

Lead absorption notifications

This factsheet presents a national indicator, which allows us to monitor lead absorption.

Key facts

Pb

Lead notifications have decreased over the last decade



There have been more notifications for males than for females every year since 2014



Lead notification rates vary widely across public health units and district health boards



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



Painters were the most common occupational group notified with occupational lead exposure



Exposure to lead from the use of firearms is an under-recognised public health issue

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

The World Health Organization (WHO) lists lead among the ten chemicals of major public health concern. Lead poisoning accounts for about 0.6% 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 a greater health risk than adults as their behaviour and physiology make them more likely to be exposed, and more susceptible to absorbing lead. When lead is ingested or inhaled, it travels to the bloodstream where it rapidly accumulates in bones, from which it may be released back into the bloodstream (Ministry of Health 2012).

There is no known safe blood lead level, and as blood lead level increases, so does the range and severity of symptoms and effects (WHO 2014). Low-level lead absorption can affect the development of the brain and nervous system in young children and the foetus, which 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).

In New Zealand, lead absorption is a notifiable disease under the Health Act 1956 if blood lead levels are 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).

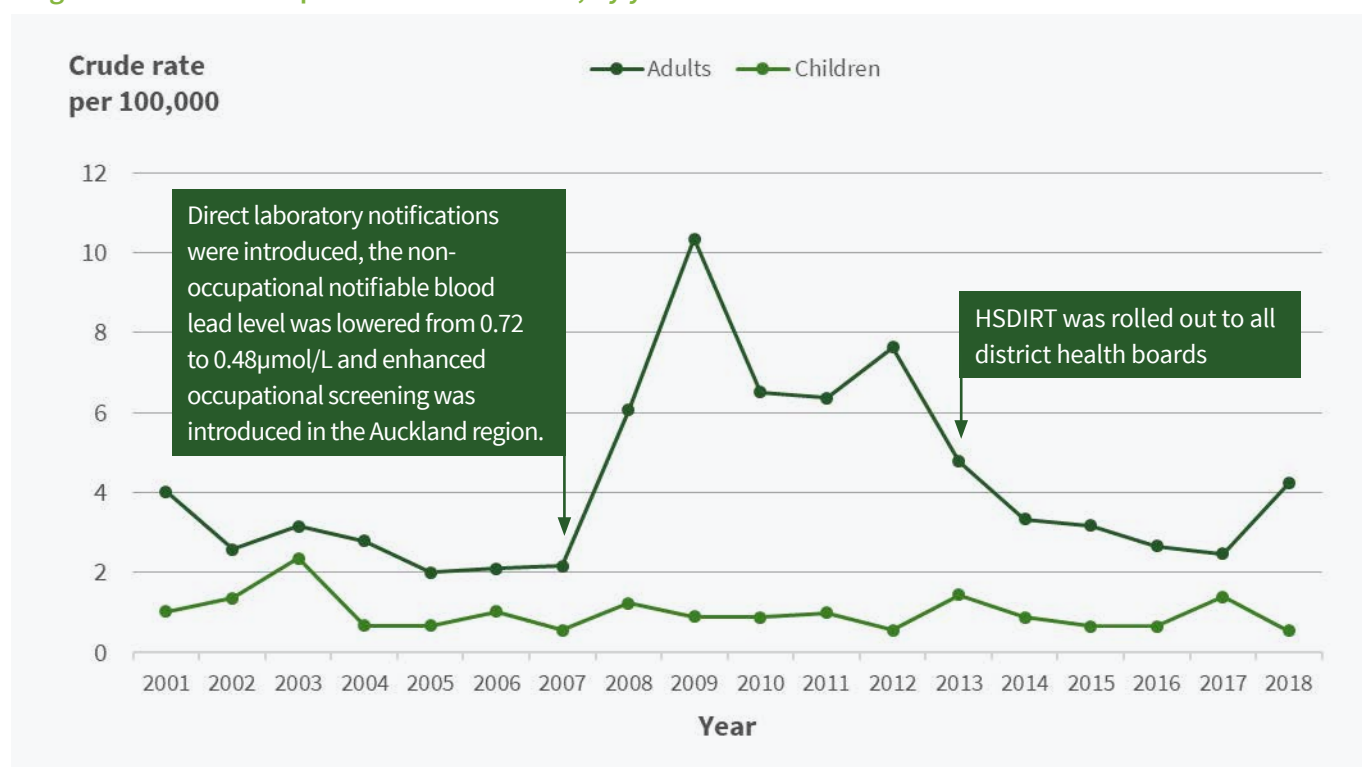
Lead-based paint is the most common identified source of lead exposure in New Zealand. A recent Official Information Act request revealed that more than 80% of Housing NZ properties – approximately 52,000 homes – have lead-based paint in some form (Clent 2019).

While lead-based paint on older buildings is generally well recognised as a source of lead exposure in New Zealand, there is less awareness of the risk of lead exposure from firearms use (Russell et al 2019).

Lead absorption notification rates have decreased among adults since 2009

There were 170 notifications of lead absorption in 2018 (3.5 per 100,000 population). For adults (15 years and over), the notification rate of lead absorption has decreased by 59% from 2009 (10.3 per 100,000) to 2018 (4.2 per 100,000), while the notification rate for children (0 to 14 years) has remained relatively constant (Figure 1).

Figure 1: Lead absorption notification rate, by year

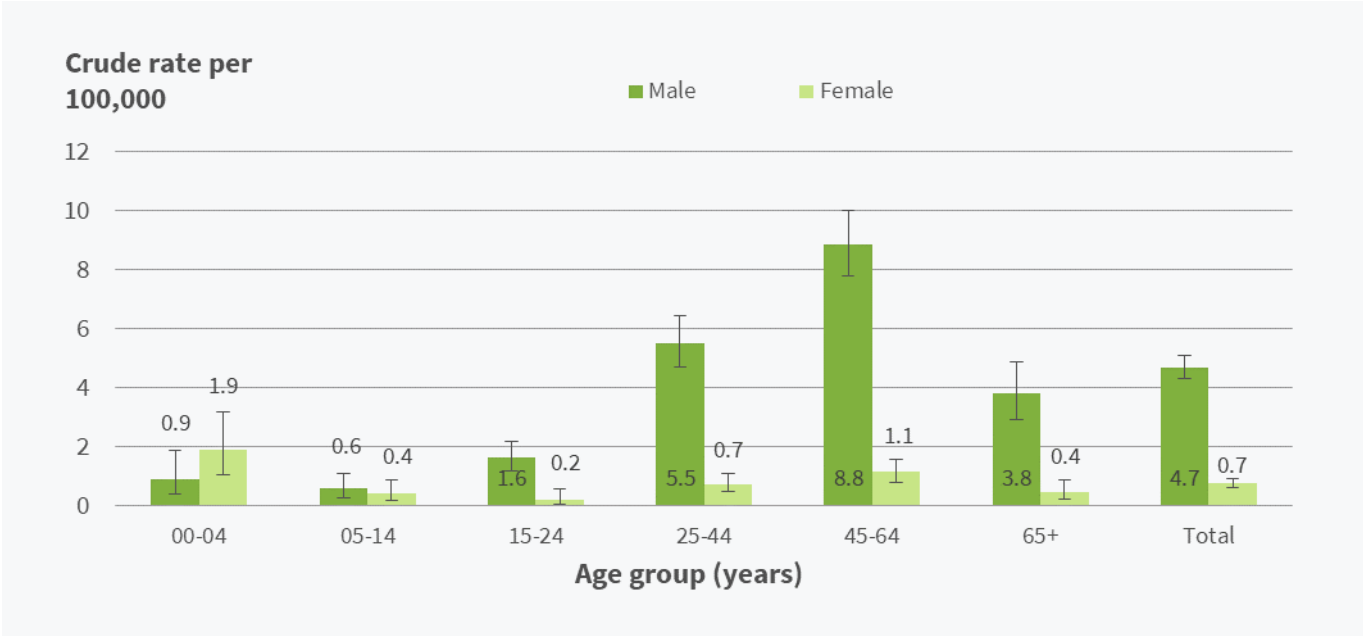


Source: Institute of Environmental Science and Research; Hazardous Substances Disease and Injury Reporting Tool (HSDIRT)

Males had higher notification rates than females.

In 2014–18, the lead notification rate was higher for males than for females, especially for the 25–44 years and 45–64 years age groups (Figure 2).

Figure 2: Lead absorption notification rate, by age group and sex, 2014–18



Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT)

In 2018, the notification rate for males was 6.0 per 100,000 (142 notifications), statistically significantly higher than for females, 0.9 per 100,000 (21 notifications).

Pacific people had the highest notification rate

In 2014–18, Pacific people had the highest notification rate (3.1 per 100,000; 46 notifications), followed by European/Other (2.6 per 100,000; 388 notifications). However, a large number of notifications listed ethnicity as ‘unknown’ (Table 1).

Table 1: Lead absorption notification rate, by ethnic group (prioritised), 2014–18

Ethnicity	Number (% of total notifications)	Crude rate per 100,000 (CI)
Māori	42 (6.6)	1.2 (0.8 – 1.6)
Pacific	46 (7.2)	3.1 (2.2 – 4.1)
Asian	35 (5.5)	1.1 (0.8 – 1.6)
European/Other	388 (60.9)	2.6 (2.3 – 2.9)
Unknown	101(15.9)	-
Not stated	25 (3.9)	-
Total	637	2.7 (2.5 – 3.0)

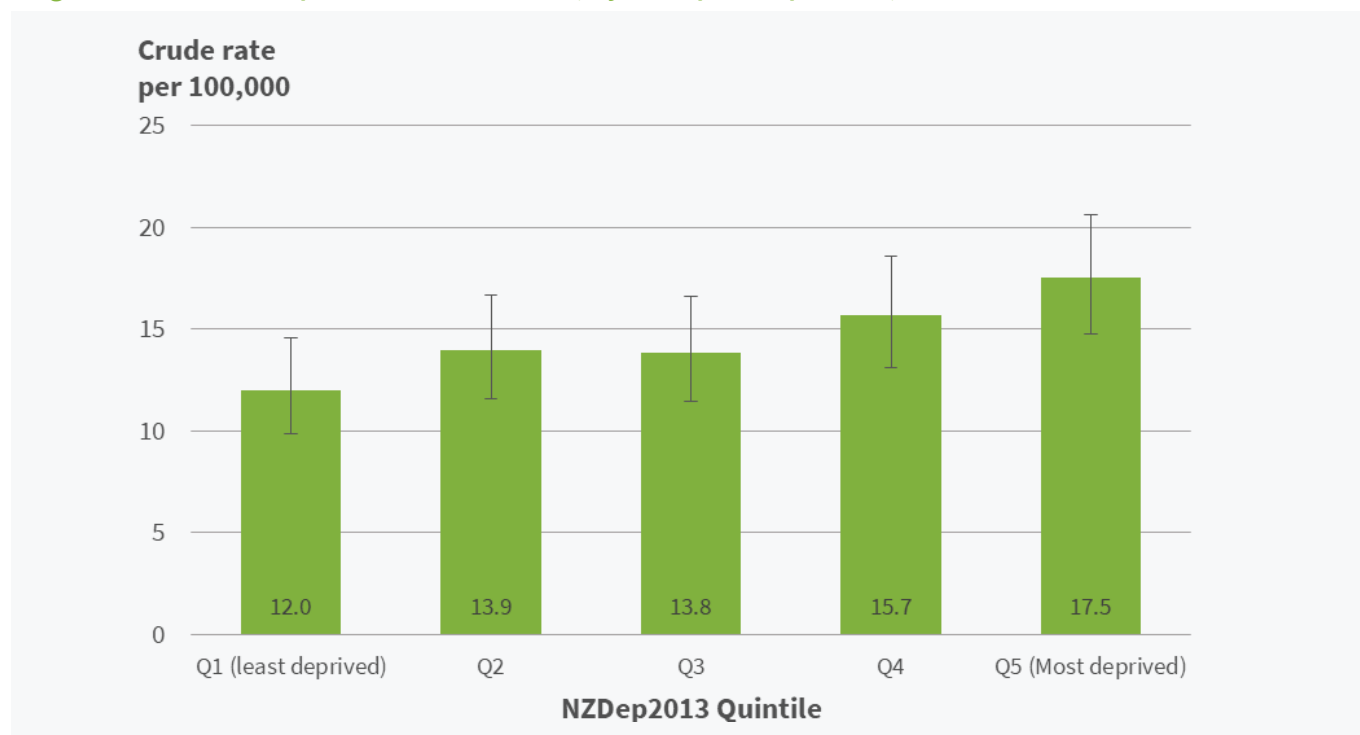
Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT)

In 2018, Pacific people had the highest rate – 12.1 per 100,000 (38 notifications), followed by European/Other with 2.4 per 100,000 (73 notifications).

Lead notification rates differed by socioeconomic deprivation

Overall, in 2014–18 there were statistically significantly more notifications from deprivation quintile 5 than deprivation quintile 1 (Figure 3).

Figure 3: Lead absorption notification rate, by NZDep2013 quintiles, 2014–18



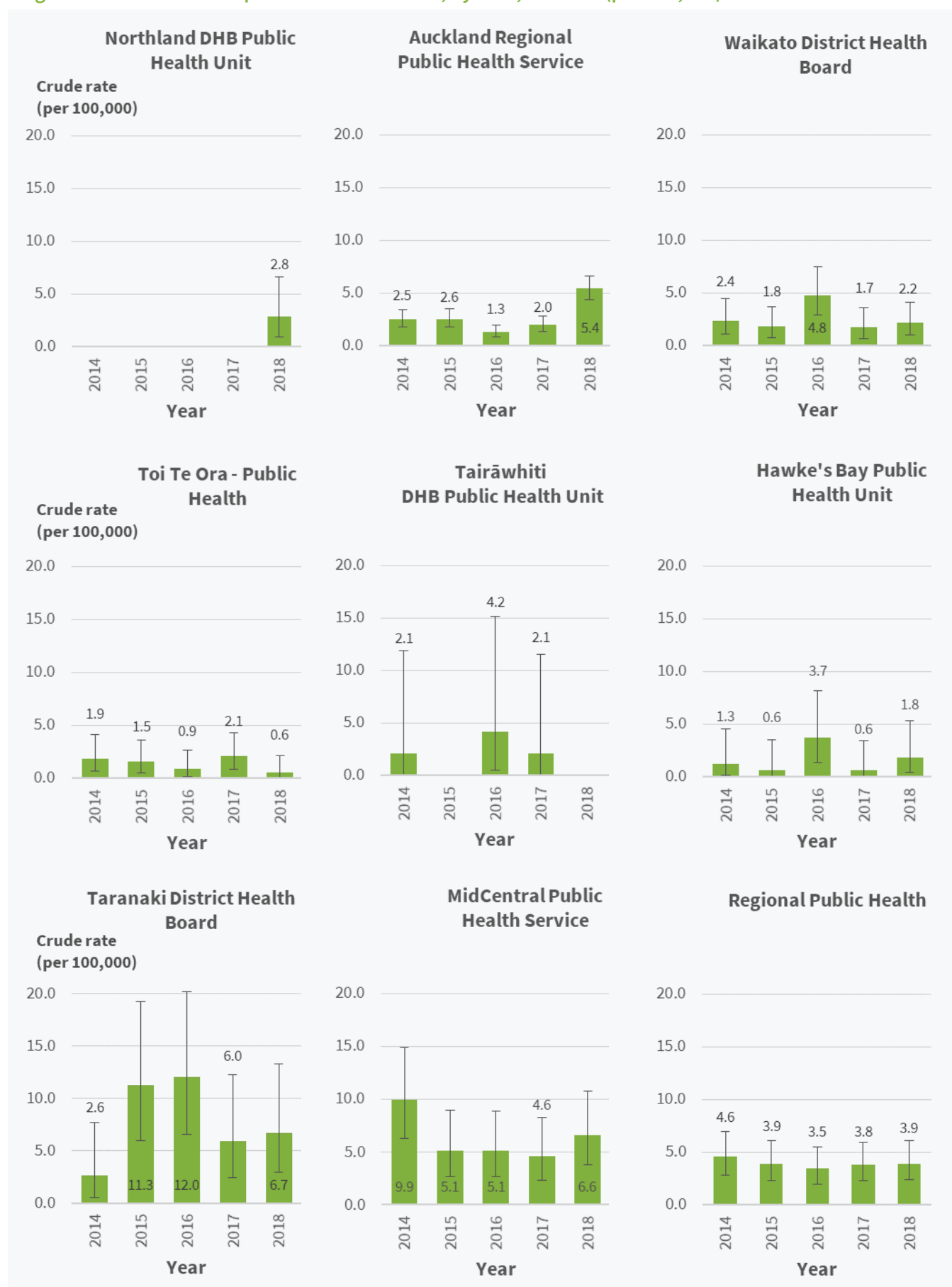
Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT)

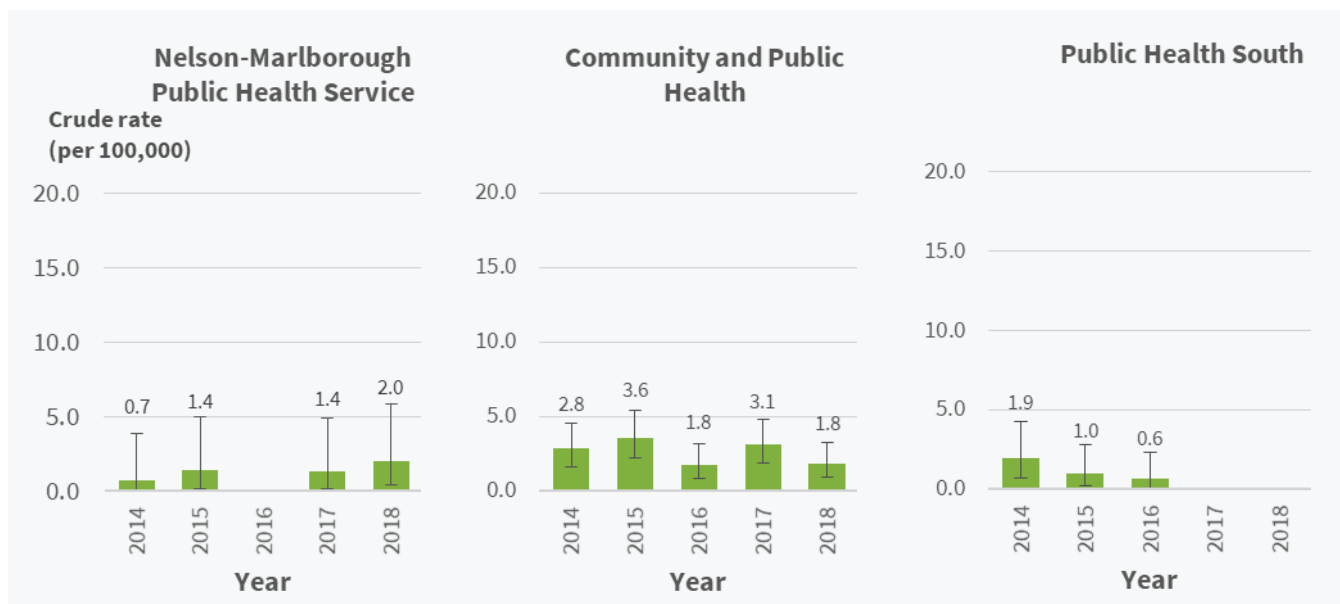
In 2018, the number of lead absorption notifications was highest among those who resided in deprivation quintile 5 (most deprived) areas (57 notifications) and lowest in quintile 2 areas (21 notifications).

Taranaki District Health Board and MidCentral Public Health Unit had the highest notification rates

In 2018, Taranaki District Health Board had the highest notification rate (6.7 per 100,000; 8 notifications), followed by MidCentral Public Health Service, with 6.6 per 100,000 (16 notifications) and Auckland Regional Public Health Service with 5.4 per 100,000 (92 notifications) (Figure 4).

Figure 4: Lead absorption notification rate, by PHU, 2014–18 (per 100,000)





Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT)

Lead absorption notifications by district health board (DHB)

In 2018, Wairarapa DHB had the highest notification rate at 15.7 per 100,000 (7 notifications), followed by Whanganui DHB with a rate of 12.4 per 100,000 (8 notifications).

Highest DHB notification rates in 2018

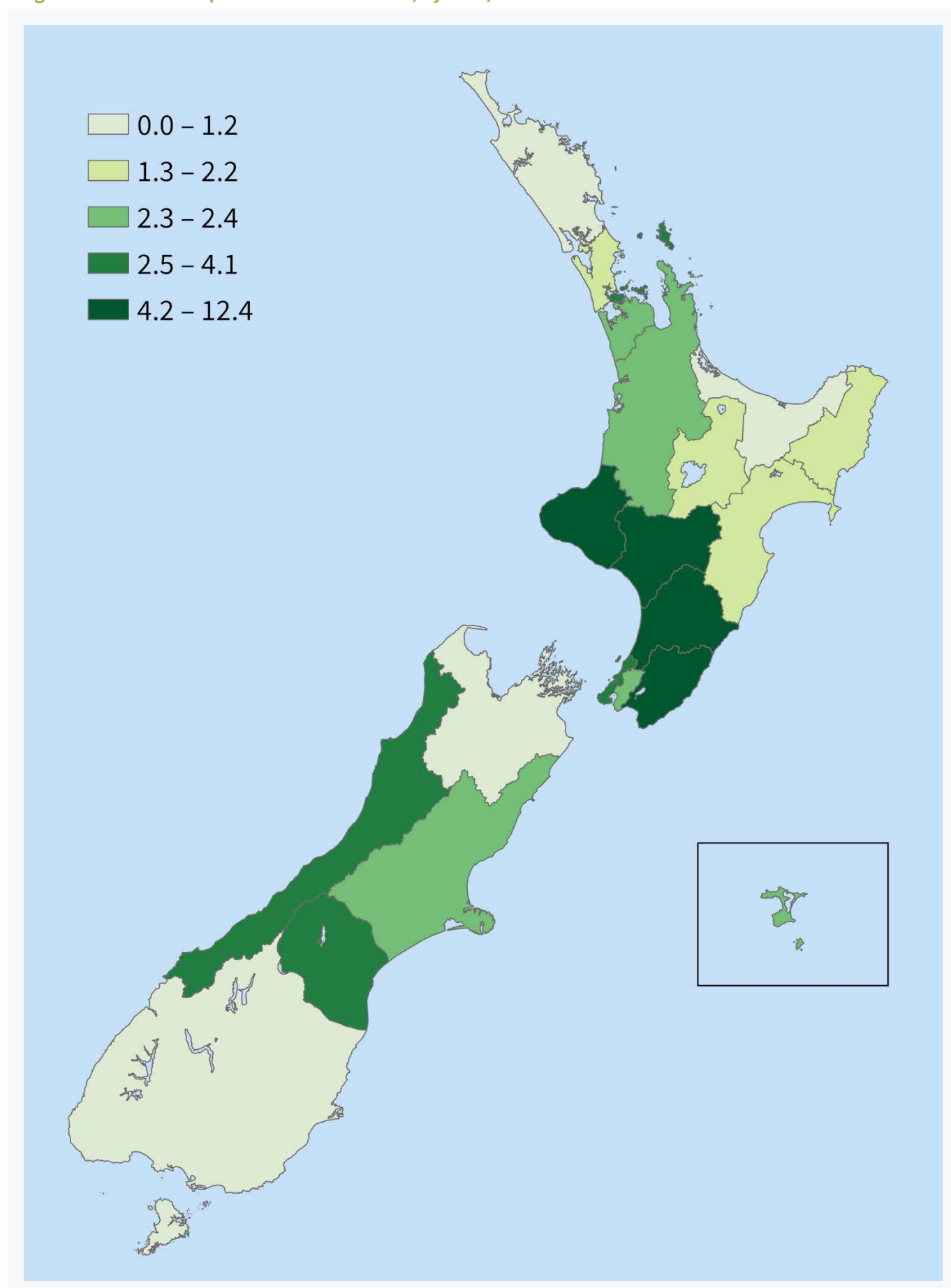
- Wairarapa 15.7 (7 notifications)
- Whanganui 12.4 (8 notifications)
- Counties Manukau 6.7 (37 notifications)
- Taranaki 6.7 (8 notifications)

From 2014 to 2018, Wairarapa DHB had the highest notification rate 12.4 per 100,000 (27 notifications), followed by Taranaki DHB with 7.6 per 100,000 (44 notifications) (Figure 5).

Highest DHB notification rates 2014 – 2018

- Wairarapa 12.4 (27 notifications)
- Taranaki 7.6 (44 notifications)
- Whanganui 6.7 (21 notifications)
- MidCentral 5.5 (92 notifications)

Figure 5: Lead absorption notification rates, by DHB, 2014–18



Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT)

Occupational lead notifications

Painters remain the most notified occupational group with lead absorption

In 2014–18, there were 262 lead absorption notifications where occupation was recorded as the source of lead exposure. In 2018, there were 75 occupational lead absorption notifications (44% of all lead notifications), compared to an average of 47 notifications per year from 2014 to 2017. Of the 2018 notifications, 34 were painters, who are the most commonly identified occupation since 2014 (Table 2).

Table 2: Number of occupational lead absorption notifications, 2014–18

Rank	2014	2015	2016	2017	2018
1	Painter (20)	Painter (16)	Painter (25)	Painter (21)	Painter (34)
2	Unknown (9)	Radiator repairer (4)	Metalworker (6)	Unknown (4)	Unknown (21)
3	Metalworker (5)	Cabinet maker (4)	Radiator repairer (3)	Paint/tank stripper (3)	Decorator (6)
Total*	55	39	53	40	75¹

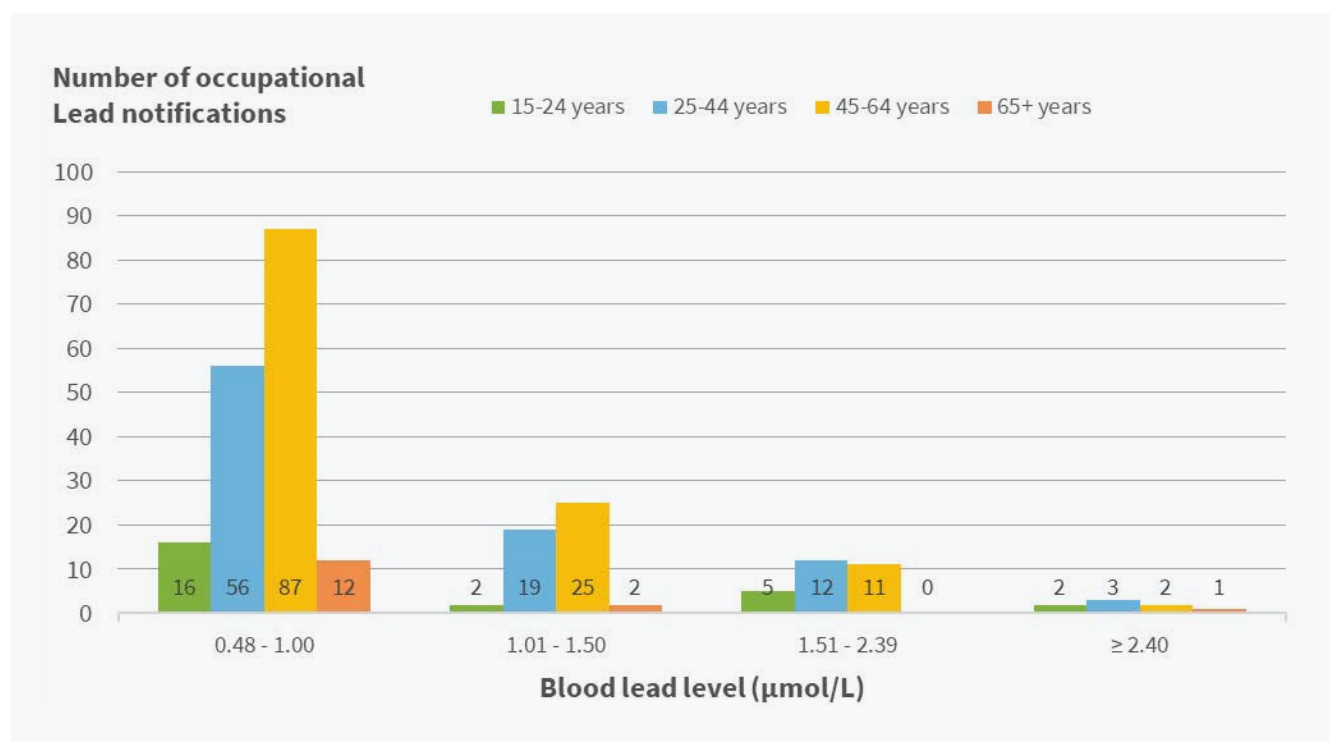
Note: ¹ Four cases were recorded as both occupational and non-occupational exposure and four cases were recorded as both occupational and unknown exposure.

*Totals include categories outside of the 3 rankings listed.

Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT)

The majority of the occupational lead notifications received in 2014–18 were below the 1.50 µmol/L Biological Exposure Index blood lead level for occupational exposure (Figure 6). In 2018, there were 34 notifications with a blood lead level that exceeded the Biological Exposure Index and eight notifications exceeded the suspension level² (2.40 µmol/L) including one ex-battery factory worker whose blood level was 2.60 µmol/L.

Figure 6: Number of occupational lead absorption notifications, by blood lead level and age-group, 2014–18



Note: ² A suspension level is used to suspend workers from working with lead until the lead in their bodies reduces to 1.93 μmol/L or less. Cases with unknown blood lead levels or ages were excluded from Figure 6

Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT)

Non-occupational lead notifications

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

In 2018, there were 95 lead absorption notifications with a non-occupational or unknown source of exposure. Of the 95 notifications, five were children aged under 15 years. Since 2014, lead-based paint was the most commonly identified source of lead exposure, followed by indoor rifle range, which indicates that lead-based ammunition is posing a risk to firearms' users (Table 3).

**While the risk of lead absorption from lead-based paint is well known
there is far less awareness of the risk from firearms use.**

(Russell et al 2019)

Other common non-occupational sources identified in 2014 – 18 were bullet or sinker manufacture, pica, traditional medicines and traditional cosmetics.

Table 3: Number of non-occupational or unknown lead absorption notifications, 2014–18

Rank	2014	2015	2016	2017	2018
1	Lead-based paint (25)	Unknown (35)	Lead-based paint (22)	Lead-based paint (27)	Unknown (55)
2	Unknown (23)	Lead-based paint (25)	Unknown (15)	Unknown (24)	Lead-based paint (17)
3	Indoor rifle range (19)	Indoor rifle range (22)	Indoor rifle range (11)	Indoor rifle range (10)	Indoor rifle range (14)
4	Bullet/sinker manufacturer (7)	Other (8)	Bullet/sinker manufacturer (7)	Other (7)	Other (5)
Total*	78	91	57	70	95³

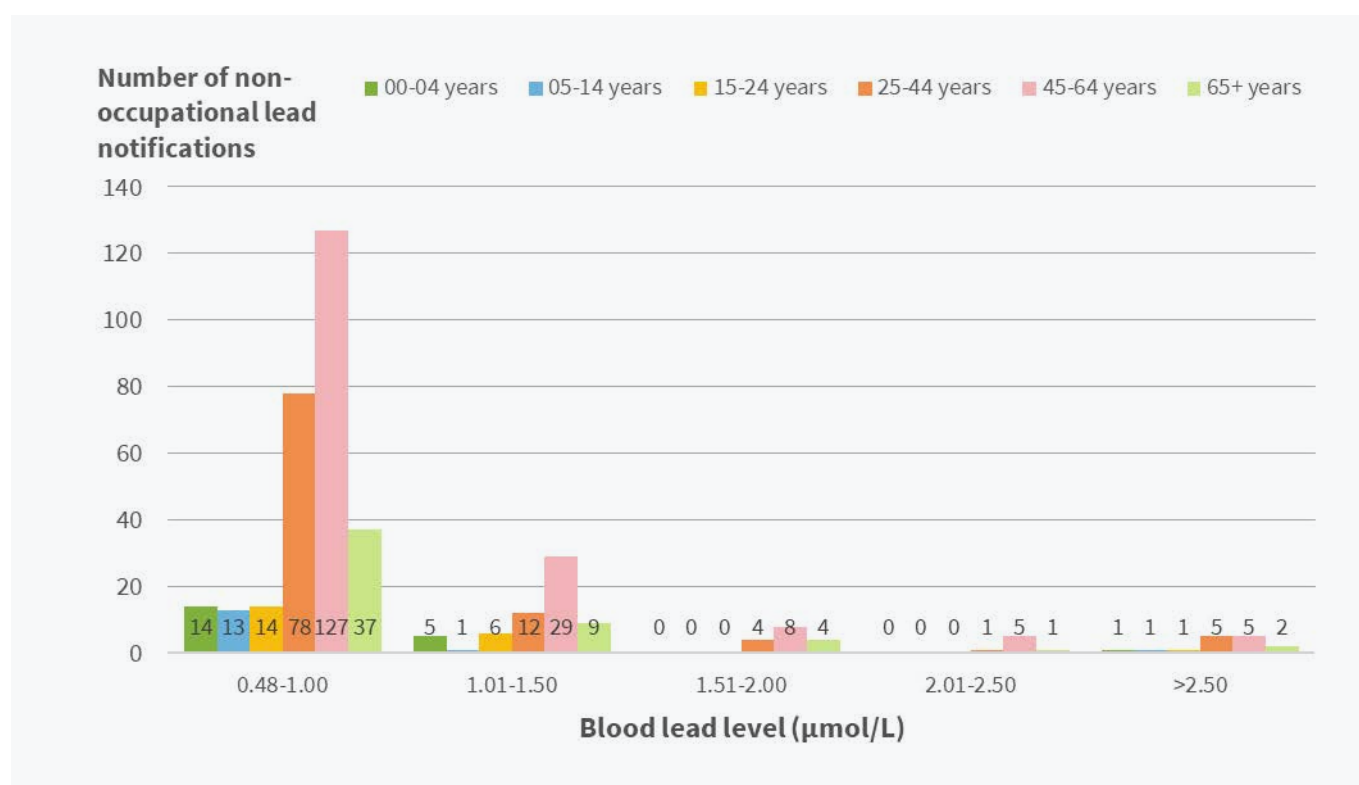
Note: ³Four cases were recorded as both occupational and non-occupational exposure.

*Totals include categories outside of the 4 rankings listed.

Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT)

In 2014–18, non-occupational lead exposure blood lead levels reached up to 6.80 $\mu\text{mol/L}$ (Figure 7). This was due to exposure from traditional medicines or cosmetics containing lead. Most non-occupational blood lead levels ranged from 0.48–1.00 $\mu\text{mol/L}$, with most notifications being adults aged 45–64 years.

Figure 7: Number of non-occupational lead absorption notifications by blood lead level and age-group, 2014–18



Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT)

Data for this factsheet

This indicator reports HSDIRT lead exposure notifications from 2014 to 2018. Data have been pooled to give sufficient numbers for analysis. Repeat blood lead tests taken within a year of the original test have been excluded from this data unless further investigation has resulted.

References

Clent J. 2019. More than 50,000 Housing NZ homes still contain toxic lead-based paint. URL: <https://www.stuff.co.nz/environment/111473661/more-than-50000-housing-new-zealand-homes-still-contain-toxic-leadbased-paint>

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World Health Organization. 2014. *Lead poisoning and health*. Factsheet No.379. URL: <http://www.who.int/mediacentre/factsheets/fs379/en/>

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Citation

Environmental Health Indicators. 2019. *Lead absorption notifications*. [Factsheet]. Wellington: Environmental Health Indicators Programme, Massey University.

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