

Blood lead levels

Lead exposure and health effects in Australia

Lead is a heavy metal used in manufacturing various batteries, alloys, plastics and protective coatings. It is not required for human health, and can be toxic when ingested or inhaled. The research evidence on the effects of low-level lead exposure – particularly in children and pregnant women – gives no simple answer on what levels are ‘safe’ or ‘of concern’. This Public Statement from the NHMRC (National Health and Medical Research Council) discusses the evidence and makes recommendations on what we should aim for regarding blood lead levels in Australia* and also gives some practical advice on minimising exposure to lead.

In the past 30 years, recommendations for limiting exposure to lead in the community have been largely driven by the need to protect children from the effects of lead on the developing brain.

*This document provides only a brief summary of the available evidence. For a more comprehensive version go to www.nhmrc.gov.au/publications/synopses/gp2.htm

How are we exposed to lead?

Although lead occurs naturally, human activity has increased levels in the biosphere more than a thousand-fold in the past 300 years. Much of this occurred in the second half of the twentieth century due to use of lead compounds in petrol, a practice which has now all but ceased. Lead from a range of sources reaches humans via air, dusts, food and water. Once in the body, it circulates in the blood; while most is excreted, some can remain in the tissues, organs and bones. Today, the most common source of lead exposure in communities not industrially exposed is restoration of homes, boats, cars and furniture coated with lead-based paints. Smokers and their children have higher blood lead levels than non-smokers and their children, respectively.

RECOMMENDATIONS

- All Australians should have a blood lead level below 10 µg/dL (micrograms per decilitre).
- All children’s exposure to lead should be minimised.
- All women are advised to minimise their exposure to lead both before and during pregnancy and also while breastfeeding.

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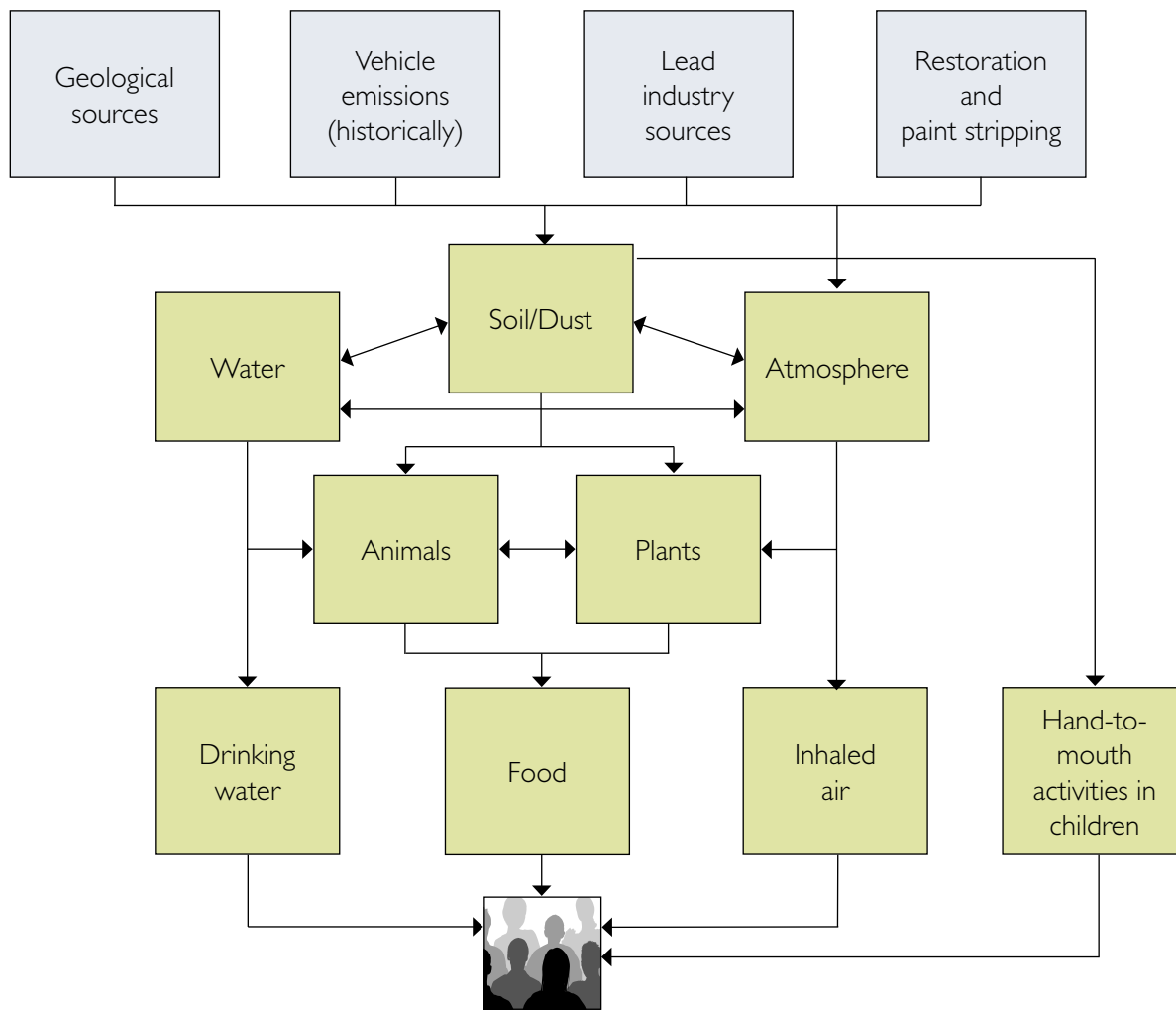


Figure 2 Principal pathways of lead from the environment to humans (EPA, 2006).

General health effects of exposure to lead

Very high blood lead levels (70-100 µg/dL or greater) arising from exposure from poor workplace practices, inappropriate stripping of old lead-based paint, or accidental swallowing of lead-containing material, can result in acute lead poisoning. Depending on how high the blood lead level is elevated, effects can include stomach pain, convulsions and even death. Incidents like these are now extremely rare in Australia.

More commonly, it is the long-term effects of lower levels of lead exposure that cause concern. Long-term exposure may result in:

- general fatigue
- headaches
- blood circulation problems
- reduced kidney function
- reduced fertility
- reduced brain function
- other effects.

Effects on children and pregnant women

Children are considered to be more sensitive than adults to the effects of lead on health. Over the past 30 years it has been generally recognised that lead, at exposure levels well below those mentioned for acute lead poisoning, may impair children’s brain development and learning. This is typically measured by using IQ tests and behavioural assessment tools. However, the evidence has some limitations, because many other factors, such as genetics or early childhood experiences, can influence behaviour and performance on IQ tests.

Lead is transferred to the unborn infant during pregnancy, and a small amount passes into breast milk.

Practical things you can do to reduce the exposure of you and your family to lead

Paint

- Seek expert advice regarding risks to your health before commencing any paint work renovations.
- Find out if painted surfaces in your house contain lead (especially accessible surfaces like cot frames and window sills). A simple kit is available from your local hardware store – or contact your local health authority for advice.
- Clean up flaking lead paint by vacuuming – and keep children away.
- Covering or removing old paint will reduce the risk of lead exposure however; renovation of lead painted surfaces must be done without generating dust that can spread to other areas of the house.
- Do not renovate when children are present. If this is not possible, a temporary solution for poor or degraded paint is to cover over with new paint, until such time a full and proper dust free renovation can be conducted.
- Dispose of lead paint debris safely do not dispose of by burning.

Hobbies

- Avoid using lead in the home especially for hobbies such as renovating old cars, lead-lighting, pottery glazing, soldering, or manufacture of lead sinkers.
- Conduct these hobbies safely by minimising dust, keeping children away from work areas, cleaning up after use (wet wiping, vacuuming, disposing of debris safely), washing well, and laundering clothing separately from all other clothes.

Coming home from work

Even if you are not directly involved in the mining and smelting of lead, you may still be exposed to lead if your work involves:

- alloying and casting (such as brass casting)
- battery recycling, radiator repairs, or soldering
- manufacture of electronic equipment, certain glass and crystal, ammunition, pigments, ceramic glazes, or pewter jewellery
- other activities that involve working with lead-based products such as lead sheathing and flashings pigments for pottery or paint.

If you work in these industries:

- avoid bringing lead home from work on cars, clothes, bags, or other personal items such as mobile phones
- shower, clean under nails, and wash hair before coming home
- don't wash contaminated clothes with the family washing
- adhere to your employer's strategies to avoid taking lead home, including washing and changing at work and use of your employer's laundry facilities.

Backyard

- Ensure hobbies do not contaminate the ground or other surfaces and are conducted well away from play and eating areas.
- Clean up after using lead.
- Do not attempt to recycle old lead batteries at home – speak to your local authority on ways to recycle safely.

Nutrition

- Maintain a healthy varied diet - remember healthy eating habits need to start early in life. Children and adults need a wide variety of nutritious food and to drink plenty of water. Breast milk is best for young babies but if unavailable use an appropriate infant formula.
- It is important to have a diet containing adequate calcium and iron since these lower the absorption of any lead that is accidentally swallowed. Good foods include milk, red meat, nuts, legumes and leafy green vegetables.
- Be aware that ceramic and pottery products purchased from developing countries often contain lead, which can leach into food when used for cooking or storage. Do not use these for food purposes unless you are confident they do not pose a lead hazard.

Smoking

- Avoid smoking indoors and in cars, especially when children are present (smoking in cars when children are present is illegal in some States).

Imported products

- Be aware that some items imported from overseas (especially in developing countries) may also contain lead, for example; cosmetics such as kohl, kohl or surma; toys; and jewellery.

If you live in a lead-exposed environment such as near a smelter or mine

In lead exposed environments, such as near smelters or mines, additional measures may be needed to avoid exposure to lead, including:

- Children require regular hand and face washing and drying to remove dust and soil contaminated with lead, so the lead is not accidentally swallowed
- Keep play areas clean and indoor surfaces free of dust to reduce the risk of children ingesting lead. Remember that dust gathers in corners, on windowsills and behind furniture and doors
- Do not grow vegetables in lead-contaminated soil
- Rainwater may be contaminated – check with your local health authority for further information.

Links to practical advice for minimising lead exposure

(Please note: This list is not necessarily comprehensive)

NATIONAL

Guidelines for lead paint removal – aimed especially at workers: www.workershealth.com.au/facts057table.html.

Telephone contact (02) 9749 7666.

Guide to lead paint management – Australian Standards AS4361.1 (Industrial, 1995), and AS 4361.2 (Residential and Commercial, 1998). The contents pages of AS4361.2 can be viewed at: www.saiglobal.com/PDFTemp/Previews/OSH/As/as4000/4300/43612.pdf.

NSW

A factsheet on lead exposure in children, from NSW Health: www.health.nsw.gov.au/factsheets/environmental/lead.html.

Telephone contact (02) 9816 0234.

A short guide, 'Lead and health – is your family at risk', from NSW Health: www.health.nsw.gov.au/mhcs/publication_pdfs/4465/BHC-4465-ENG.pdf.

QUEENSLAND

Government information on lead paint exposure: http://access.health.qld.gov.au/hid/AccidentsInjuriesandPoisonings/SafetyintheHome/leadPaintExposure_ap.asp.

Telephone contact (07) 3234 0938.

SOUTH AUSTRALIA

Information on lead poisoning from the Women's and Children's Hospital: www.wch.sa.gov.au/services/az/divisions/labs/geneticmed/lead.html.

Information on lead poisoning from Parenting and Child Health: www.cyh.com/HealthTopics/HealthTopicDetails.aspx?p=114&np=304&id=1895.

Government advice on 'What to do about lead': www.dh.sa.gov.au/pehs/topics/topic-ptpirie-services.htm

Telephone contact (08) 8638 4100

'What can we do to minimise our child's exposure to lead?', from Ten by 10. www.tenby10.com.au/EveryChild/WhatCanWeDo.aspx.

VICTORIA

A short guide, 'Lead and health – is your family at risk', from NSW Health but also relevant to Victoria: www.health.nsw.gov.au/mhcs/publication_pdfs/4465/BHC-4465-ENG.pdf

WESTERN AUSTRALIA

'Managing possible lead dust in and around the home' www.health.wa.gov.au/envirohealth/home/docs/Managing_lead_dust_in_and_around_the_home.pdf.

Telephone contact (08) 9388 4999.

References

1. Schwartz BS, Stewart WF, Bolla KI, Simon D, Bandeen-Roche K, Gordon B, Links JM, Todd AC. Past adult lead exposure is associated with longitudinal decline in cognitive function. *Neurology* 55:1144–1150, 2000.
2. Navas-Acien A, Guallar E, Silbergeld E, Rothenberg SJ. Lead exposure and cardiovascular disease – a systematic review. *Environ Health Perspect* 115:472-82, 2007.
3. Donovan J, Lead in Australian children: report on the national survey of lead in children. Australian Institute of Health and Welfare, 1996.
4. Gulson B, Mizon K, Taylor A, Korsch M, Stauber J, Davis JM, Louie H, Wu M, Swan H. Changes in manganese and lead in the environment and young children associated with the introduction of methylcyclopentadienyl manganese tricarbonyl in gasoline – preliminary results. *Environmental Research* 100, 100–114, 2006.