grams of mercury from a broken fever thermometer were collected and placed in a pan that was laid on a hot kitchen stove. As a result, the mercury vaporized quickly. Two elderly patients developed severe pulmonary edema, diarrhea, confusion, tremors, and coma, and died after 7 and 17 days of hospitalization. A third patient developed a skin rash that cleared up after 3 weeks.
- Another case involved a 32 month-old girl who was afflicted by hypertension, irregular heartbeat, apathy, irritability, excessive sweating and acrodynia as the result of exposure to mercury spilled from a broken thermometer onto carpet. Three months of treatment were required before her condition improved.
- Three children, ranging in ages from 20 months to six years old, were exposed to mercury from a thermometer that had been spilled on a carpet. They developed symptoms including loss of appetite and weight loss; sensitivity to light; pink, sweating, and scaling palms; eczema and itching. The two more severely affected children required four months of therapy before complete recovery.

## Do fever thermometers really contain enough mercury to affect the environment?

Yes. If you dispose of a mercury thermometer in your regular garbage and that trash is burned in an incinerator, mercury vapors will be released into

the air. Mercury from landfilled garbage can seep into groundwater or can be released into the air as a toxic vapor. Airborne mercury eventually falls to earth, often into rivers and lakes, where microorganisms transform the mercury into a highly toxic form called methylmercury. Methylmercury builds up in aquatic animals, including fish. It accumulates in muscle tissue, and so, unlike some other pollutants, it cannot be trimmed away when cooking the fish. All five Great Lakes and over 2500 North American lakes contain fish consumption warnings due to mercury contamination. Mercury poses the greatest threat to people who eat large amounts of contaminated fish. For pregnant women, eating contaminated fish poses a special risk because mercury crosses the placenta into the developing child.

While the amount of mercury in an individual thermometer may seem small, the total amount contained in all thermometers is significant. The United States Environmental Protection Agency considers mercury thermometers one of the largest sources of mercury to the solid waste stream, estimated at 17 tons per year. Clearly, thermometers are a meaningful source of mercury to the environment that can be easily reduced by switching to non-mercury thermometers.

### What happens if a mercury fever thermometer breaks in a child's mouth?

It is also common for children to break fever thermometers in their mouths. Mercury that is swallowed poses a low risk in comparison with the risk of breathing mercury vapor. The mercury passes through the body and is minimally absorbed, but it will contaminate the environment when it enters the waste water system.

### What are the alternatives to mercury thermometers?

Several types of non-mercury thermometers are available commercially.

These include:

- Digital electronic thermometers
- Glass gallium-indium-tin (galinstan) thermometer
- Flexible forehead and ear canal thermometers

A recent statement by the American Medical Association indicated that non-mercury fever thermometers are adequate diagnostic tools.

### What are the risks that an alternative thermometer could poison the user?

There is no known or anticipated risk.

### What are the environmental consequences of non-mercury thermometers?

The known environmental damages caused by alternative thermometers are significantly less than those presented by mercury thermometers. The primary environmental concern arising from use of alternative thermometers relates to the disposal of button cell batteries used in digital electronic or ear canal thermometers. Button cell batteries used in digital thermometers contain significantly less mercury than a mercury thermometer—roughly 3.5 to 11 milligrams of mercury per battery.

When a mercury thermometer or a button cell battery is thrown away and burned in an incinerator, much of the mercury that it contains is likely to be emitted to the atmosphere. However, a mercury thermometer that breaks in the home, or that breaks in the solid waste system prior to burial in a landfill, will release significantly more of its mercury than will a button cell battery.

### Notes

1. See Environmental Protection Agency website: [www.epa.gov/glnpo/bnsdocs/hg/thermafaq.html](http://www.epa.gov/glnpo/bnsdocs/hg/thermafaq.html)



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