

# Model Australian Public Health Policy on Lead

*This policy was developed by Joanne Farrelly and Kate Whittaker from the Macquarie University NSW and is based on the “[Model National Public Health Policy on the Prevention of Lead Poisoning](#)” (2008) by Anne Roberts and Elizabeth O’Brien of The LEAD Group Inc. Edited by Anne Roberts and Elizabeth O’Brien, 3<sup>rd</sup> December 2010*

## Preamble

In 2009 the NHMRC made the following recommendations (goals):

*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.*

This model policy is proposed by The LEAD Group for adoption by Australia’s National Health and Medical Research Council (NHMRC). The NHMRC is the national body that recommends health policy to the Health Ministers of Australia’s federal (national) government, and state and territory governments. Please also read the [BACKGROUND to the Model Australian Public Health Policy on Lead](#), published by The LEAD Group Inc.

The policy adopts the German practice of setting blood lead ‘targets’ for people with a blood lead level above that of 95 per cent of the survey population (the 95<sup>th</sup> percentile). The targets can be expected to trend downwards, as awareness, prevention and treatment of lead poisoning continues to improve. (To make this clear: there would be no such thing as a ‘national’ target for the whole population; there would, instead, be targets for each sub-group, to be set by a process of blood lead level surveys, as described below. On the other hand, there could be a national ‘goal’, nominated by the NHMRC. See below.) Once established by blood lead survey, the targets to become ‘action’ levels, as in Germany; meaning, something should be done, for example, reduce their blood lead level, remove the source of lead poisoning, etc.

The policy calls for an immediate national blood lead level survey, with subsequent surveys at five-year intervals.

The policy also suggests determining and allocating responsibility for prevention of lead poisoning in order to reach the targets.

## Preliminary

Prevention of lead poisoning is commonly divided, in health literature, as consisting of Primary, Secondary and Tertiary Prevention.

**Primary Prevention** is the responsibility of all three Australian levels of government, and possibly international government bodies, in some cases. It is concerned with preventing

lead poisoning occurring in the first place. (See introduction to the BACKGROUND to the Model Australian Public Health Policy on Lead, mentioned above, on the nature of government in Australia.)

**Secondary Prevention** is more diversified, in that it is not necessarily possible to designate, in advance, whose responsibility it is. Secondary Prevention is concerned with individuals, and is about removing the individual from the source of lead exposure, or removing the source from the individual. A typical example of the former would be a person changing their occupation or place of residence in order to stop being exposed to lead. An example of the latter would be removal or abatement of lead contaminated soil from a backyard before allowing a lead poisoned child who has pica, to play there. Health Departments have a clear role in writing Clinical Practice Guidelines for secondary lead poisoning prevention and overall management of cases of elevated blood lead level.

**Tertiary Prevention** is concerned with preventing the lead already in a person's body from doing further harm; and specifically, in the case of lead, causing early death. Responsibility for this is also diversified, from the individual and their medical professionals seeking to counter the effects of lead poisoning through diet or treatment, to governments sponsoring long-term studies of the effects of certain treatment protocols and nutritional interventions, and writing Clinical Practice Guidelines.

*There must be strategies for carrying out or encouraging all three forms of prevention. These strategies need to be tailored to the specific circumstances of Australia, but public awareness campaigns as to the health effects of lead (particularly the little-known long-term health effects), possible sources of exposure, and what can be done, are essential.*

**Having signed the OECD's Declaration on Lead, Australia has a duty to promote good lead management policies internationally. The policy concludes with proposals for this.**

## **The Policy**

**Adopt Germany's approach (world's best practice) to setting individual action levels within sub-populations, for blood lead**

The NHMRC accepts that lead exposure should be minimized and that no threshold exists for negative impacts of lead exposure. All lead exposure is harmful. Those individuals who have a blood lead level above the 95<sup>th</sup> percentile for their sub-population are recommended to be followed-up with state or territory health department assistance in identifying lead sources and pathways and advice on nutritional intervention and prevention of further exposure.

**Assess baseline blood lead levels by sub-population: research who is at risk and what are the sources and pathways**

Develop and implement a national blood lead survey of all ages, to definitively establish who is at risk and what are the most common and most concerning sources and pathways of lead exposure in Australia. Base a review of the NHMRC's 2009 goal (see Preamble, above) on the survey results. (Note: much is already known as to sources of lead poisoning. A blood

lead survey will help quantify degrees of risk, and possibly reveal previously unsuspected sources and pathways of lead exposure.)

Plan and carry out a National All-Ages Survey to test Lead in the Blood of representative samples\* of all Australian adult and child sub-populations. The following identified high-risk sub-group's within the sub-populations require over-sampling to allow for statistically significant findings: Aboriginals and Torres Strait Islanders, people living in older housing, people undergoing renovations on housing built pre 1970, people dependent on rainwater for drinking water, lead mining and smelting community residents, smokers, passive smokers, ex-smokers, alcoholics, people taking Ayurvedic medicines or Chinese herbal medicines, people suffering from hypertension, osteoporosis, learning difficulties, developmental delay, autism, pica (eating non-food items such as soil or plastics), cataracts or Alzheimers, hobbyists such as backyard car-repairers, renovators, jewellery-makers, fishing sinker or ammunition casters, ceramicists, artist painters, lead workers and ex-lead-workers, etc.

\* A representative sample is a small number (big enough to obtain statistically significant results) of the targeted sub-populations, as listed above, whose characteristics represent (as accurately as possible) the entire sub-population.

Based on the results of the survey, identify individuals and groups with elevated blood lead levels (i.e. above the 95<sup>th</sup> percentile), and implement relevant legislative changes and education programs for doctors and the public within those sub-populations and sub-groups, and fund ongoing monitoring programs consisting of regular follow up surveys to determine the success of the interventions. In each repeat of the national blood lead survey of all ages, use isotopic fingerprinting\* to identify the sources of lead exposure in the 5% of the study population with the highest blood lead levels.

\* Isotopic fingerprinting is an expensive technique used to identify the original mine source and pathways of lead found in the blood.

Set new National Health and Medical Research Council (NHMRC) national blood lead targets\* according to the 95<sup>th</sup> percentile (the blood lead level that 95% of the population is already below) for the survey results within each sub-population: Foetal (via the umbilical cord), pre-crawling babies and 4-8 month old children in lead mining and smelting towns; 9 month to 5 year olds; 6-17 year olds; men and women born after the peak in the use of lead in petrol (1985); men and women born before the peak in the use of lead in petrol in Australia; post-menopausal women, retired men.

\* A target is a blood lead level to be achieved by the entire sub-population by a certain date.

To successfully achieve the continual reduction of the targets, National Blood Lead Surveys should be conducted every 5 to 7 years in order to achieve an intermediate goal\* for all Australians to have a blood lead level less than 5 micrograms per deciliter and a long term goal of less than 2 micrograms per decilitre, with the ultimate goal being zero blood lead level.

\* A goal is the result or achievement toward which an effort is directed - it has no timeframe for success, but it drives policy.

Review the recommended timing and frequency of Occupational blood lead testing and recommended action levels for workers exposed to lead and other heavy metals according to Occupational Health and Safety Regulations.

Lead workers eventually change industry or retire, and their lead bone stores from occupational exposure then becomes a public health issue, rather than one of Occupational Health and Safety. (This is because the 'acceptable' blood lead level is much lower for non-lead industry workers.) Blood lead surveys for individuals in all lead-related occupations should be carried out and the results used to set new blood lead targets for workers under 18 years, and workers over 18 years, according to the 95<sup>th</sup> percentile for each lead-risk occupation.

According to the recommendations made by the Australian Institute of Occupational Hygienists Inc (AIOH), immediately establish a reduced industry standard on the medical-removal and return-to-work lead levels. Following the blood lead survey, new targets can be set by occupation to establish medical removal benchmark, whereby the worker is removed from the lead risk job (and provided with non-lead risk work) if blood lead levels exceed the target. Establish a separate and significantly-reduced blood lead level by occupation for workers returning after medical removal.

### **Primary prevention: preventing lead poisoning occurring in the first place**

Blood lead testing and collation and analysis of the results is the most useful tool in setting a baseline for individuals and sub-populations, and for ongoing monitoring to determine whether lead poisoning primary prevention policies are working.

Develop a questionnaire, regarding patients' symptoms and behaviours, to trigger a blood lead test, either by the doctor ordering a blood lead test or the patient requesting one.

Make this questionnaire publicly accessible - e.g. on NHMRC's website, and on display in doctors' waiting rooms. Educate doctors on the range of symptoms and behaviours which may be caused by exposure to lead, but which also may have another cause. Encourage doctors to automatically order a blood test for lead when such symptoms or behaviours manifest themselves.

Through provision of advice to doctors, and publicly-accessible information - e.g. on NHMRC website, pamphlets in doctors' waiting rooms - aim to increase by at least ten-fold over the next two years, the number of blood lead tests carried out each year in Australia and add all results to a national register with details of postcode, gender, age, any known lead exposure and the reason for testing. It is only by pre-testing and post-testing blood lead levels at times when the blood lead level could reasonably be expected to change (e.g. before and after an infant begins crawling in an old home; when moving children into an old home or a family to a smelter or mining town; when planning to renovate an old home or to conceive; when an older person is forced into inactivity and bed-rest due to bone break/s, etc); that cases of elevated blood lead levels can be found at the time of exposure, rather than missed altogether.

Promote lead to be included in opportunistic testing\* of blood within a medical setting, especially when a patient is being investigated for iron deficiency anaemia, pica, developmental delay, hypertension, Alzheimers disease or osteoporosis.

\* Opportunistic testing occurs when an additional test is offered to an individual when they present to a health care practitioner for a medical enquiry which would normally entail a blood test. For example, a woman of reproductive age who presents to the doctor for a blood test to confirm pregnancy could also be tested for lead (and iron and other nutrients).

Provide input to veterinary associations recommending the publication and dissemination via veterinary clinics of a factsheet about pets as sentinels for human lead poisoning, stating that vets recommend blood lead testing to family members (especially young children or renovators) whenever a pet is diagnosed with elevated blood lead levels, if the lead source is not known or is known to be a source which humans may also be exposed to.

Recommend to the states and territories that they promote and support the Australian Government's "[National Waste Policy](#)"; in particular, the [Product Stewardship Scheme](#), which will recycle televisions, computers and electrical appliances, and should be operational by 2011. Promote the expansion of E-waste recycling services in Australia and encourage involvement from all levels of government.

In accordance with [Australia's commitment to fulfilling the objectives of the Basel Convention](#), the NHMRC recommends that the Department of Sustainability, Environment, Water, Population & Communities (DSEWPaC) license smelters to recycle wastes containing heavy metals. This will dispose of hazardous matter close to the source of production and reduce its movement.

In accordance with Australia's commitment to the [OECD Declaration on Risk Reduction for Lead 1996](#)) recommend that Customs be alert to new uses of lead in imported items; and, if found, regulate to limit such new uses of lead. Encourage research into finding substitute materials for lead products such as fishing sinkers and jigs, motor vehicle wheel weights, shot and bullets.

Ensure that aviation gasoline (AvGas), and fuel for motor racing boats and vehicles which still use the additive Tetraethyl lead (TEL) are phased-out while also ensuring that unleaded fuels maintain the requirements for effective functioning and safety of the racing vehicles and aircraft.

Keep a watching brief on the U.S. Environmental Protection Agency (EPA) which is in the process of reviewing the extent to which aviation lead emissions cause or contribute to air pollution, and in turn impact upon health. The results will be used to review the emission engine standards and the transition of piston engine aircraft to use unleaded fuel. Adopt similar policy in Australia.

Recommend that the Federal Government develop a Foreign National Policy on the importation, exportation and safe disposal of lead.

Recommend that the Federal Government establish legislation to ban the international export of lead ores or concentrates to smelting companies that are on-selling or using

Australian lead for the production of leaded petrol, lead-based paints or inks, leaded pesticides or other dispersive uses of lead for which alternatives exist.

The Foreign National Policy will prohibit the exportation of leaded ores, concentrates or refined lead metal to countries which have not established adequate facilities to smelt, manufacture lead products or recycle them safely. Lead corporations to provide assistance to non-Organization of Economic Co-operation and Development (OECD) countries to develop large scale lead acid battery and e-waste recycling plants.

Recommend that the Federal Government establish an OECD countries' Lead Licensing Scheme to enforce safety standards on the exportation by OECD countries of lead ores, concentrates and refined lead metal to non-OECD countries.

Recommend that the Federal Government enforce stricter heavy metal standards on ALL food imports into Australia. Current Australian food manufacturing regulations, according to Food Standards Code 1.4.1, limit the content of lead in food, if it is the only present chemical present, to 0.01 mg/kg. If other metals or chemicals are present, the limit of lead varies according to different food groups.

Recommend that the Federal Government enact regulations to prohibit the importation of products painted with lead-containing paints and inks and glazes.

The Therapeutic Goods Administration, which is responsible for the regulation of quality and safe therapeutic goods in Australia, to set a limit for lead in all imported traditional medicines, such as traditional Ayurvedic medicines. Customs regulations to require lead testing of all imported traditional medicines which are known to be potentially lead-contaminated from medical cases.

The Australian Competition and Consumer Commission, Product Safety Australia, to require labels on heat guns, electric sanders, grinders, grinding discs, flame torches, sand paper and sanding sponges, and scrapers, warning purchasers of the danger of producing hazardous lead dust or fumes when the tools or materials are used dry, to remove leaded paint.

### **Secondary Prevention: preventing further exposure to lead in individuals**

Given that most people born in the era of leaded petrol or who have been smokers or had family members who smoked, or who had a hobby or occupation that exposed them to lead, or other sources of exposure, will have *some* level of lead in their blood, the 'trigger' for secondary prevention will be if the person's blood lead level is above whatever is the target level at the time for that sub-population (e.g. retired men or post-menopausal women). It is only possible to prevent further exposure if the lead sources are properly identified and eradicated.

#### ***Whose responsibility is it?***

Well, it depends. It [secondary prevention] is about identifying - from either a national blood lead level survey, or other blood lead level research, groups of persons likely to be at risk...and encouraging (them) to have a blood lead test. Individuals, parents and health professionals need to be aware that a person's behaviour or symptoms may be linked to a

high blood lead level, and both doctors and public health officers need to be well-enough informed to identify what, in the individual's environment, is the probable source of the person's exposure to lead. (See above, under Primary Prevention)

A National Surveillance Program requiring ALL blood lead results to be notified to the Register set up for the purpose, along with ANY information about likely sources of lead for results above 2 micrograms per decilitre. Quarterly collation and analysis by the health departments and reporting on trends and sources for elevated blood lead levels. Quarterly summary of results and warnings about identified lead sources to alert doctors, health staff and the public.

The NHMRC recommends to pathology laboratories that they add to their blood lead testing reports that an elevated level which is above the 95th percentile target for the particular sub-population which the patient is a member of, should be followed up with further testing of specific nutrients, such as iron, calcium, zinc, copper, and any other deficiencies known to increase absorption of lead. State health departments are recommended to do follow-up home lead assessments and state occupational health agencies are recommended to carry out follow-up occupational lead assessments in response to these elevated blood lead levels. The environmental assessment results will also be used to write the quarterly summary of results and warnings about identified lead sources in each state and territory with particular emphasis on clusters of results above the 95<sup>th</sup> percentile (the current target for a particular sub-population), in a particular area health or population health area.

The NHMRC recommends that State and Territory governments legislate for Local Councils to assume responsibility for establishing records of land use involving likely sources of lead contamination.

State and Territory Governments are recommended to write guidelines on the safe development of private food production gardens, chicken runs and community food production gardens. Potential community garden locations to be tested for lead and pH and for arsenic in areas known to have been orchards or market gardens previously (where lead arsenate pesticide may have been used). The results of the test to be recorded and acidity/alkalinity to be neutralized by soil treatment then retested for pH until it is within recommended levels to gain council approval.

State and Territory Governments are recommended to ensure specialized training and licensing for professionals on the safe testing and abatement of lead in paint, dust and soil contamination.

Only qualified ceiling dust removalists to conduct ceiling dust abatement in homes to be renovated, maintained or demolished. NHMRC recommends this be completed before demolition or partial demolition and replacement (ceilings and cavity walls). Ceiling dust removal prior to demolition or partial demolition is to be *enforced*, when the building is government property.]

NHMRC recommends testing to determine lead content and safe removal of lead-contaminated accessible under-floor soil for the safety of family and pets. Leachate-protected landfill disposal or controlled re-use as non-accessible fill, of lead-contaminated soil.

Regulations requiring homebuyers and renters be informed prior to renting, buying and renovating older houses of the likelihood of lead in paint, dust and soils and any known history of lead-related activity on the land and to receive results from Local Council of any previous testing of lead concentrations in soil, waterways, paint, and cavity and ceiling dust on the residential property.

Renting and buying individuals should be given all known information on lead-based hazards in and around the specific house and general government publications, by the real estate agent, before the sale or lease of property built prior to 1970's.

The contract for buying or renting should include a lead warning statement. This must comply with the notification requirements to the buyer or renter that the property may contain traces of lead. The possible sources of lead must be identified and located where possible.

Develop Regulations and Education Packages to promote recycling, testing and awareness of lead.

Develop campaigns to create public and professional awareness of sources and impacts of exposure to lead and guidance on the management and treatment, by nutritional intervention of elevated blood lead levels.

Extend Producer Responsibility legislation and education on the safe removal and recycling of household and consumer products containing lead, such as lead acid batteries, paints, lead flashing and damp coursing and mirrors. Local councils should be involved and establish specialized collection sites or services.

Educational awareness acknowledging the impacts of nutrients, including calcium, iron, vitamin C, zinc, phosphorous and selenium that reduce lead absorption. Also, thiamine (vitamin B1), folate (vitamin B9) and pectin have been shown to increase the body's lead excretion. Educational awareness is essential for children, parents and doctors working in lead mining or smelting towns.

Government-approved home lead testing kits on sale in hardware and gardening specialty stores would be useful secondary prevention strategy.

Direct the National Institute of Clinical Studies (NICS) commission development of clinical practice guidelines for secondary lead poisoning management by health professionals, for web-publication at the NHMRC's Guideline Portal ([www.nhmrc.gov.au/publications/subjects/clinical.htm](http://www.nhmrc.gov.au/publications/subjects/clinical.htm)) Direct the NCIS to incorporate lead management guidelines into relevant clinical practice guidelines, e.g., "Male Infertility" and "Management of Early Pregnancy Loss."

Award a Translating Research Into Practice (TRIP) Fellowship to an early-to-mid-career clinical leader to research approaches in applying research to improve clinical practice in management of recently-identified lead poisoning cases and secondary lead poisoning prevention (preventing further lead poisoning in those cases)

Re-educate health professionals and employers on new blood lead level targets, set by the National All-ages Survey and have the Register provide continuous updates on lead statistics and lead prevention information.

New information based on policy changes, research studies and health promotion campaigns.

### **Tertiary Prevention**

Carry out research and conduct studies to verify existing and establish new links between lead and whole-of-life adverse health effects. Also, carry out or encourage research linking lead poisoning treatments and any resulting reduction in adverse health effects.

The NHMRC supports research into synergistic effects of lead and other heavy metals, lead and pesticides, lead and other toxics.

In particular, investigate the feasibility of developing a lead-free or even heavy-metal-free cigarette so that the synergistic effects of smoking and lead exposure can be researched.

Fund clinical, double-blind trials to test whether certain intervention protocols regarding the removal of lead from the body succeed in reducing risk of known health effects of low blood lead levels, specifically, levels below 10 µg/dL. These interventions should include low-dose chelation, Vitamin C, Pectin and Cholella.

Design and implement a study to investigate the links between elevated blood lead levels and what are regarded as normal symptoms of aging. Research the link between minerals returning to the blood stream as bones demineralise with age, and health effects including cardiovascular disease, high blood pressure, stroke, renal failure and osteoporosis.

Direct the National Institute of Clinical Studies (NICS) to commission the writing of Tertiary Lead Poisoning Prevention Clinical Practice Guidelines for web-publication at the NHMRC's Guideline Portal (<http://www.nhmrc.gov.au/publications/subjects/clinical.htm>) and to organise for lead management knowledge to infiltrate all other relevant clinical practice guidelines e.g. "Calcium and Bone Health", "Clinical Guidelines for Management of Cardiovascular Risk", "My hands shake: Classification and Treatment of Tremor."

### **International extension work**

Extend the benefits of this policy internationally, in accordance with Australia's commitment to the [OECD Declaration on Risk Reduction for Lead 1996](#):

"Extend co-operative efforts to share, including with non-OECD countries, information about exposures of concern, risk reduction options and environmentally sound and economically viable technologies in order to reduce risks from exposure to lead."