

Lead and your health

Lead is not required for any normal bodily function. This metal has been used extensively by many industries in the past but as our knowledge of its toxic health effects expanded, the use of lead has been regulated and reduced.

What is lead?

Lead is a naturally occurring heavy, bluish-grey metal with a relatively low melting point (327°C). It is found naturally in the earth's crust with an average concentration of 10 parts per million (ppm). The concentration of lead in soil is higher in mineralised areas. It rarely occurs naturally as a metal, and is most commonly associated with other elements to form lead compounds. Galena is a typical compound, mined in Broken Hill and Mt Isa. Metallic lead is corrosion-resistant, easily shaped and mixed with other metals to form alloys. Lead is commonly used in roof flashing, paint (domestic paint pre-1970, although lead concentrations up to 0.5% could be found in paint up to 1991), shot and ammunition, solder, fishing sinkers, ceramic glazes, dyes and shielding to protect from radiation (x-rays etc.). It has also previously been used in water pipes and food storage cans. The most widespread use of lead today is in vehicle batteries.

What happens to lead in the environment?

Prior to being phased out in 2000, leaded petrol was the most prominent source of environmental lead. Today, the main sources of lead are from mining, smelting and refining. Lead particles can be removed from the air by rain and by physical fallout into the surrounding environment. Once lead falls onto soil or water, it sticks strongly to soil and sediment particles, where it can remain for many years. The movement of lead into groundwater is highly unlikely unless rainfall is acidic.

How might I be exposed to lead?

Lead is often found in mining and smelting areas, older houses and soil near heavily trafficked roadways (due to leaded petrol).

People living near smelters and mines can be exposed to lead by breathing contaminated air or swallowing dust, soil or drinking rainwater contaminated with lead.

People living in older houses may be exposed to lead by drinking water from old lead piping or swallowing lead paint chips directly or fragmented in dust and soil.

People may be exposed to lead when they work in jobs such as radiator repair or car battery manufacture and recycling. Hobbies where lead is used such as lead-lighting, making stained glass, firing and glazing pottery, soldering electronics, making fishing sinkers and renovating older homes, furniture, cars or boats coated with lead-based paint can also be an exposure risk.

Babies and small children can breathe and swallow lead while they play on the ground or floor by:

- > mouthing toys, hands or feet contaminated with lead from soil or dust, or from contaminated surfaces such as carpet,
- > eating soil (pica) or,
- > swallowing flaking old paint chips which can contain up to 50% lead.





There is also a risk of lead exposure from some imported products such as; toys containing lead or coated with lead-based paint, cosmetics (hair dye, kohl or surma), jewellery, canned food, traditional medicines and ceramic cookware where lead can be released from poorly fired clay or glazing during cooking or storage of alcoholic, acidic or hot food.

How does lead enter and leave the body?

Lead can enter your body by breathing air containing very small particles or by swallowing lead-bearing dust, soil or paint chips. Only very small amounts of lead on your skin can pass into your bloodstream, but if it is not washed off, it can be accidentally swallowed. Once particles are swallowed or breathed in, the amount of lead that actually gets into your blood will depend on how old you are, when you last ate and how well the lead particles dissolve in the stomach or lung.

If adults and children swallow the same amount of lead, about five times more is absorbed into the body by children. Shortly after lead is absorbed into your body it travels in your blood to soft tissues and organs, such as liver, kidneys, brain, muscles and heart. The lead can be either stored or excreted into your urine and faeces. The time it takes for most of the lead to be excreted depends on how long you have been exposed for.

If the lead is not excreted by the kidney or gut within a few weeks the remaining lead moves to your bones and teeth. Some lead can be stored for up to 30 years in bone. This can move back into the blood during pregnancy, breast feeding, after breaking a bone, and due to osteoporosis. Lead absorbed by the mother can also pass through the placenta to the baby. If exposure is ongoing, greater amounts of lead will accumulate in the body, especially in bone. The amount of lead measured in your blood is the best indicator of recent exposure.

How can lead affect my health?

The effects of lead are the same whether it enters the body by breathing or swallowing. The central nervous system is the main target for lead toxicity in both adults and children.

In adults, long-term exposure to low levels of lead may be associated with weakness in fingers, wrists and ankles, headaches, fatigue, small increases in blood pressure, anaemia (low iron in the blood) and damaged nerve and renal function.

At very high levels, lead can severely damage brain and kidney function and ultimately cause death. Those with diabetes have a higher risk of adverse effects associated with the kidney.

In pregnant women, high levels of exposure may cause decreased birth weight or miscarriage and in men it can damage the organs responsible for sperm production.

There is no conclusive evidence at this time that lead is carcinogenic (cancer causing).

Can lead affect the health of my children?

Children are more susceptible to being exposed to lead. They can be exposed during pregnancy and tend to spend much of their awake time in areas that can easily be contaminated such as floors and soil.

Children are more susceptible to the effects of lead than adults because:

1. Their brains, which are the main targets, are still growing and developing and,
2. They swallow, absorb and retain more lead in their body.

Long-term exposure to low levels of lead may be associated with reduced growth, learning difficulties, behavioural problems and reduced IQ in young children. It can cause hearing difficulties and affect the nervous system outside the brain.



These effects are most likely not reversible. Exposure to lead very early in life can re-program genes which may make it harder for these children to weather stresses later in life.

At high blood lead levels effects may include: anaemia, colic, muscle weakness, lack of appetite and brain damage with seizures. In some cases lead levels may need to be lowered by treating with drugs that can bind to lead to help the body eliminate it.

Is there a safe level of lead exposure?

Humans do not need lead for their bodies to work. There is a general consensus that everyone's lead exposure should be reduced or prevented, especially children and pregnant women, to keep blood lead levels as low as possible.

In May 2015 the National Health and Medical Research Council (NHMRC) stated that 'lead can be harmful to people of all ages, but the risk of health effects is highest for unborn babies, infants and children' and 'it is well established that blood lead levels greater than 10 micrograms per decilitre can have harmful effects on many organs and bodily functions'. The NHMRC recommends 'that if a person has a blood lead level greater than 5 micrograms per decilitre the source of exposure should be investigated and reduced, particularly if the person is a child or pregnant woman'.

What do I do if I think I have been exposed to lead?

If you think that a member of your family or you have been exposed to lead or may have lead poisoning, you should discuss this with your doctor. The doctor may recommend a blood test to assess the level of exposure and determine if further steps are necessary to reduce the health effects and minimise further exposure.

How can I reduce my risk of exposure to lead?

It is important for families to know about the sources of lead in their homes and avoid exposure to these sources. In the home, deteriorating lead-based paint and renovating old painted surfaces pose the greatest exposure risk. Test kits that detect if your paint contains lead are available from most paint retailers. Making sure that surfaces accessible to children, such as cot frames and window sills are not coated with lead-based paint or varnish is important. These need to be safely removed or covered with new paint to reduce the risk.

Pregnant women and children should not be present during house demolitions and renovations. Stripping lead painted surfaces must be done without generating dust or fumes (e.g. not by using a heat gun) and debris must be disposed of safely (e.g. not by burning).

Lead dust can be brought inside on your hands and clothes if lead is present in your workplace.

If you work with lead, your family's exposure can be reduced by showering, changing clothes and washing private vehicles before leaving work.

In lead contaminated environments (e.g. near smelters) regular cleaning to remove household dust, particularly in areas where children play and sleep and soil is tracked inside, will minimise exposure.

Cleaning tips: vacuum carpets, furnishings and furniture using a vacuum fitted with a high efficiency particulate air filter (HEPA filter), regularly damp dust and wet mop surfaces, remove dust from door and window screens and sills and dispose of vacuum dust in rubbish bins, not on the garden.

What should I do if I live in an area with lead contamination?

In areas where exposure risk is high, children require regular hand and face washing and drying so that lead is not accidentally swallowed, especially before eating or sleeping and after playing outside or with pets.

Surfaces that children contact need to be regularly cleaned. This includes carpets, floors and outside areas where children play. Regular cleaning of toys, particularly those used outside will reduce the potential for transferring lead inside and ingestion via mouthing activities.

Dusting needs to be done with a wet mop and vacuum cleaners should have a HEPA filter to prevent dust being redistributed. Babies and young children should never be present during sweeping, vacuuming or renovating.

Preventing dust from entering the house can be difficult. Using door mats and leaving footwear such as boots and shoes outside prevents tracking in soil and dust. Windows and doors should be kept closed on windy days and outdoor eating and play areas cleaned before use.

It is important that children eat a healthy balanced diet with adequate calcium, iron and vitamin C (ascorbic acid). Good nutrition with frequent meals and snacks lowers the amount of swallowed lead that is absorbed and may reduce some toxic health effects.

Children should be encouraged to eat in high chairs or at tables and food dropped on the floor should be discarded.

If rainwater could possibly contain lead dust it should not be used for cooking, food preparation or drinking (including making up baby formula or cordial).

More information

SA Health Information Sheet - Reducing your lead exposure: <https://bit.ly/2khbaEZ>

NHMRC statement and information paper on the health effects of lead:
www.nhmrc.gov.au/about-us/publications/evidence-effects-lead-human-health

National Six Step Guide to Painting Your Home:
www.environment.gov.au/protection/publications/lead-alert-six-step-guide-painting-your-home

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