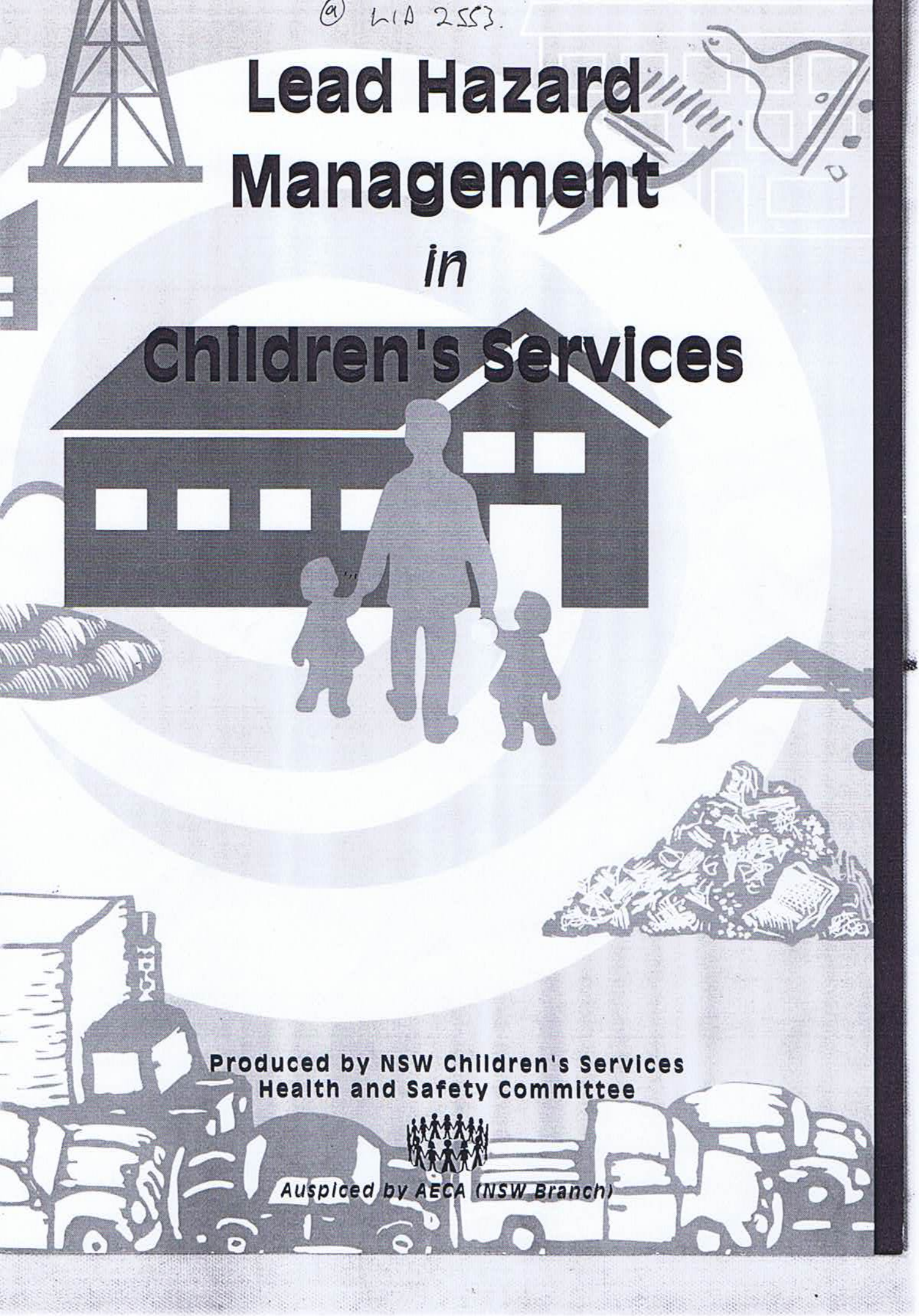


© LIA 2553.

Lead Hazard Management

in

Children's Services



Produced by NSW Children's Services
Health and Safety Committee



Ausplced by AECA (NSW Branch)

ACKNOWLEDGEMENTS

ISSUE OF COCA

MEMBER

MEMBER

MEMBER

MEMBER

MEMBER

MEMBER

MEMBER

MEMBER

--	--	--	--	--

This document has been developed by NSW Children's Services Health and Safety Committee with acknowledgments to the Lead Reference Centre, EPA.

We thank the following individuals and organisations for their comment:

Kerri Jacobson, Lady Gowrie Child Centre, Sydney

Deb Mann, Kindergarten Union

Dr John Frith, School of Community Medicine, University of NSW

Cathy Gray, NSW Department of Community Services

Produced by NSW Children's Services Health and Safety Committee

Auspiced by AECA (NSW Branch)

May 1999

ISBN 0-646-37264-5

© Copyright 1999

This material may be reproduced, with permission, in whole or in part, provided the meaning is unchanged and its source, publisher and authorship are acknowledged.

For information about lead and its effects contact EPA Pollution Line 131555.

Page No.

Childcare facilities need to consider the management of lead hazards because:

- Many childcare centres and family daycare homes may contain lead hazards, putting children and carers at risk;
- Many young children spend a large part of their waking hours in care;
- Young children and pregnant women are at greatest risk of adverse health effects from lead exposure;
- Childcare staff have a role in assisting families to understand the sources of lead and to recognise behaviour in children that may be caused by lead exposure.

WHAT YOU SHOULD KNOW ABOUT LEAD

Lead is a cumulative toxin because, when ingested or inhaled and absorbed, it can harm many systems in the human body, including the brain, kidney, and the nervous and reproductive systems of both males and females. Lead disrupts enzyme systems mediated by other metals important to the body – iron, calcium and zinc. Lead affects all people and animals, but children and pregnant women are particularly vulnerable.

In June 1993, the National Health and Medical Research Council (NHMRC) set a blood lead goal of less than 10 ($\mu\text{g}/\text{dL}$) (micrograms of lead per decilitre of blood) for all Australians by the end of 1998. The NHMRC stressed the urgency of reaching this level in children aged 1 to 4 years because of the adverse effects of lead on intellectual development and psychomotor development.

THE CHILDREN

Exposure of foetuses and children under 4 years to lead is linked to:

- damage to the brain and nervous system
- impaired growth and IQ
- poor hearing
- learning difficulties
- hyperactivity and aggressiveness
- social and behavioural problems

Normal exploratory behaviour and hand-to-mouth activities in children under 48 months, or in children suffering from “pica” (eating non-food substances), in lead-contaminated environments may result in repeated exposure to lead from household dust, paint and soil. Deficiencies of iron, zinc or calcium, or high fat diets, can increase absorption of lead if a child is exposed. This lead can accumulate over months and years in a child’s body. Damage sustained at this early stage of development is permanent.

The effects of excessive lead exposures on the brain and nervous system in early childhood may persist through late adolescence. Studies of groups of children exposed to chronic high lead levels in early childhood found children have increased chances of poor performance at school including:

- reading disabilities
- problems with attention and fine motor skills

- lower class standing
- increased absenteeism
- lower vocabulary and grammatical/reading scores

These children are more likely to develop behavioural and social problems and are less likely to graduate from high school. It must be stressed, however, that excessive exposure to lead is only one of a number of causes of learning difficulties, behavioural problems and attention deficits in children.

THE STAFF

Lead effects are greatest for young children and pregnant women; however, adults can be seriously affected by excessive exposure also. The staff will need information about lead and its effects, both for informing the parents of children in attending the service and for protecting their own health, especially when renovation work is being undertaken.

Exposure to lead in adults is linked to:

- loss of libido
- infertility
- aggressiveness and higher blood pressure
- loss of appetite
- constipation
- anaemia
- in severe cases, paralysis, fits, swelling of the brain, seizures, coma and death

Women may be at slightly greater risk of lead poisoning: many women may have low iron levels, which have been associated with increased lead absorption. While medical research on the effect of lead on women has been limited, it is likely they experience similar increases in blood pressure and neurological symptoms at higher levels as those found in other population studies.

PREGNANT AND BREASTFEEDING WOMEN

Physiological changes associated with pregnancy can increase maternal and foetal exposures to, and absorption of, lead due to:

- Slowed gastrointestinal transport, allowing increasing absorption of contaminants, such as lead;
- Increased respiratory tidal volume which may enhance inhalation exposures;
- Increased blood volume and body fat, which may affect concentrations of lead in the blood and its distribution to body tissues.

Exposure to lead before and during pregnancy is linked to:

- pre-term delivery
- low birth weight
- miscarriage and stillbirth
- problems in the early mental development of the foetus

The placenta poses no barrier to lead, which may be passed from mother to baby. The impact of low in utero lead exposures remains controversial. Care must be taken to avoid exposure to lead during pregnancy and breastfeeding. All people store lead in their body – mainly in the bones. As women’s bodies change during pregnancy, previously stored lead can be released from the bones and affect the health of the developing foetus. This can be serious if a woman has stored high lead levels and is not meeting her daily requirements of calcium, iron or zinc.

Pregnant staff who are concerned about lead hazards in the childcare setting should seek advice from their treating doctor, or obtain advice from the local Public Health Unit. Pregnant staff should be aware of the various environmental sources of lead exposure, particularly if their workplace or home was built before 1970 or is undergoing renovation.

SYMPTOMS OF EXPOSURE TO DIFFERENT LEAD LEVELS

The table on the next page shows the symptoms caused by “moderate”, “severe” and “medical emergency” levels of lead in the blood.

<u>Moderate</u>	<u>Severe</u>	<u>Medical emergency</u>
Children <45 (µg/dL)	Children 45-70 (µg/dL)	Children >70 (µg/dL)
Adults <60 (µg/dL)	Adults 60-80(µg/dL)	Adults >80 (µg/dL)
Muscle pains	Joint pains	Partial paralysis
Prickly, itchy feeling	General fatigue	Paralysis
Mild fatigue	Poor concentration	Brain swelling
Aggressiveness	Tremor	Stupor or coma
Irritability	Headache	Fits and vomiting
Lethargy	Abdominal pain	Gum lead line
Abdominal discomfort	Constipation	Colic
	Weight loss	Death

While the NHMRC has established a goal of 10 µg/dL for all Australians by 1998, most children with blood lead levels below 45 µg/dL (2.17 µm/L) may show no signs of elevated blood lead levels or illness. When symptoms do appear at higher levels, they may be non-specific symptoms like tiredness, abdominal pain or constipation, headache, irritability, aggressiveness and paralysis.

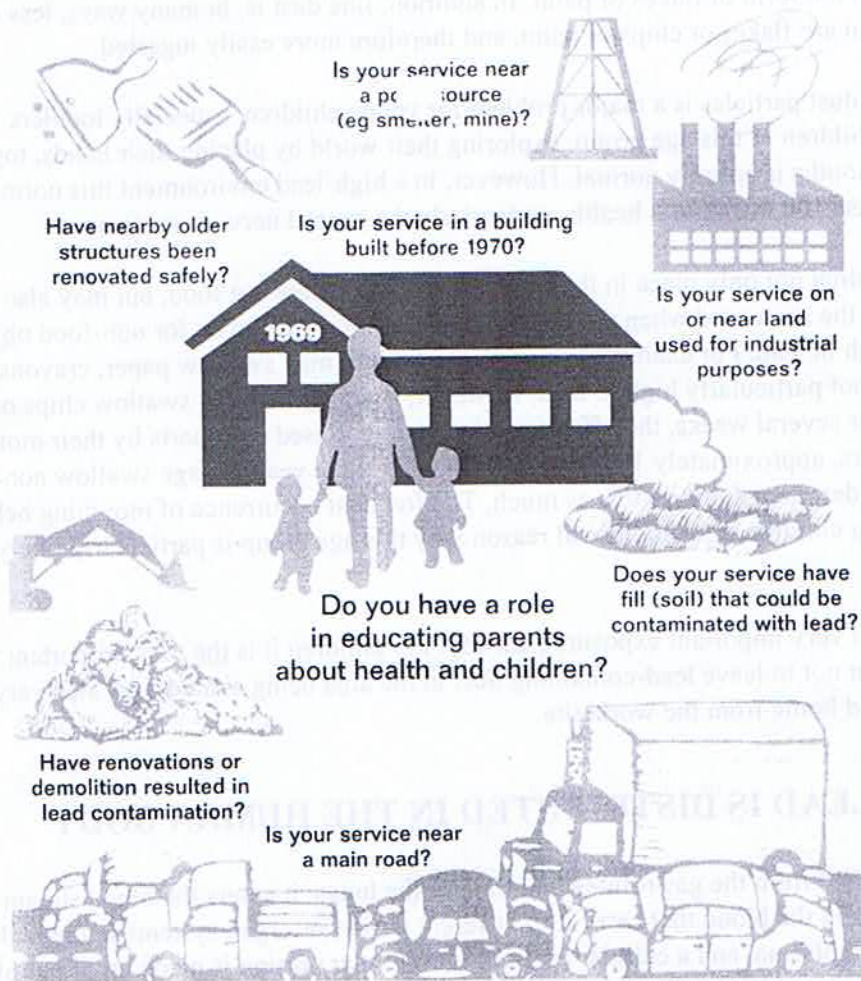
Lead Hazard Management in Children's Services

Early childhood is a crucial stage of development. Whether children are cared for at home, or away from home, it is important that the care they receive keeps them both physically and emotionally safe.

This booklet is about managing lead in children's services. It has been designed to help service providers develop systems that will minimise the risk of a child's exposure to lead.

Carers of children need to be aware of, and informed about, potential sources of lead in childcare facilities and be able to identify any dangers, so that exposure to lead as a hazard can be reduced.

It is important for carers of children in the childcare environment to ensure that the strategies that are adopted and then implemented focus on a high level of safety and quality for children in care.



This booklet is part of a program to increase the skills and knowledge of carers in children's services in order to minimise the risks of exposure to lead. It is accompanied by information for parents and references that can be obtained free of charge (see Resources and References section).

TESTING FOR LEAD

Because most children and adults who have been exposed to lead show no symptoms until high levels are reached, the best way to confirm excessive lead exposure is a blood test.

Lead in blood is most effectively measured in venous blood, taken using lead-free equipment. Capillary or finger-prick samples are not recommended because they could be contaminated by lead on the skin.

Except in cases of chronic exposure, a blood lead level does not reflect total body lead, only lead from recent exposure (within the last three to six weeks) still circulating in the bloodstream. The timing of the blood lead test is important and should be done while the person is living and working in their normal environments.

The less commonly used measurement of dentine (tooth) lead is considered a more accurate measure of total accumulated lead in the body, but there is disagreement about what constitutes a "normal" dentine level. Bone X-ray fluorescence also gives a more exact measure of the "body burden" of lead. These methods are used more for research purposes than for standard diagnosis.

Urine and hair tests are not recommended as a guide to clinical management, as contamination problems are common and they do not accurately represent circulating lead levels.

Where it is known or suspected that children have eaten paint flakes or have swallowed lead objects, health professionals should obtain an X-ray of the abdomen. If there is evidence of significant lead objects in the intestine, a cathartic and possibly activated charcoal should be considered (although its value has not been proven).

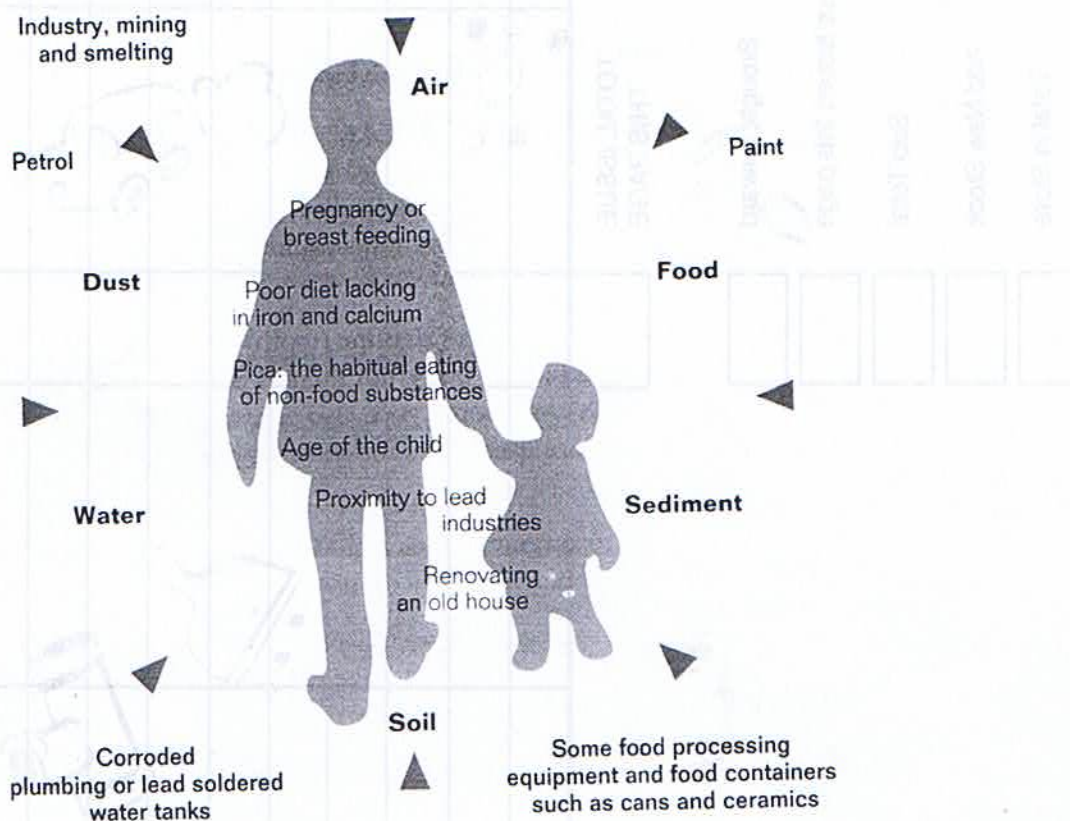
WHO SHOULD BE TESTED?

The NHMRC recommends blood tests for children who:

- Are aged 9 to 48 months and live in or visit older dilapidated houses;
- Are aged 9 to 48 months and have been present during "unsafe" renovations of pre-1970 houses;
- Have brothers or sisters with elevated blood lead levels;
- Have pica (habitual eating of non-food items, e.g. dirt), particularly if living in pre-1970 housing;
- Are aged 9 to 48 months whose parents may be occupationally exposed or who are living near an active lead mine, smelter, battery recycling plant or on highways or main roads with heavy traffic;
- Children exposed to the less common exposure pathways, e.g. lead hobbies, folk medicines containing lead;
- Children with intellectual disability or behaviour problems should be considered for testing.

Adults should also have a blood test if they have been renovating pre-1970 houses, have any of the symptoms above, or work in industries or hobbies that use lead. If you are at risk, the cost of the test is covered under Medicare.

SOURCES AND PATHWAYS OF LEAD EXPOSURE



OLD LEAD PAINT

Old lead paint is one of the major hazards facing people occupying pre-1970 buildings. Most homes built or decorated in Australia before 1970 contain lead paint – which can be dangerous, especially if the paint is peeling or breaking down.

Lead was a major ingredient in paint from the late 1800s to 1970. It was used as a base, a drying agent, as colouring (often white, red, orange, yellow and scarlet) and to protect steel or iron from rust.

Older houses will usually have more lead paint present because:

- older types of paint contained more lead (up to 50% of the volume of paint)
- lead paint was used on more parts of the house, both inside and outside
- The house paint now available has only a small amount of lead in it (about 0.1%)

Lead paint can be dangerous even before renovations start. Paint in good condition around windows, doors, stairs, skirting boards and other features can be knocked off or ground into dust as part of normal wear and tear.

Deteriorating paint can peel off in large pieces, flake off in smaller chips or can “chalk” (break down into a fine powder). Children and pets can accidentally eat paint chips or dust. These dangers are increased during renovations. Fine dust can be breathed in or can contaminate the house, its contents and surrounding gardens or play areas. Some types of renovation activities can disturb or create new lead paint hazards.

LEAD-CONTAMINATED DUST

Renovations can disturb existing lead-contaminated dust built up over many years in ceiling cavities, behind walls and between or under floorboards. Sources of lead dust include:

- industrial pollution
- car exhaust
- the breakdown of old lead paint
- previous renovations in the house or nearby
- emissions and fumes from burning wood covered in lead paint or coal (which contains traces of lead and other metals)

Working in places where lead dust is present, or opening up or demolishing walls, ceilings or floors, can quickly spread dust and contaminate the house. Unsafe renovation practices - including sand blasting, burning and dry mechanical or hand-sanding old lead paint- can create serious dust hazards.

Lead dust on floors or in carpets may be accidentally eaten by young children when they put their hands on toys covered in lead dust in their mouths while playing or moving around.

LEAD-CONTAMINATED SOIL

Many sources of lead can contaminate soil and surrounding buildings. A common source is old lead paint, either peeling or being washed off exterior walls, fences, sheds and garages.

Undisturbed soil within 2 m of the wall or structure is likely to be the most contaminated in the garden. Soil underneath the house or verandahs can also contain high levels of lead due to the breakdown of paint. Other sources of lead that can contaminate soil include nearby industries, busy main roads, contaminated fill used in the garden, hobbies that use lead paint or materials (such as making fishing sinkers, or car or boat restoration), or unsafe renovations of the property or neighbouring houses.

Contaminated soil can be eaten by small children or animals, or brought into the house on shoes, clothes, toys or animals. Lead is non-biodegradable - it does not break down. Once in the soil, if it isn't moved, it is there forever.

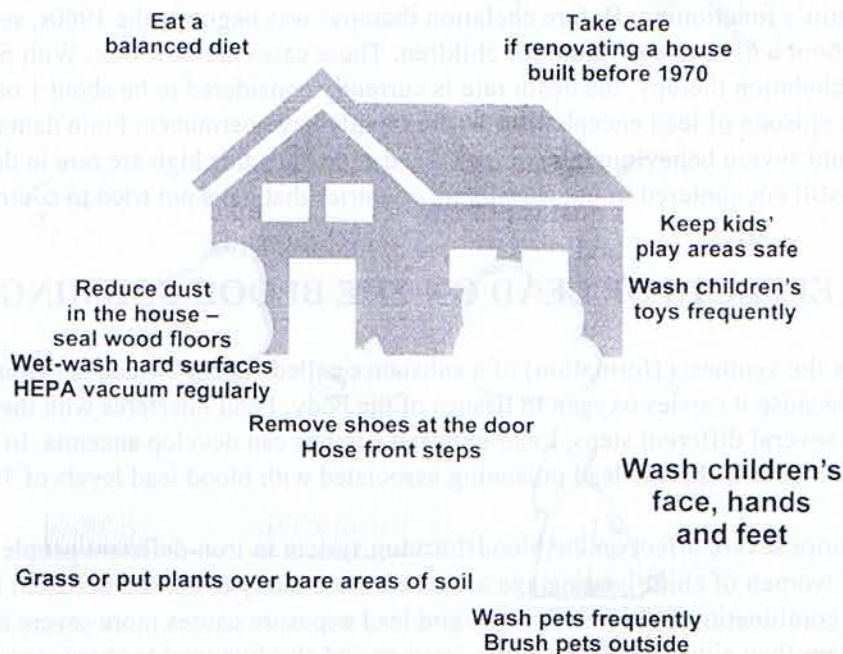
Other sources of lead in buildings:

- sheet lead and lead flashing
- lead solder (note: it is illegal to use solder containing lead on drinking-water pipes)
- lead water pipes and plumbing fittings
- PVC products
- leadlight windows

Other consumer products containing lead:

Some toys and equipment (ceramics, etc.) may contain lead, as there are few controls on lead in imported goods. Also some ethnic foods or medicines may contain lead. If a service is concerned about a toy or consumer product they can contact the Department of Fair Trading or, if they have concerns about food items, they should contact their Public Health Unit and have the item tested.

PREVENTION OF LEAD EXPOSURE: GUIDELINES FOR CHILDCARE STAFF



The best solution to reducing the health impact of lead is to avoid being exposed to lead hazards in the first place. This can be done by:

- Reducing or eliminating child exposures to lead hazards such as peeling lead paint or lead contaminated dust or soil, and/or;
- Reducing or eliminating lead hazards, and;
- Preventing the creation of future lead hazards.

What to do with the building and yard

Step 1

If the property was built before 1970 or you suspect lead may be an issue, organise a lead audit as soon as is feasible.

Directors should bring to the attention of the building owner any part of the structure (internal and external) that presents a possible lead exposure hazard, such as peeling paint and wallpaper or contamination from outside dust.

CONDUCTING A LEAD AUDIT

A lead audit will assess all sources of lead exposure inside and outside the building and in the outdoor play areas. Consult the owner or property manager, who should carry out a lead audit on your behalf. If you need to engage a private environmental consultant to conduct a lead audit, they are listed in the Yellow Pages. However, not all consultants will be experienced with lead. Environmental Health Officers at the Public Health Unit or Council can assist you with advice and information. They may even conduct the lead audit if there is evidence of childhood lead exposure at the centre. You can also contact the Environment Protection Authority's Pollution Line 131555 for more information.

Step 2

While this assessment of the property is being conducted, directors and staff can limit children's possible exposure to lead as far as possible, including both the internal and external environments of the care facility. Barriers to peeling or flaking paint areas, and to outdoor areas can be introduced:

- Children should not be able to touch peeling paint or "chewable" surfaces painted with lead paint, especially cots, windowsills and windows. Use tape or furniture to cover them up until they can be permanently fixed;
- Children's furniture, such as cots, should be moved away from surfaces with deteriorating paint;
- Children should play in grassy areas rather than places where dirt sticks to their fingers and toys. Plant grass or ground cover on bare areas of soil;
- Children should play in a sand pit safely removed from bare soil areas.

Step 3

Following a lead audit which identifies sources of lead, you will need to discuss with management the type of work required to make the service safe from lead hazards. If lead is present in the building or yard, use contractors (builders and painters) experienced in lead safe renovations. Renovation can be done safely if it is planned properly, the necessary precautions are taken and the right equipment is used. See the Lead Safe Renovators Booklet for information about how to renovate buildings and yards safely.

The service will need to develop policies for the ongoing management of lead hazards.

Step 4

If work is to be conducted, the service should ensure that the building contract specifies the procedures for lead safe work practices and that the project manager makes sure that all work is carried out in accordance with these procedures. All staff and parents should be kept informed about the procedures, and extra cleaning may be needed while work is in progress.

Step 5

A clearance test of the property is recommended to assure the service of the safety of the building and yard or to identify the areas needing further action. This should be conducted by a qualified environmental consultant experienced in lead assessment.

What to do about ongoing repairs and maintenance in pre-1970 buildings

Step 1

Directors should ensure that all damage to walls and doors is reported and that immediate action to make the area safe for children is undertaken.

Step 2

Directors should ensure that all ongoing repairs to the building or yard are conducted with the awareness that lead may be present and that lead safe precautions should be taken.

Education of Staff and Parents

All staff should be aware of the effects of lead on health and the actions that can be taken to prevent adverse health effects from lead exposure.

Directors and staff should be aware of the various resources that can be consulted for information or for remedial action when a lead exposure arises.

The issue of lead should be discussed with the other staff, parents, management committee or maintenance group for your building. Training should enable staff to identify children who may be experiencing adverse health effects from lead exposure and bring the information to the attention of the director.

The director should inform parents of children who may be at risk of exposure to lead and provide information to the parent about lead issues.

Prevention through improved hygiene

Use the same measures recommended to control the spread of germs to help prevent lead dust build-up on hands and surfaces:

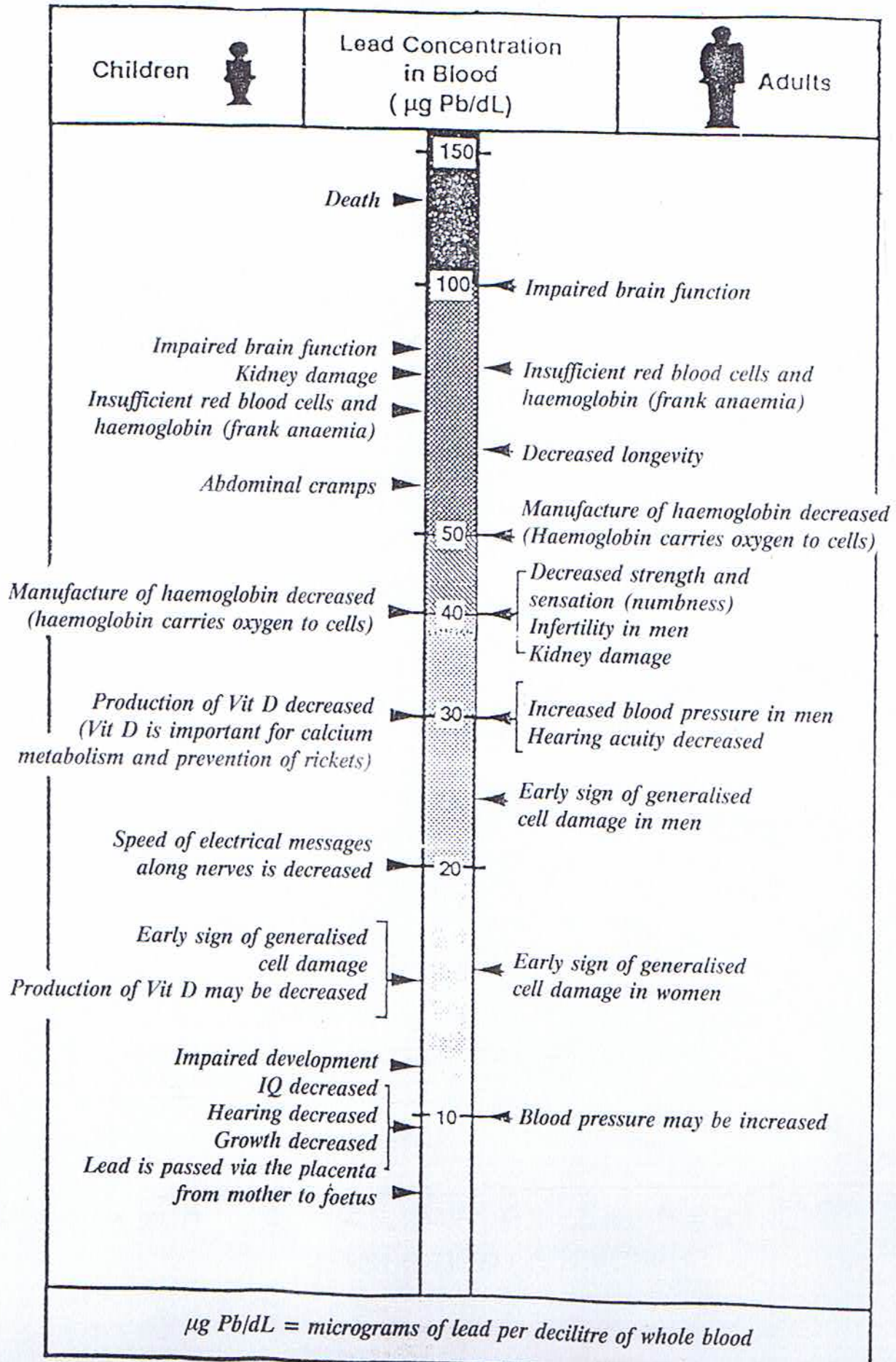
- Children should wash their hands and faces (babies' feet should be washed) before eating or having a nap;
- Wash fruit and vegetables before eating;
- Encourage children to throw away food that falls on the floor;
- Keep indoor toys inside and outdoor toys outside;
- Wash children's toys (especially those used outside) and dummies frequently;
- Seal wood floors to reduce collection of dust between floorboards and to provide a cleanable surface;
- Wet-wash hard surface halls, floors, stairs and windows with water mixed 4:1 with phosphate detergent, then rinse with clean water;
- Slowly vacuum any carpets contaminated with lead dust with a high efficiency particulate air (HEPA) vacuum (they can be hired), not your domestic machine;
- Hose front steps and verandahs, and remove shoes at the door.

Eliminating consumer products containing lead

Directors and staff should be aware of the possible lead exposure hazards in consumer products, such as toys or equipment that contain lead or leaded paint, and should prevent children's contact with these.

Adapted from: ATSDR, Toxicological Profile for Lead (1989)
Simplified by Dr Garth Alperstein, Community Paediatrician,
Central Sydney Area Health Service ph. 02 5506700 (1995).

Figure 1. Effects of Inorganic lead on children and adults--
lowest observable adverse effect levels



RESOURCES AND REFERENCES

Contact your local Council or your Public Health Unit for assistance in assessing the lead hazards in your service.

Environmental consultants (see the Yellow Pages) – are able to assess the extent of lead in your property and recommend action to minimise or eliminate lead hazards.

For information about lead in consumer products, contact the Department of Fair Trading on 9895 0111.

For further information, consult these materials (obtain copies from the EPA Pollution Line on 131555).

Lead Safe: A guide for health care professionals 1997 (booklet)

Lead Safe Fact Sheet: Lead, your health and the environment 1997 (an accompanying fact sheet in Korean, Vietnamese, Arabic, Chinese, Turkish, Macedonian, Spanish)

Lead Safe: A guide to keeping your family safe from lead 1997 (booklet)

Lead Safe: A renovator's guide to the dangers of lead 1998 (booklet)

Lead Safe Fact Sheet: Old lead paint 1997

Lead Safe Fact Sheet: Lead in ceiling dust 1997

Lead Safe Fact Sheet: Lead safe housekeeping 1997

Lead Safe Fact Sheet: Lead and home renovations 1997

Information can also be accessed through the Lead Reference Centre's websites:

<http://www.epa.nsw.gov.au/leadsafe>

<http://www.epa.nsw.gov.au/leadsafe> .