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MASSEY UNIVERSITY TE KUNENGA KI PŪREHUROA UNIVERSITY OF NEW ZEALAND

Lead absorption notifications in New Zealand

HIGHLIGHTS:

- **Lead absorption is an important public health problem and is a notifiable disease in New Zealand.**
- **Young children are at greater health risk than adults.**
- **Child lead notifications in 2013 were at their highest since 2003.**
- **In 2013, 81 lead notifications occurred in occupational settings.**
- **In 2013, 99 lead notifications were from non-occupational of which 13 were children under 15 years.**
- **For children, the main sources of exposures were lead fishing sinkers and lead-based paint.**
- **For adults, lead-based paint and indoor rifle range were the most common sources of lead exposure.**

Lead absorption is an important, under-recognised, public health issue

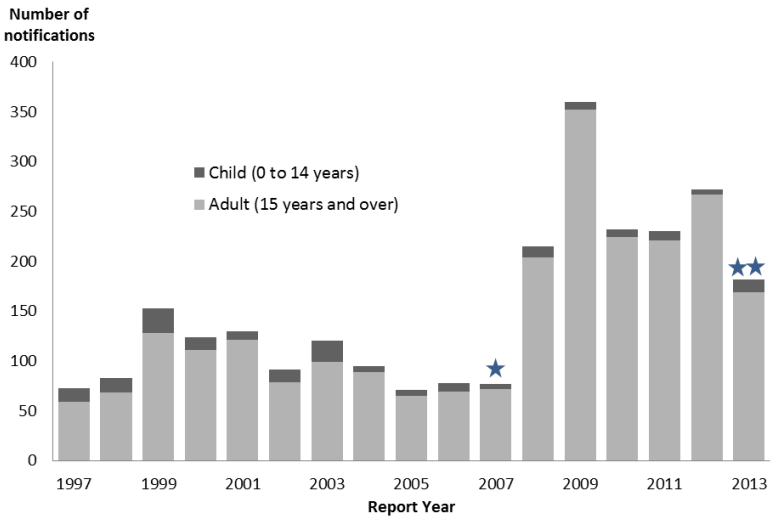
Lead absorption is an important, and under-recognised, public health issue. The World Health Organization (WHO) ranks lead among 10 chemicals of major public health concern. Lead poisoning accounts for about 0.6 percent of the global burden of disease and is one of the most common childhood diseases of toxic environmental origin.[1] Young children are at greater health risk than adults. Their behaviour and physiology make them more susceptible to exposure and absorbing lead. When lead is ingested or inhaled, it travels to the bloodstream where it accumulates in tissues such as bones and teeth, from which it may be released back into the bloodstream.[2]

In New Zealand, lead absorption is a notifiable disease if whole blood lead level is greater than or equal to 0.48 micromole per litre (µmol/l). At this level, public health interventions are required for children and non-occupationally exposed adults.[2]

A new electronic reporting system, the Hazardous Substances Disease and Injury Reporting Tool (HSDIRT), was designed for general practitioners (GPs) to notify cases of disease and injury related to lead and other hazardous substances. The HSDIRT has operated throughout New Zealand since late 2013 and has replaced the EpiSurv surveillance system for lead since January 2014.

Child lead notifications in 2013 at their highest since 2003

Figure 1: Number of lead notifications in New Zealand, 1997-2013



Children (≤ 14 years) accounted for 13 cases in 2013 - the highest number of child notifications since 2003 (Figure 1). Of the 180 notifications of lead absorption in 2013, over 80 percent were males and the 45-64 year age group had the highest number of lead notifications (80 cases).

The 2013 notifications are a mix of EpiSurv and HSDIRT notifications. The removal of repeat blood lead level tests taken within 12 months of the original test in this analysis may have contributed to the decrease of lead notifications in 2013.

*In 2007, direct laboratory notification was introduced, the non-occupational notifiable blood lead level was lowered from 0.72 to 0.48µmol/L and enhanced occupational screening was introduced in the Auckland region.

** In 2013, the HSDIRT was rolled out to all health districts. Repeat blood lead level tests taken within a year of the original test have been excluded from the data unless further public health investigation has resulted.

Sources: Institute of Environmental Science and Research (1997-2013) and Hazardous Substances Disease and Injury Reporting Tool (2013) .

Lead absorption notifications in New Zealand

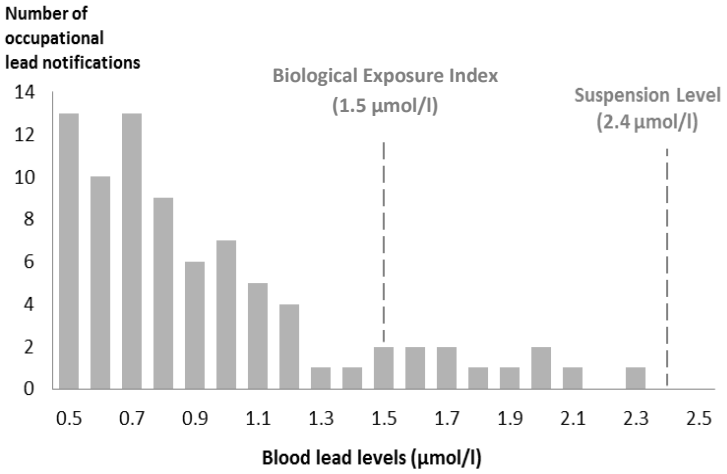
81 lead notifications from occupational exposure

In 2013, there were 81 lead absorption notifications where occupation was recorded as the source of exposure. The blood lead levels of relevance are 1.5 µmol/l (the Biological Exposure Index [BEI]) and 2.4 µmol/l (the suspension level) (Figure 2).

The BEI for lead is a guideline value that indicates the importance of an individual worker's blood lead level. The suspension level is used to suspend employees with high blood lead levels from working with lead until the lead in their bodies reduces to an acceptable level.[3]

There were 12 cases with a blood lead level of ≥1.5 µmol/l including three scrap metal workers from the same workplace. There were no occupationally-related cases reported above the suspension level (2.4 µmol/l) with the highest blood lead level recorded being 2.3 µmol/l.

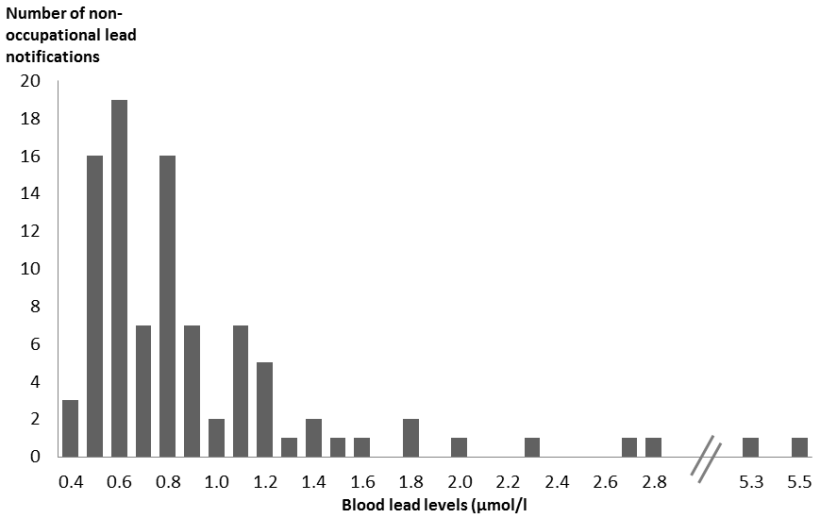
Figure 2: Occupational blood lead levels, 2013



The most common occupational exposures were for painter/decorators (17 cases), scrap metal workers (9 cases), and foundry workers (5 cases).

99 non-occupational lead exposure notifications

Figure 3: Non-occupational blood lead levels, 2013



In 2013, there were 99 lead absorption notifications with a non-occupational source of exposure. The highest blood lead level recorded was 5.5 µmol/l (Figure 3). The source of this lead exposure was ayurvedic (traditional Indian) medicine.

Thirteen children under the age of 15 years were exposed to lead in 2013. All seven children between the age of 0-4 years had blood lead level concentrations between 0.48 and 0.71 µmol/l. The most common sources of children's exposure were lead fishing sinkers and lead-based paint. Pica—an eating disorder characterised by a craving for non-food items—was also reported for two children.

Lead-based paint (24 notifications) and indoor rifle range (17 notifications) were the most common sources of lead exposure for adults (15+ years).

Health effects of lead absorption

Notifications of lead are not a true reflection of the problem. A number of cases go undetected as there is often no symptoms at lower lead levels.[2] There is no known safe blood lead level. However, it is known that, as the blood lead level increases, the range and severity of symptoms and effects also increases.[4] Low level lead absorption can affect the development of the brain and nervous system in young children including the fetus. This is considered irreversible. In adults, lead can cause long-term harm such as increased risk of high blood pressure and kidney damage. Exposure of pregnant women to high levels of lead can cause miscarriage, stillbirth, premature birth, and low birth weight.[4]

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