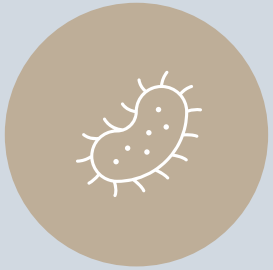
Mercury Overview

Content

BACKGROUND



CAUSES

SYMPTOMS

TREATMENT

Background - Mercury

- Mercury is a naturally-occurring chemical element found in air, water and soil. It can be toxic to people and wildlife.
- Was added to numerous products historically.
- Mercury can vaporize (evaporate) into the air. The vapor cannot be seen or smelled.
  - Breathing in mercury vapors is the most common way to get mercury poisoning – and the most dangerous.
- Mercury can be toxic to the nervous system, lungs, and kidneys.
- Has three forms: elemental (liquid mercury), inorganic mercury and organic mercury (methylmercury).

Background - Elemental - Liquid Mercury

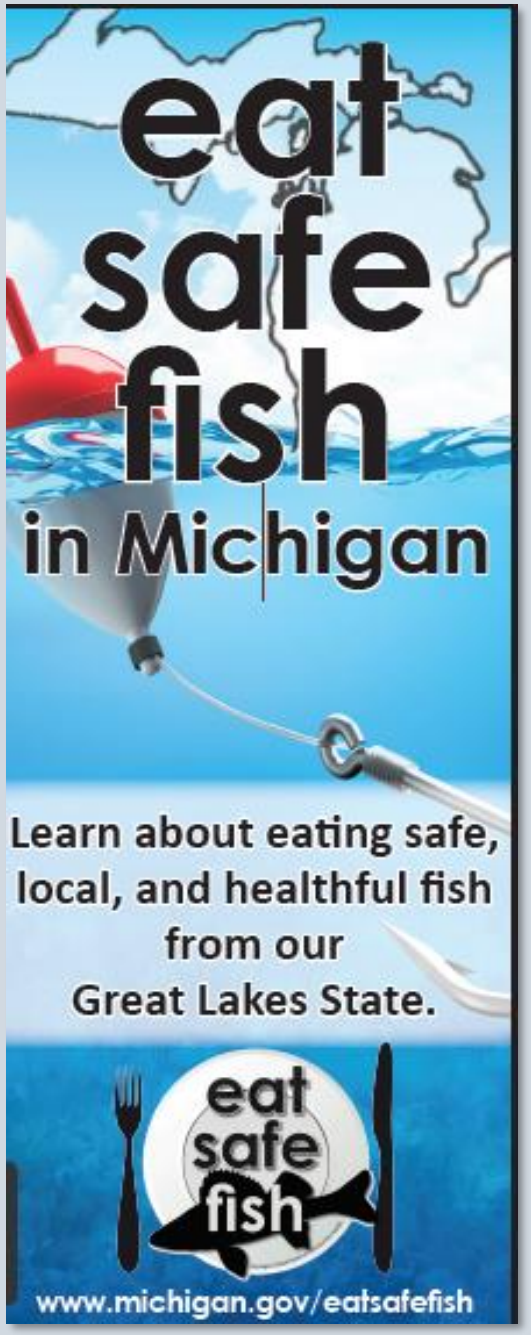
- Elemental (metallic) mercury is the shiny, silver-gray metal found in thermometers, barometers, thermostats, fluorescent lightbulbs, and other electrical switches.
- Liquid at room temperature.
- Readily breaks into droplets and easily vaporizes at room temperature into an odorless, colorless vapor that can be inhaled. The droplets can also spread easily and can build up in tiny cracks and spaces wherever it is spilled.
- Breathing in mercury vapors is the most common way to get mercury poisoning – and the most dangerous.

Background - Inorganic Mercury

- Formed when mercury combines with other elements, such as sulfur or oxygen, to form compounds or salts.
- Usually white, except for cinnabar, which is red. *(Ex., mercury(I) chloride in photo)*
- Can enter the body through mouth and skin from products such a disinfectants and fungicides.
- 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.
- Frequently found in school science labs.
- Least toxic of the three forms of mercury.

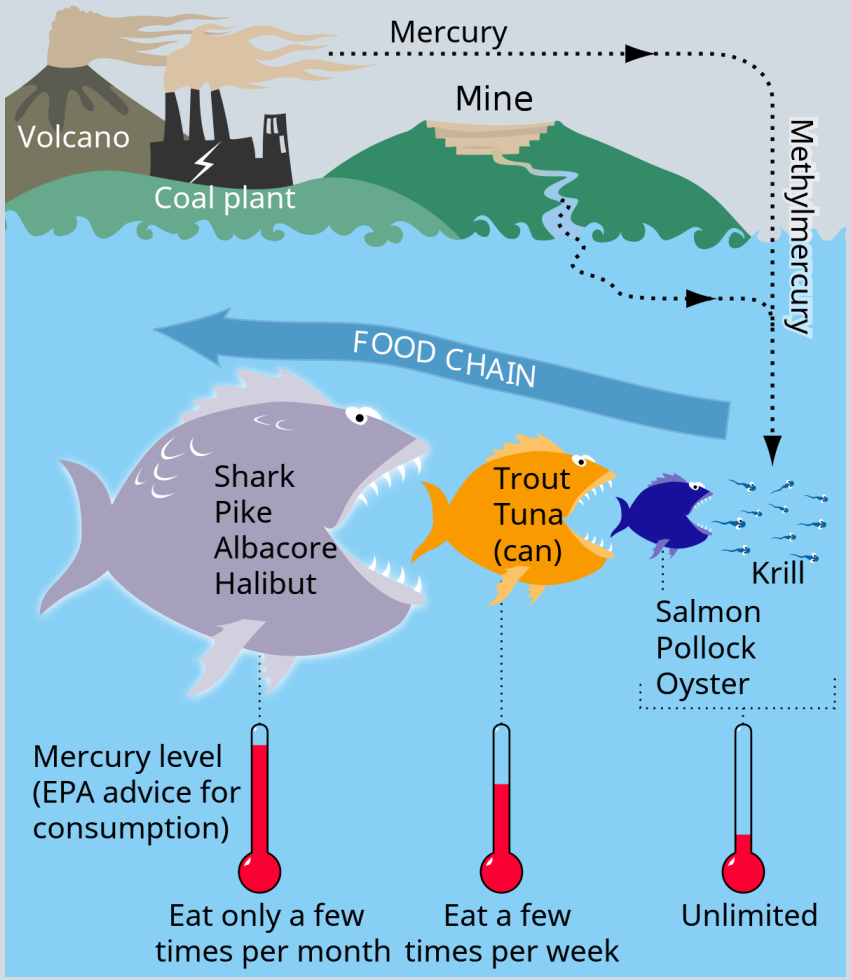
Background - Organic Mercury (methylmercury)

- Organic Mercury, or methylmercury, is most commonly found in the environment.
- Formed when mercury combines with carbon.
- It bioaccumulates in the environment and is often found in fish but can be found in animals as well like eagles, songbirds, polar bears, and alligators.
- Oral ingestion of fish is the most common route of exposure of mercury to humans. (i.e., Do Not Eat Fish Advisories)



Common Exposures to Mercury

- The main way that people are exposed to mercury is by eating fish and shellfish that have high levels of methylmercury in their tissues.
- A less common way people are exposed to mercury is breathing mercury vapor. This can happen when mercury is released from a container, or from a product or device that breaks.
- If the mercury is not immediately contained or cleaned up, it can evaporate, becoming an invisible, odorless, toxic vapor.



Exposure

- **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.

Factors of Exposure

- Factors that determine whether health effects occur and their severity include:
  - the type of mercury concerned;
  - the dose;
  - the age or developmental stage of the person exposed (the fetus is most susceptible);
  - the duration of exposure;
  - the route of exposure (inhalation, ingestion or dermal contact).
- Easily crosses blood/brain and placental barriers and can enter breast milk.

Symptoms - Elemental

Symptoms of elemental mercury poisoning occur immediately after inhaling the chemical and include:

- Coughing
- Trouble breathing
- Metallic taste in your mouth
- Nausea or vomiting
- Bleeding or swollen gums

Symptoms - Inorganic

Inorganic mercury is poisonous when swallowed. When the chemical enters your body, it travels through your bloodstream and attacks your brain and kidneys.

Symptoms of inorganic mercury poisoning include:

- Burning sensation in your stomach and/or throat
- Nausea or vomiting
- Diarrhea
- Blood in vomit or stool
- Changes in urine color

Symptoms - Organic

Organic mercury causes symptoms if you inhale it or touch it. Symptoms don't occur immediately and usually arise after long periods of contact (could be years or decades) with the compound. Though not always common, being exposed to a large amount of organic mercury at one time can cause symptoms.

Symptoms from long-term exposure include:

- Feeling numb or dull pain in certain parts of your body
- Tremors (uncontrollable shaking)
- Unsteady walk
- Double vision or blurry vision; blindness
- Memory loss
- Seizures

Testing for Mercury

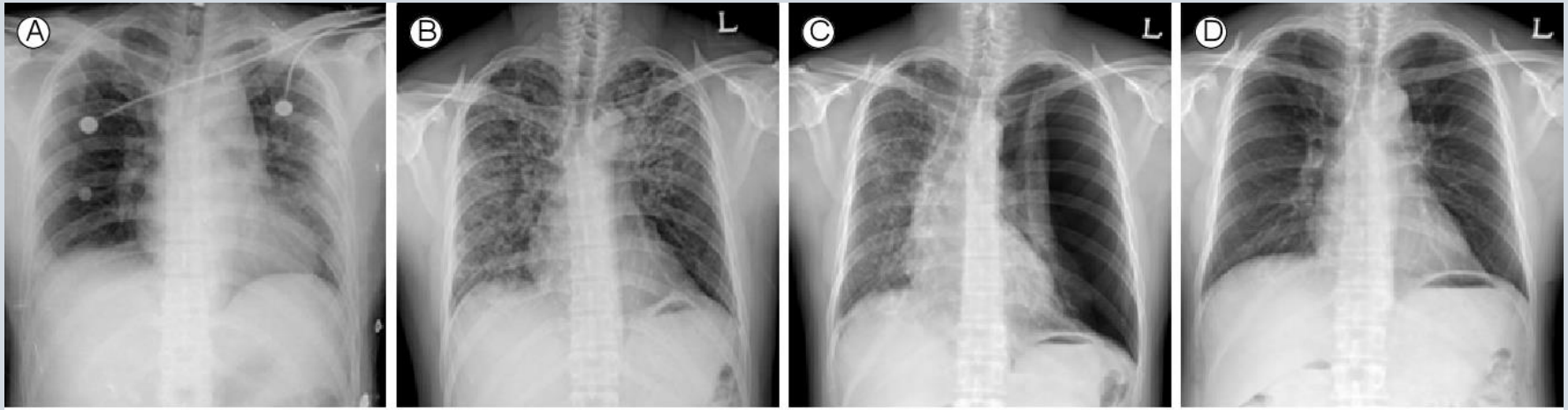
- Mercury can be measured in your blood, urine, hair, or toenails.
- To confirm the diagnosis, your provider will offer several tests to monitor mercury levels in your body including:
  - Chest X-ray.
  - Urinalysis (24-hour urine collection).
  - Bloodwork (complete blood count and a metabolic panel).
  - Electrocardiogram.
- Tests cannot determine which form of mercury you were exposed to.
- Tests also cannot predict whether you will have health problems.

Treatment

- Treatment focuses on removing mercury from your body and could include receiving:
  - Chelation therapy (removing metals from your body) via fluid through an IV.
  - Oxygen through a face mask.
  - Medicine to treat symptoms.
  - Dialysis.
  - Surgery to remove mercury.

Treatment

- Mercury is dangerous to the human body and your prognosis after exposure depends on the amount of mercury that entered your body and your overall health at the time of exposure.
- Some people have very mild symptoms and after treatment to remove the compound from their body, remain in good health after exposure.
- More severe cases of mercury exposure often lead to a poor prognosis. Elemental mercury, if inhaled, can cause permanent lung damage and potential brain damage. Inorganic mercury can damage kidneys and cause blood loss. Organic mercury can damage your central nervous system (brain and spinal cord). Large amounts of mercury or long-term exposure can lead to death if not treated.



Other hospital (HD-10) On admission (Day 1) After 10 days After 30 days

Prevent Mercury Poisoning

- You can prevent mercury poisoning by:
  - Limiting the amount of fish (that contain mercury) you eat.
  - Avoid fish (containing mercury) if you're pregnant or breastfeeding.
  - Wearing PPE when handling chemicals and compounds.
  - Avoid areas in your environment where mercury is present.
  - Replacing old amalgam fillings in your teeth.
- Do not vacuum the area to prevent mercury from becoming airborne and entering your lungs.
- Contact your local or state health department or environmental protection agency to properly clean up any spilled mercury to prevent poisoning.

Case Definitions

- Elemental
- Inorganic
- Organic