

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.
- The number of lead notifications decreased in 2016 compared to 2015.
- There were 51 (48%) lead notifications where occupation was recorded as the source of exposure in 2016 compared with 37 (31%) notifications in 2015.
- In 2016, there were 52 lead notifications for adults (15+ years) from non-occupational or unknown exposures, six of which were for children under 15 years old.
- In 2015, there were 81 lead notifications for adults (15+ years) from non-occupational or unknown exposures, six of which were children under 15 years old.
- In 2015 and 2016, lead-based paint was the most common source of non-occupational or unknown lead exposure for both children and adults.



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 (WHO, 2010). 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 (Ministry of Health, 2012).

In New Zealand, lead absorption is a notifiable disease if the whole blood lead level is greater than or equal to 0.48 micromoles per litre ($\mu\text{mol/l}$). At this level, public health interventions are required for children and non-occupationally exposed adults (Ministry of Health, 2012).

An 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 absorption since January 2014.

The number of lead notifications decreased in 2016 compared to 2015

There were 106 notifications of lead absorption in 2016 (2.3 per 100,000 population) compared with 121 notifications in 2015 (2.6 per 100,000 population) (Figure 1).

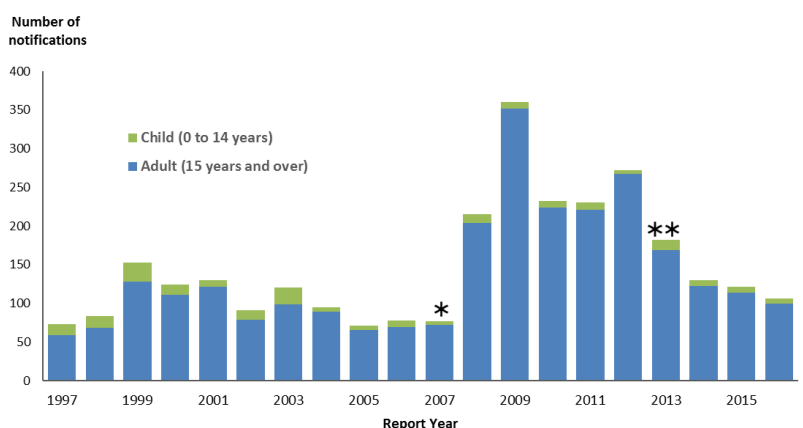
Note:

* In 2007, direct laboratory notification was introduced, the non-occupational notifiable blood lead level was lowered from 0.72 to 0.48 $\mu\text{mol/L}$ 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 HSDIRT (2013-2016).

Figure 1: Number of lead notifications in children and adults by year, 1997-2016



Lead absorption notifications in New Zealand

Males were the most affected

In 2016, 88 percent (93 notifications) of all lead notifications were males, and the most common age groups were 45-64 years (51 notifications), followed by 25-44 years (31 notifications) (Table 1). The most common ethnic group was European/Other with 64 notifications.

In 2015, 84 percent (102 notifications) of all lead notifications were males, and the most common age groups were 45-64 years (56 notifications) and 25-44 years (33 notifications) (Table 1). The most common ethnic group was European/Other with 85 notifications.

Table 1: Demographics of lead absorption notifications, 2015-2016

Age group (years)	2016				2015			
	Female	Male	Unknown	Total	Female	Male	Unknown	Total
0-4	2			2	6			6
5-14		4		4		1		1
15-24	1	2		3		9		9
25-44	2	29		31	7	26		33
45-64	8	43		51	3	52	1	56
65+		14		14	2	14		16
Unknown		1		1				
Ethnicity								
Māori		8		8	1	4		5
Pacific	2	3		5	1			1
Asian		6		6		4		4
European/Other	9	55		64	12	72	1	85
Unknown	2	21		23	4	22		26
Total	13	93		106	18	102	1	121

Sources HSDIRT (2016).

For occupational lead notifications, painters were the most exposed to lead

In 2016, there were 51 lead absorption notifications (49 % of all lead notifications) where occupation was recorded as the source of exposure. Painter (29 notifications) was the most commonly reported occupation, followed by Foundry worker (3 notifications) (Table 2).

In comparison, there were 37 occupational lead notifications (31% of all lead notifications) in 2015. Painter (17 notifications) and Radiator repairer(5 notifications) were the most commonly reported occupations (Table 3).

Table 2: Number of lead absorption notifications by occupation, 2016

Occupation	Notifications
Painter	29
Foundry worker	3
Scrap metal worker	3
Radiator technician	2
Bricklayer	1
Car radiator manufacturer	1
Caretaker	1
Electrical soldering transformer	1
Cleaner	1
Fibreglass grinder	1
Lead lighter	1
Panel Beater	1
Roofer	1
Sandblaster	1
Sinker maker	1
Turner Fitter	1
Builder	1
Welder	1
Unknown	1
Total	52

Table 3: Number of lead absorption notifications by occupation, 2015

Occupation	Notifications
Painter	17
Radiator repairer	5
Builder	3
Metal worker	3
Glazier	2
Sandblaster	2
Engineer	1
Port worker	1
Renovator	1
Machinery mechanic/fitter	1
Cabinet maker	1
Unknown	1
Total	38

Note:

- Cases can be recorded as both occupational and non-occupational. Those cases were included in both occupational and non-occupational/unknown cases analyses.
- More than one occupation can be reported for a single notification. Therefore the sum of notification for each occupation may be higher than the total notifications.

Source for Table 3&4: HSDIRT (2016)

Lead absorption notifications in New Zealand

Lead-based paint was the most common source of non-occupational/unknown lead exposure in both children and adults

In 2016, there were 58 lead absorption notifications for both children and adults (15+ years), with the setting recorded as non-occupational or unknown (Table 4). Lead-based paint (24 notifications) and indoor rifle ranges (12 notifications) were the most common sources of lead exposure. Of the 58 notifications recorded, six were for children under 15 years old, four of which were exposed to lead-based paint at home.

In 2015, there were 87 non-occupational/unknown lead absorption notifications. The most common source of lead exposure for both children and adults (15+ years) was lead-based paint (26 notifications) (Table 5).

Table 4: Number of non-occupational/unknown lead notifications, by source of lead, for adults and children, 2016

Non-occupational/unknown lead sources	Notifications
Lead-based paint	24
Indoor rifle range	12
Bullet/sinker manufacturer	6
Traditional medicine or cosmetic	3
Pica	3
Ceremonial incense and dietary spices	1
Gunpowder	1
Restoration of lino casting machine	1
Unknown/other	13
Total	64*

Table 5: Number of non-occupational/unknown lead notifications, by source of lead, for adults and children, 2015

Non-occupational/unknown lead sources	Notifications
Lead-based paint	26
Indoor rifle range	20
Bullet/sinker manufacture	5
Traditional medicine or cosmetic	2
Pica	2
Close contact with people who were exposed to lead	2
Occupation also involved lead exposure	2
Leadlighting	1
Bullet	1
Lead-based solder	1
Unknown/Other	33
Total	95*

Note:

- Cases can be recorded as both occupational and non-occupational. Those cases were included in both occupational and non-occupational/unknown cases analyses.
- More than one lead exposure source can be recorded for a single notification. Therefore, the total can add to more than the number of notifications.
- Source for Table 4 and Table 5: HSDIRT (2016)

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 low lead levels (Ministry of Health, 2012). 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 (WHO, 2014). 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 (WHO, 2014).

For more information: <http://www.ehinz.ac.nz/assets/Reports/Hazardous-Substances-and-Lead-Notifications-Jan-Dec2016.pdf>

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