



# NEWSLETTER



LETTER FROM THE EDITOR

February 2024

Greetings!

The present, and final, PCPHCoP newsletter in the toxic metals series focuses on mercury. As the final newsletter in the series, it will conclude with the importance of poison center and public health collaboration to address toxic metal exposures.

Please let me know if you would like to hear more about a specific topic in future newsletters.

Sincerely,  
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## Mercury

**Mercury (Hg)** is a naturally occurring metal distributed throughout the earth's crust. It can be released into the environment by processes such as volcanic activity, weathering rocks, and anthropogenic processes.<sup>1</sup> Human activities, including using coal-powered power plants, burning residential coal, engaging in industrial processes, incinerating waste, and mining, are the leading causes of anthropogenic mercury emissions.<sup>1,2</sup>

Elemental mercury can evaporate, becoming a colorless, odorless, toxic vapor that can be inhaled. Atmospheric mercury (gaseous elemental mercury) is subject to long-range transport. Thus, it is ubiquitous in the environment and can be found in locations far away from its release site.<sup>1</sup> Mercury combined with other substances can form organic and inorganic compounds. Organic mercury compounds such as methylmercury can cause profound neurologic deficits that are usually permanent.<sup>1</sup>

### Forms of Mercury

**Elemental:** shiny, silver-white liquid at room temperature

**Organic:** mercury combined with carbon

**Inorganic:** mercury combined with other elements (e.g., sulfur or oxygen).



Credit: Getty Images

Human exposure to inorganic compounds is less common than exposure to organic and elemental mercury. However, acute ingestion of inorganic mercuric salts can cause life-threatening effects, including hemorrhagic gastroenteritis with severe fluid loss, shock, and kidney failure.<sup>1</sup>

## Historical and present-day use

There are many uses for mercury because of its unique properties. Because of the dangers of mercury, many uses have been eliminated or reduced over the past few decades.<sup>1</sup>



Credit: Getty Images

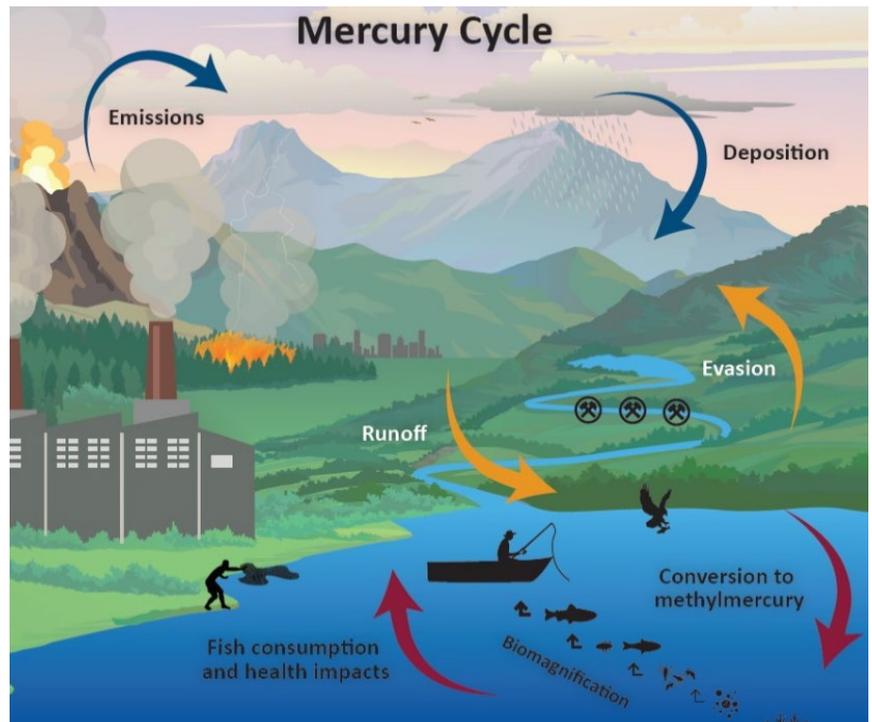
- Historical uses of mercury included the production of textiles and fabrics, explosives, and medications such as antibiotics and diuretics.<sup>1</sup>
- Mercury-containing products that have had production reduced or eliminated recently include alkaline batteries, electronic switches, pesticides, paints and pigments, thermometers, and other scientific and medical devices.<sup>1</sup>
- In 2019, the leading domestic users of mercury were industries involved in the production of chlorine-caustic soda, dental products, electronics, and fluorescent lighting. In 2020, one of the two chlorine-caustic soda production facilities in the United States converted to a mercury-free process.<sup>1</sup>

## Main sources of environmental contamination

While emissions have declined in the United States over the past few decades, anthropogenic mercury emissions have typically entered the atmosphere from mining ores and fossil fuel burning.<sup>1</sup> The disposal and incineration of mercury-containing products, such as dental amalgam, also causes environmental emissions.<sup>2,3</sup>

Atmospheric mercury can travel far and deposit on land and in bodies of water. Some deposited mercury will volatilize, pass off in vapor, back into the atmosphere. This makes it challenging to trace mercury to its original source.<sup>1</sup>

Deposits of mercury on land and water can contaminate plants and be ingested by animals. In bodies of water, elemental and inorganic mercury deposits can be converted by anaerobic bacteria to the organic form, methylmercury. Methylmercury is highly bioaccumulative and biomagnifies up the aquatic food chain.<sup>1</sup> Therefore, high levels of mercury can be detected in freshwater fish, marine fish, other aquatic organisms, and vegetation.<sup>1,4</sup>



[Mercury Cycle - National Park Service](#)

## Main sources of human exposure

Almost all people have small amounts of methylmercury in their bodies because of the widespread presence of it in the environment.<sup>5</sup>

**Food:** People may be exposed to organic mercury from dietary exposure to methylmercury. Regularly consuming fish and shellfish with high levels of methylmercury in their tissue can lead to chronic exposure in people.<sup>1,6</sup> Mercury is also found in foods grown in contaminated soils, such as collards, spinach, and rice.<sup>1</sup>



Credit: Getty Images

**Occupational:** Mercury is used in many production industries. People at risk of occupational exposure include those who work in

- mines where mercury was previously used and residues still exist,
- electrical equipment manufacturing facilities,
- fluorescent light bulb recycling facilities,
- automotive parts manufacturing facilities,
- healthcare services that use mercury-containing equipment, and
- dentistry where they may breathe in mercury vapors released from amalgam fillings.<sup>5,7</sup>



Credit: Getty Images

**Consumer products:** Certain mercury-containing products pose a risk if the mercury is released from the container through spills or breaks.<sup>5</sup> If not immediately cleaned up, the mercury can evaporate and become a colorless, odorless, toxic vapor. Only a few drops are needed to generate enough fumes to contaminate the air in a room.<sup>4</sup>

Spilled elemental mercury should never be vacuumed up, as it creates mercury vapor that can easily be inhaled.<sup>5</sup>

Historically it was not uncommon for children to break mercury thermometers in their mouths. Though such thermometers are not widely used today, they are still a potential source of exposure.<sup>5</sup> Samples of elemental mercury can often be found in school laboratories.<sup>5</sup>

Skin lightening and anti-aging products that contain inorganic mercuric salts can still be found in local beauty shops.<sup>8</sup> These products are usually manufactured abroad and sold illegally in the United States.

In 2019, the first known case of skin lightening cream contaminated with methylmercury was [reported](#).<sup>9</sup>

## Health effects

Mercury is a neurotoxin. The health effects and severity of mercury exposure depend on various factors.<sup>5</sup> Elemental mercury mainly causes health effects when inhaled and absorbed through the lungs.<sup>5</sup> Methylmercury can pass through the placenta and expose a developing fetus.<sup>6</sup>

Methylmercury Poisoning <sup>2,5</sup>	Fetal Methylmercury Exposure <sup>5,6</sup>	Elemental Mercury Poisoning <sup>5</sup>
<p>Symptoms include</p> <ul style="list-style-type: none"> <li>• Loss of peripheral vision</li> <li>• “Pins and needles” feeling in hands, in feet, and around the mouth</li> <li>• Lack of coordination</li> <li>• Speech, hearing, and walking impairment</li> <li>• Muscle weakness</li> </ul> <p>Populations who regularly eat large quantities of fish may have greater exposure to mercury.</p>	<p>Fetuses may be exposed to methylmercury when their mother eats contaminated fish or shellfish. The risk of fetal exposure varies depending on the type of fish and quantity eaten.</p> <p>Infants and children exposed while in the womb can have severe developmental disabilities and cerebral palsy. They may experience negative effects with their</p> <ul style="list-style-type: none"> <li>• cognitive thinking,</li> <li>• memory,</li> <li>• language,</li> <li>• fine motor skills, and</li> <li>• visual-spatial skills.</li> </ul>	<p>Symptoms include</p> <ul style="list-style-type: none"> <li>• Tremors</li> <li>• Emotional changes</li> <li>• Neuromuscular changes</li> <li>• Nerve response changes</li> <li>• Headaches</li> <li>• Poor mental function</li> </ul> <p>High exposures may cause kidney dysfunction, respiratory failure, and death.</p>

**Climate Change:** Research suggests that rising global temperatures, extreme weather incidents, and changing human actions will affect the environmental distribution of mercury.<sup>10</sup> More intense storms result in larger amounts of mercury released from the soil, which may end up in bodies of water. Melting permafrost may also release previously sequestered mercury back into the environment.<sup>11</sup>

## Toxic Metals Conclusion

### Poison Centers and Public Health

Many regulations have been implemented to reduce exposure to arsenic, mercury, and lead. However, because of their persistence in the environment millions of people, especially children, are still at risk of exposure.

Poison centers (PCs) have expertise in toxicology and can provide immediate, accurate, unbiased information and guidance for managing and preventing toxic metal exposures. PCs also provide a direct line of communication with the public. This line creates opportunities to capture data beyond what is available in NPDS. For example, new products or contaminated sites in a specific locale that may be an emerging exposure risk. Through regional collaboration, these data could help public health departments better understand and respond to future exposures and effectively educate the public on preventative measures.

As of June 2020, arsenic, lead, and mercury are on the World Health Organization's list of 10 chemicals of major public health concern.<sup>12</sup> The United States imports a lot of food (e.g., fish) and consumer products from other countries without strict regulations. These imported products have an increased potential for toxic metal contamination. There are also gaps in our understanding of how climate change may affect the distribution of and exposure risk to toxic metals. So, it is essential to stay vigilant and monitor exposures in locations known to have high levels and in areas without previous levels of concern.

NPDS has codes for elemental arsenic, mercury, and lead, as well as certain metal-containing products, such as

- Arsenic Pesticides
- Wood Preservatives
- Thermometers: Mercury
- Disc Batteries: Mercuric Oxide
- Mercurial Fungicides
- Mercury Containing Antiseptics
- Glazes
- Soldering Flux
- Anti-Corrosion Paints

### Additional Resources

[Mercury | Toxicological Profile | ATSDR](#)

**Poison Emergency?**

**Call 1-800-222-1222 OR  
Visit [POISONHELP.ORG](https://www.poisonhelp.org)**

### Announcements

The next quarterly PCPHCoP webinar will be held **April 17, 2024, from 3:00 p.m. to 4:00 p.m. Eastern Time.**

To be added to the CoP email distribution list, please request by emailing [PCPHCoP@cdc.gov](mailto:PCPHCoP@cdc.gov).

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