



Lead

General Information

Key Points

- lead is a metal that is found naturally throughout the environment
- it has a range of uses including storage batteries, cables, solder and steel products, ammunition and shielding systems from radiation
- it was previously used in petrol, paint and drinking water pipes however these uses are being phased out
- exposure to inorganic lead occurs primarily through food and drinking water, although exposure may also occur through soil, dust and air
- old lead based paint may also lead to exposure, especially to young children who may eat or mouth it
- lead is more likely to cause harm following exposure for a long time or following exposure to very large amounts in a short space of time
- exposure to lead, may cause a wide range of effects, including damaging the kidneys, circulatory system, and the developing brain
- the unborn child and young children are the most sensitive to lead
- there is some evidence that lead may cause cancer in humans

Public Health Questions

What is lead?

Lead is a metal that is widely distributed in the earth's crust (soil and rocks), air and water. It is largely emitted into the environment as inorganic salts.

What is lead used for?

Lead is used either as a metal or as a chemical compound (e.g. inorganic salts). Owing to its valuable physical properties metallic lead has many uses including in storage batteries, cables, solders and steel products, ammunition, shielding systems from radiation and x-rays, circuit boards in computers and electronic equipment, and superconductor and optical technology. Lead compounds are used in cathode ray tubes (now largely replaced by other technologies), colour pigments, enamels and ceramics and in PVC; though these uses are generally in decline.

Historically lead has been used in paint, petrol, food cans and water pipes; these uses have been phased out in the EU. However, old lead containing products may still be in circulation. Leaded petrol was banned in the EU in 2000 with possible exceptions until 2005, while the sale of lead paint was banned in the UK from 1992.

How does lead get into the environment?

Lead is naturally present in the environment; however it has become more widespread because of human (anthropogenic) activities. With the decline in combustion of leaded fuel and the phasing out of lead in pipes and paints, industrial emissions from mining, smelting, recycling or waste incineration are now the major source of environmental lead.

How might I be exposed to lead?

Exposure to inorganic lead occurs primarily through food and drinking water, although exposure may also occur through soil, dust and air.

Lead in drinking water mostly occurs as a result of old lead plumbing (or the illegal use of lead solder) in the home, and rarely from natural sources.

Young children may exhibit exploratory hand-to-mouth behaviour with non-food items or even ingest them. As a result of this children may be exposed to lead in soils, dusts and flakes of old paint.

Exposure to the general public could also occur through the use of traditional or imported remedies, cosmetics and pottery (not marketed in the EU) which contain lead. Smoking tobacco and second hand smoke are sources of lead exposure.

Workplace exposure to lead and inorganic lead compounds may occur in a variety of occupations, including steel welding and spray coating, battery manufacturing or plumbing.

Employers are required by law to limit the exposure of their workers to lead; this is achieved by regular monitoring of workers blood lead levels and subsequently taking action if these levels are too high.

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

Exposure to high levels of lead in a short time can result in stomach upset, mood changes, poor attention span, headaches, hallucinations and damage to the brain and kidneys in severe cases. Lower level exposure to lead over a long time can lead to anaemia and low blood pressure, damage to the nervous system, brain and kidneys as well as effects on male and female reproduction. Eating food or drink or breathing in air contaminated with lead or lead compounds for a short period usually does not cause any ill effects. Additionally, in the UK lead levels are under stringent control and exposures to lead in water, air and food are reduced to the lowest practical level to minimise possible risks to health.

Can lead cause cancer?

The International Agency for Research on Cancer (IARC) evaluated the available evidence regarding the ability of inorganic lead compounds to cause cancer. IARC concluded that there was sufficient evidence in experimental animals, but only limited evidence in humans from occupational studies in workers exposed to lead for several years. As a result inorganic lead compounds were classified as probably able to cause cancer in humans.

Does lead affect pregnancy or the unborn child?

Exposed to lead for a long time may result in miscarriage, stillbirths or premature births. Children who are exposed to lead in the womb may have a lower IQ, behavioural problems, nerve damage or delayed growth. Lead may also affect both male and female fertility.

Information on exposure to chemicals during pregnancy can be found at the following website: <http://www.medicinesinpregnancy.org/>

How might lead affect children?

Children are particularly sensitive to the effects of lead on the nervous system as their brains are still developing. Children exposed to lead during the first few years of life may have a lower IQ, behavioural problems or nerve damage.

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

Pregnant women, infants and young children are particularly sensitive to the harmful effects of lead (see above).

What should I do if I am exposed to lead?

If you have any health concerns regarding exposure to lead seek guidance from your GP or contact NHS 111.

Additional sources of information

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

HSE – Lead: <http://www.hse.gov.uk/lead/>

HSE – Lead and you: <http://www.hse.gov.uk/pubns/indg305.pdf>

FSA – Advice to frequent eaters of game shot with lead:
<https://www.food.gov.uk/science/advice-to-frequent-eaters-of-game-shot-with-lead>

COT – COT statement on the potential risks from lead in the diet of infants and young children: lay summary: <https://cot.food.gov.uk/sites/default/files/2016leadlaysummaryfinal.pdf>

This information contained in this document from the PHE Centre for Radiation, Chemical and Environmental Hazards is correct at the time of its publication.

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