



Inorganic mercury/elemental mercury

General Information

Key Points

- mercury occurs widely in the environment, owing to natural and human processes
- elemental mercury is a shiny, silver-white liquid metal at room temperature
- inorganic mercury compounds are mostly white powders or crystals
- uses for elemental mercury include making dental fillings, lamps (light bulbs), batteries, electrical switches, and historically thermometers and barometers
- mercury compounds have been used in pharmaceuticals, preservatives, fungicides and antiseptics although their use in these areas has been largely discontinued
- breathing in large amounts of mercury for a short time damages the lining of the mouth and lungs, causing breathlessness, coughing and pain
- If small amounts of mercury are inhaled over a long period, the lining of the mouth and lungs may be damaged
- swallowing inorganic mercury can cause stomach irritation, leading to nausea, vomiting and diarrhoea
- ingesting large amounts of inorganic mercury can cause stomach ulcers and damage the, intestines and nervous system
- all forms of mercury accumulate in the kidney causing kidney damage, although this is largely reversible when mercury is removed from the body

Public Health Questions

What is mercury?

Mercury occurs widely in the environment, owing to natural and human processes. It is present in three forms, namely elemental (metallic) mercury, inorganic and organic mercury. This review will focus on metallic and inorganic mercury only.

Elemental mercury is a shiny, silver-white liquid metal at room temperature and may also be referred to as quick silver. It evaporates to form mercury vapour, which is the predominant form of mercury in the atmosphere. Inorganic mercury compounds contain mercury combined with other elements: mercuric sulphide contains sulphur; mercuric oxide contains oxygen; and mercuric chloride contains chlorine. These compounds are mostly white powders or crystals.

What is mercury used for?

Elemental mercury is used in the electrolysis of sodium chloride, to make caustic soda and chlorine and in extracting gold from ores. It is used to make lamps, electrical switches, thermometers and barometers. Dental amalgam (used in dental fillings) also contains elemental mercury. Inorganic mercury compounds have been used in pharmaceuticals, preservatives, fungicides and antiseptics although their use in these areas has been largely discontinued over the last few decades. Inorganic mercury may also be found in illegal skin-lighteners and traditional medicines.

How does mercury get into the environment?

Small amounts of mercury exist in the environment in soil, water and air owing to natural and human (anthropogenic) processes. The major natural sources of mercury in the environment are degassing from the Earth's crust, emissions from volcanoes and evaporation from water bodies. Most of the mercury released from man-made activities is elemental mercury released into the air due to mining, burning fossil fuels and incinerating waste. Mercury also enters the soil from fertilizers, fungicides and from solid waste i.e. thermometers, light bulbs or electrical switches.

How might I be exposed to mercury?

Exposure to mercury may occur from breathing contaminated air, eating contaminated food or water, or by skin contact. Everyone is exposed to mercury to a small extent from air, water and food. People may be exposed to mercury from dental amalgam used in dental fillings. The EU Scientific Committee on Emerging and Newly Identified Health Risks (SCENIR) recently considered the safety of dental amalgam and concluded that dental amalgam already in place is not considered a health risk for the general population.

Spillages of elemental mercury from broken thermometers, barometers or compact fluorescent light bulbs may result in exposure to mercury vapour. Some traditional medicinal

products and illegal skin lightening creams may contain mercury and their use can lead to exposure.

Occupational exposure to mercury can occur in a number of work places that use mercury, such as in factories making electrical equipment or thermometers, chemical processing plants and dental practices. Safe levels are enforced to protect employees who may be exposed to mercury at work. Such levels are below those that are thought to cause harmful effects.

If I am exposed to mercury how might it affect my health?

The presence of mercury in the environment does not always lead to exposure. In order for it to cause any adverse health effects you must come into contact with it. You may be exposed to mercury by breathing or ingesting it, or by skin contact with it. Following exposure to any chemical, the adverse health effects you may encounter depend on several factors, including the amount to which you are exposed (dose), the way you are exposed, the duration of exposure, the form of the chemical and if you were exposed to any other chemicals.

After swallowing small amounts of elemental mercury, very little is absorbed by the body, whereas after breathing elemental mercury vapour, about 80% is absorbed by the blood from the lungs. Large amounts of mercury vapour in the air can cause effects such as cough, breathing difficulties and chest tightness; lung and airway damage may develop in severe cases. It can also affect the nervous system, causing effects such as tremor, irritability, nervousness, memory loss, hallucinations, muscle changes and headaches. Effects on the kidneys, mouth, stomach and skin may also arise. Inhalation exposure to elemental mercury over a long period of time can have an effect on the central nervous system. Symptoms include personality changes, insomnia, memory loss, poor concentration, headache, speech problems, blurred vision, tremors and muscle weakness.

Inorganic mercury compounds do not vaporise, hence are not generally breathed in and only small amounts may pass through the skin. Swallowing inorganic mercury can cause stomach irritation, leading to nausea, vomiting and diarrhoea. Ingesting large amounts of inorganic mercury can cause stomach ulcers and damages the kidneys, intestines and nervous system.

Can mercury cause cancer?

The International Agency for Research on Cancer (IARC) found that there was not enough evidence to determine whether mercury could cause cancer in humans.

Does mercury affect pregnancy or the unborn child?

There is little evidence on the effects of exposure to inorganic or mercury during pregnancy. Therefore, it is not possible to draw any definitive conclusions. Effects on the unborn child are more likely to occur at levels that harm the mother.

How might mercury affect children?

Children may be more susceptible to the neurotoxic effects of mercury as their central nervous system is still developing.

Rarely, some children exposed to high levels of metallic or inorganic mercury have developed a condition called acrodynia. The symptoms and features of this are muscle cramps, irritability, skin redness and swelling, peeling of skin, itching, fever and sweating.

Are certain groups more vulnerable to the harmful effects of mercury?

Rarely, some people (more often children) exposed to mercury will have a reaction known as acrodynia (see section above).

What should I do if I am exposed to mercury?

You should remove yourself from the source of exposure.

If you have got mercury on your skin, remove soiled clothing, wash the affected area with lukewarm water and soap for at least 10 – 15 minutes and seek medical advice.

If you have got mercury in your eyes, remove contact lenses, irrigate the affected eye with lukewarm water for at least 10 – 15 minutes and seek medical advice.

If you have inhaled or ingested mercury seek medical advice.

What should I do if I spill mercury or break a mercury-containing device?

People may be exposed to metallic mercury vapour if they come into contact with broken thermometers, fluorescent light bulbs, thermostats or barometers. Metallic mercury and vapours are difficult to remove from household furniture and clothing. After spillages items must be thoroughly cleaned to prevent a continuous exposure.

Advice on cleaning up spills of mercury is available online at the following URL:

<http://www.nhs.uk/chq/Pages/854.aspx>.

Additional sources of information

NHS Choices – Poisoning: <http://www.nhs.uk/Conditions/Poisoning/Pages/Introduction.aspx>

NHS Choices – Can a Broken thermometer or light bulb cause mercury poisoning?:

<http://www.nhs.uk/chq/Pages/854.aspx>

NHS Choices – Skin lightening: <http://www.nhs.uk/Conditions/cosmetic-treatments-guide/Pages/skin-lightening.aspx>

UKTIS. Best Use of Medicines in Pregnancy <http://www.medicinesinpregnancy.org/>

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