MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

ehinz
Environmental Health Intelligence New Zealand
Rapu Mātauranga Hauora mo te Taiao – Aotearoa

Related indicators

Liam Kelly
Intelligence Analyst

Non-occupational/unknown source lead absorption notifications

This factsheet presents data on non-occupational lead absorption notifications and notifications with unknown lead sources entered into the Hazardous Substances Disease and Injury Reporting Tool (HSDIRT) from 2014–2021.

Lead-based paint is responsible for over a third of non-occupational lead notifications and the second highest median blood lead level, 0.69 µmol/L.

In 2021, non-occupational lead notification rates increased due to the new notifiable range of 0.24–0.47 µmol/L, despite higher levels declining since 2019.

From 2017–2021, males aged 45–74 had the highest non-occupational lead notification rates, accounting for roughly half of all notifications.

NZ Dep

There is no difference in non-occupational lead notification rates between those in more and less deprived areas, based on NZDep18.

Lead absorption investigation guidelines

Although no safe level of exposure to lead has been found, the blood lead levels required to be notified in New Zealand are lead absorption equal to or in excess of 0.24 µmol/L. At and above this level, public health intervention is required for children and non-occupationally exposed adults.

Public health intervention and investigation of sources and pathways is dependent on the blood lead level of the individual as set by the Ministry of Health (2021):

Lead level	Guidelines
0.24–0.48 µmol/L	Investigate particularly for children and women of childbearing age (<45 years)
0.48–0.71 µmol/L	Investigate all cases
0.72–0.95 µmol/L	Investigate all cases. Notify children to their general practitioner.
0.96–2.16 µmol/L	Investigate with spot tests and laboratory analysis of appropriate environmental samples.
≥2.17 µmol/L	Investigate all cases with spot testing and laboratory analysis of environmental sources. For children, arrange an urgent paediatric assessment.

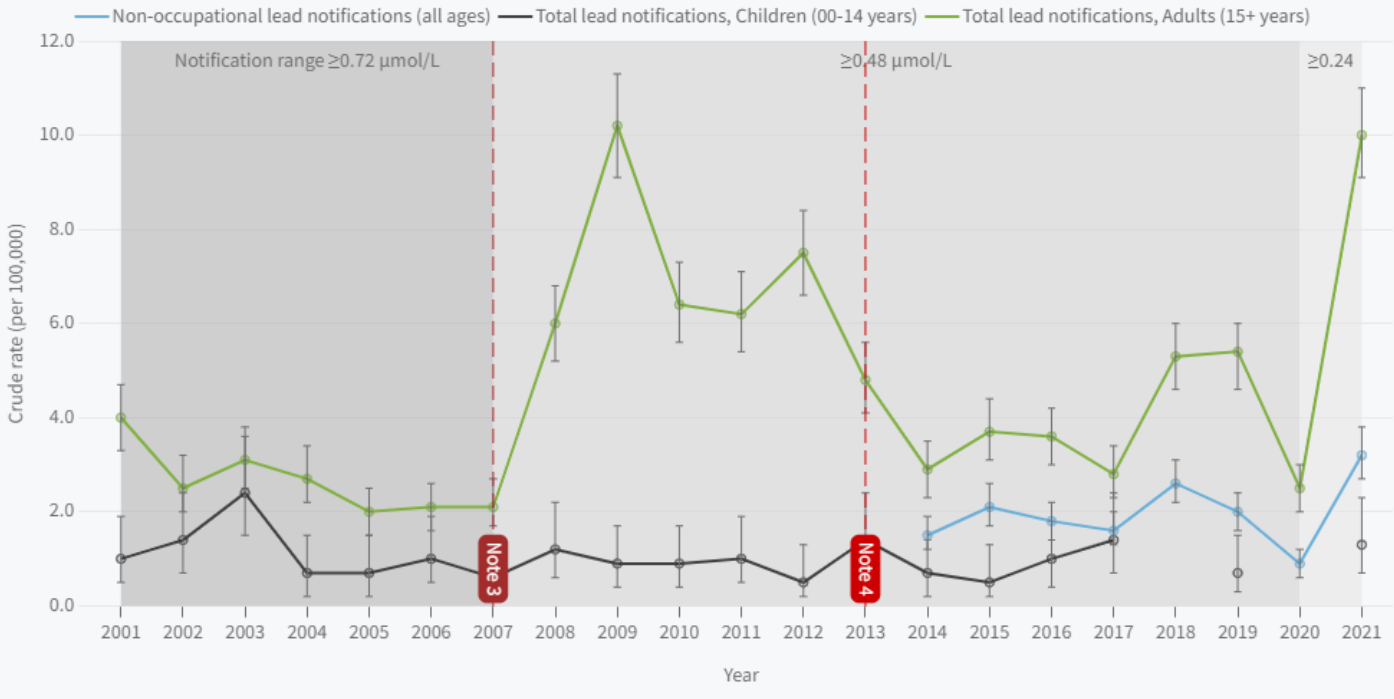
This factsheet presents lead absorption notifications based on a blood lead notification threshold of ≥0.48 µmol /L up until 9 April 2021 and ≥0.24 µmol /L to the end of 2021. For information on the health risks lead absorption has for adults and children, visit the EHINZ website.

Non-occupational lead notifications decline for levels ≥0.48 µmol/L

From 2014–2019, non-occupational lead notification rates ranged from 1.5 to 2.6 per 100,000 people. This declined in 2020 (0.9 per 100,000). It is assumed the drop in 2020 is due to COVID-19 restrictions resulting in people seeking less access to general practice and lead blood testing.

In 2021, there were 69 notifications (1.3 per 100,000) for blood lead levels ≥0.48 µmol/L, with a further 96 notifications relating to the new notifiable range of 0.24–0.47 µmol/L. This resulted in the highest non-occupational notification rate since HSDIRT's inception in mid-2013, despite declining rates for higher lead ranges (Figure 1).

Figure 1 Non-occupational lead notification rates, and total lead notification rates by age, 2001–2021



Note 1: 95% confidence intervals have been presented as error bars.
Note 2: Missing rates have been suppressed as it is an unreliable estimate based on small numbers. See metadata for more information on how to interpret this graph.
Note 3: In 2007 direct laboratory notifications were introduced across New Zealand.
Note 4: Over the course of 2013, HSDIRT was introduced to districts (formerly district health boards) across New Zealand. Data from HSDIRT is presented from 2014 onwards.

Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT) 2022.

Lead-based paint and rifle ranges are the most common known exposure sources

Since 2014, lead-based paint and indoor rifle ranges were consistently among the most recorded non-occupational lead sources. Unknown exposure sources are also consistently in the top three, with approximately half of these being for lead levels of ≥0.72 µmol/L (which should have been investigated) and approximately a third being ≥0.96 µmol/L (spot testing and laboratory analysis should have occurred). Table 1 presents the five most common exposure sources from 2017–2021.

Table 1 Number of non-occupational lead absorption notifications, 2017–2021

Rank	2017	2018	2019	2020	2021
1	Unknown (31)	Unknown (72)*	Lead-based paint (37)	Lead-based paint (17)	Unknown (75)
2	Lead-based paint (28)	Lead-based paint (26)	Unknown (23)	Unknown (13)	Lead-based paint (34)
3	Indoor rifle range (9)	Indoor rifle range (18)	Other (22)	Indoor rifle range (7)	Indoor rifle range (28)
4	Other (8)	Other (10)	Indoor rifle range (18)	Bullet/sinker manufacturing (5)	Other (20)
5	Bullet/sinker manufacturing (5)	Bullet/sinker manufacturing (3)	Bullet/sinker manufacturing (4)	Pica (3)	Bullet/sinker manufacturing (13)
Total**	**78**	**128**	**99**	**45**	**165**

Note 1: * 36 individuals were participants in the Housing NZ study but were listed as having unknown exposures
Note 2: ** Totals include categories outside of the five rankings listed.

Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT) 2022.

The severity of notifications can be assessed using blood lead levels. Table 2 shows that while there are few notifications relating to traditional medicines/cosmetics, this exposure source results in extremely high blood lead levels, with a median of 1.91 µmol/L. Lead-based paint is the most common known source with the second highest median blood lead level, 0.69 µmol/L.

Table 2 Median blood lead level and interquartile range, by exposure source, 2017–2021

Exposure Source	Median blood lead level, µmol/L (Interquartile range)	Count*
Traditional medicine/cosmetics	1.91 (0.69 - 4.57)	11
Lead-based paint	0.69 (0.52 - 0.99)	142
Other	0.62 (0.48 - 1.03)	62
Indoor rifle range	0.60 (0.50 - 0.77)	80
Bullet/sinker manufacture	0.54 (0.45 - 0.69)	30
Pica	0.53 (0.49 - 1.08)	12
Unknown	0.69 (0.49 - 0.96)	214

Note: * A notification can have more than one non-occupational exposure source resulting in counts being higher than the total number of notifications recorded for 2017–2021.

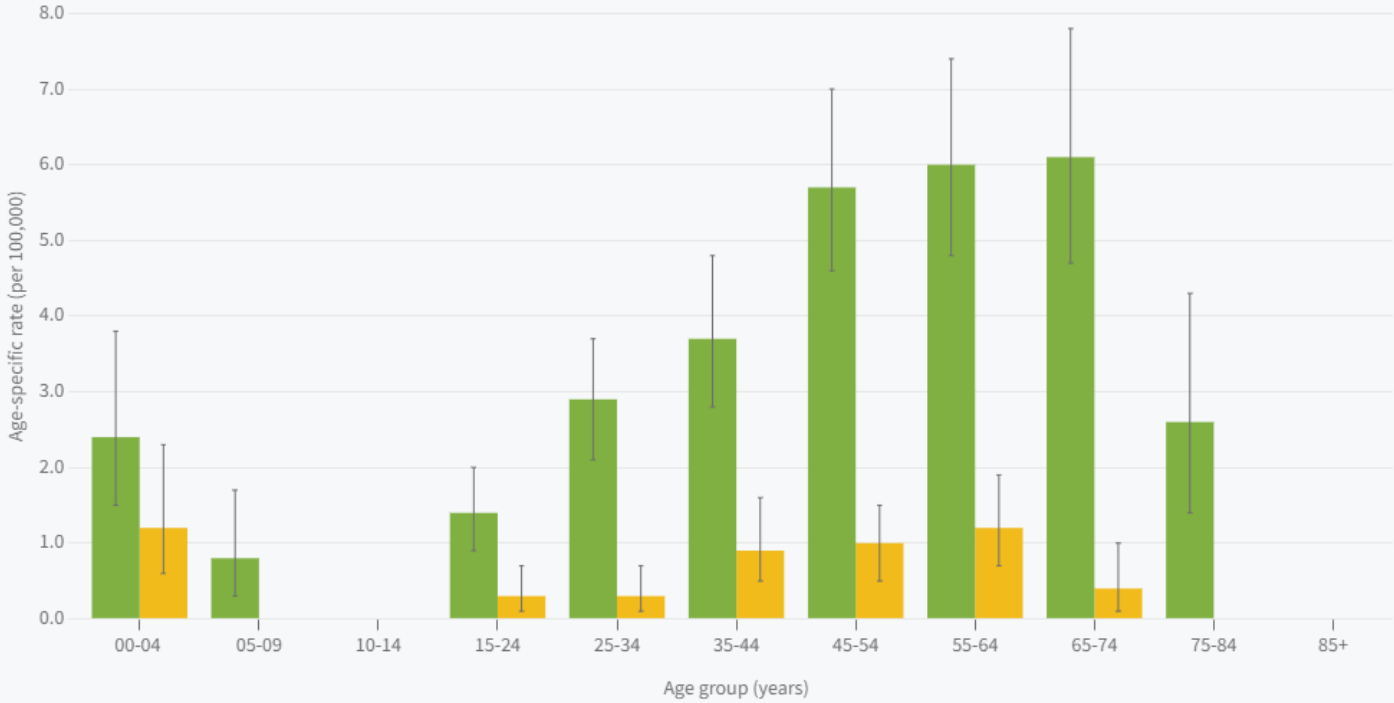
Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT) 2022.

Males aged 45–74 have the highest rates of non-occupational lead absorption

From 2017–2021, males aged 45–74 years made up approximately half (245/515) of all non-occupational/unknown source lead notifications (Figure 2).

Lead-based paint and rifle ranges were the two most common known exposure sources for both sexes, with median lead levels being similar for males, 0.67 µmol/L (interquartile range: 0.50–0.97 µmol/L), and females, 0.64 µmol/L (interquartile range: 0.50–0.88 µmol/L).

Figure 2 Non-occupational lead notification rates, by age and sex, 2017–2021



Counts	00-04 males	05-09 males	10-14 males	15-24 males	25-34 males	35-44 males	45-54 males	55-64 males	65-74 males	75-84 males	85+ males
New Zealand	19	7	1	23	52	57	91	88	66	14	1

Counts	00-04 females	05-09 females	10-14 females	15-24 females	25-34 females	35-44 females	45-54 females	55-64 females	65-74 females	75-84 females	85+ females
New Zealand	9	3	2	5	6	15	16	19	5	4	0

Note 1: 95% confidence intervals have been presented as error bars.
Note 2: Missing rates have been suppressed as it is an unreliable estimate based on small numbers. See metadata for more information on how to interpret this graph and table

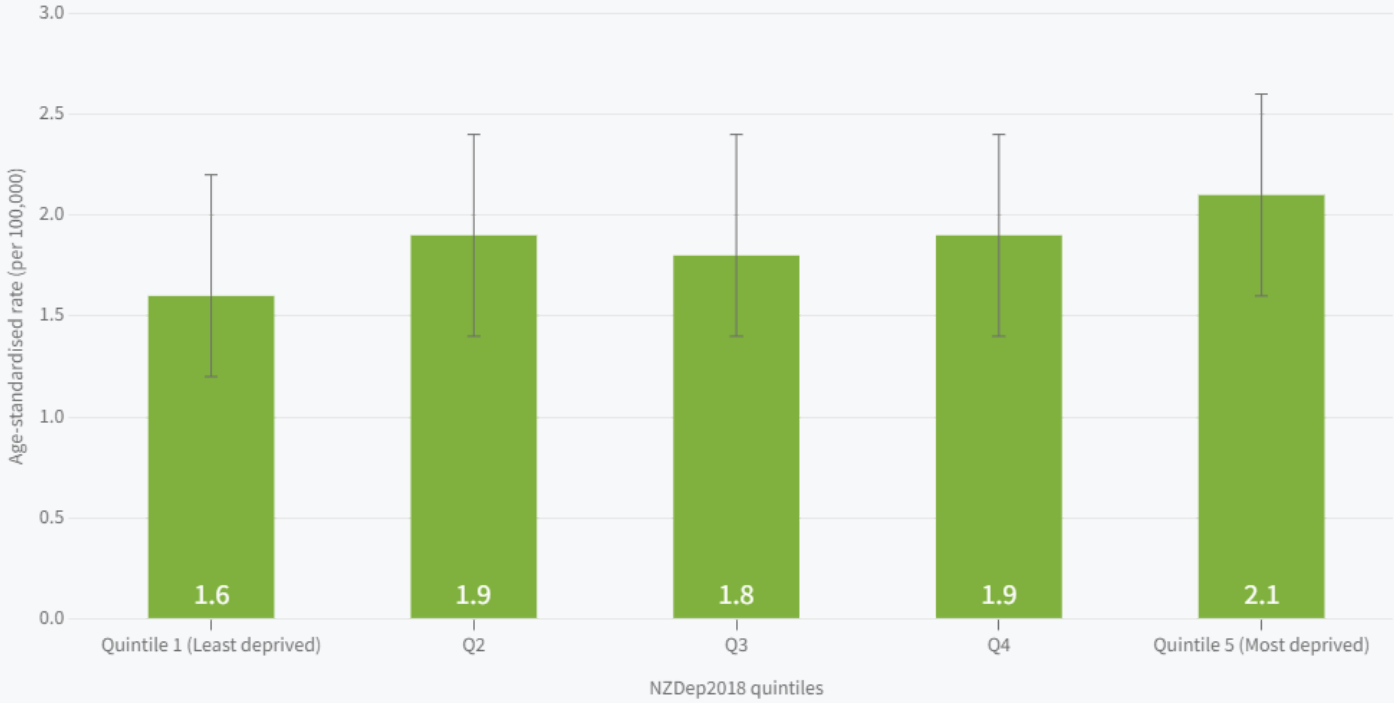
Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT) 2022.

Non-occupational lead notification rates are similar between deprivation quintiles

From 2019–2021, there was no apparent difference between notification rates for individuals in more deprived areas, quintiles 4 and 5, and those in less deprived areas, quintiles 1 and 2 (Figure 3). This was also the case from 2015–2017. The Housing NZ Study, mentioned below in more detail, included predominantly more deprived individuals. As a result, 2018 is the only year more deprived areas had higher rates of non-occupational lead notifications.

This contrasts with occupational lead notifications, where individuals in the most deprived areas have notification rates four times higher than those in the least deprived areas. To view this factsheet, visit the occupational lead page on the EHINZ website.

Figure 3 Non-occupational/unknown source lead notification rate, by NZDep18 quintiles, 2019–21



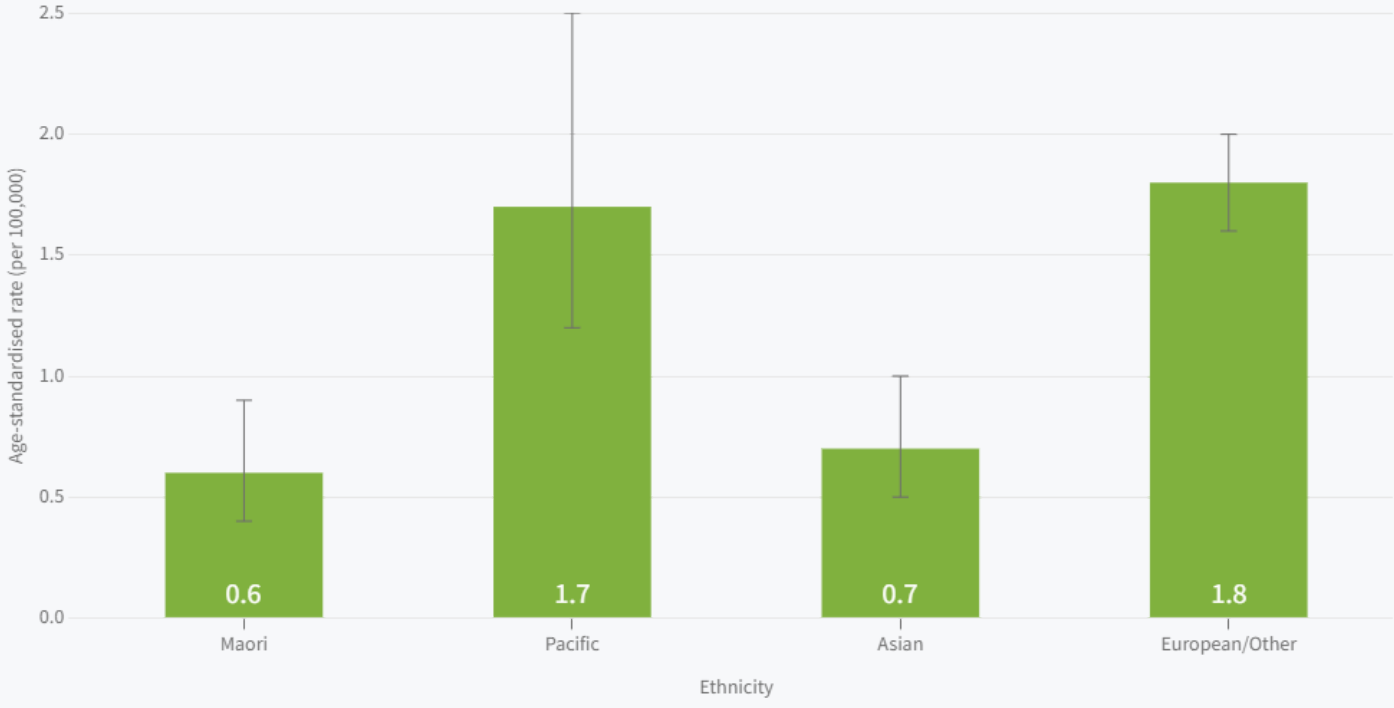
Note: 95% confidence intervals have been presented as error bars. See metadata for more information on how to interpret this graph.

Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT) 2022.

20% of non-occupational/unknown lead notifications did not record ethnicity

From 2017–2021, lead notifications from non-occupational/unknown sources were highest in European/Other (1.8 per 100,000) and Pacific Peoples (1.7 per 100,000) (Figure 4). It should also be noted that a mass testing event in Auckland in 2018, the Housing NZ Study, identified a large number of Pacific Peoples and is the predominant source of the high rate seen here. Ethnicity was also unknown for 113 out of 515 notifications from 2017–2021, meaning these figures could be unreliable.

Figure 4 Non-occupational lead notification rates, by ethnicity, 2017–2021



Note 1: Pacific notifications in 2018 attribute half of all notifications for that ethnic group from 2017–2021. These were from a singular testing event, the Housing NZ Study in ARPHS.
Note 2: 95% confidence intervals have been presented as error bars. See metadata for more information on how to interpret this graph.

Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT) 2022.

While the rate for people in the Asian ethnic group were low from 2017–2021, they comprise over half (9/16) of all high lead notifications (≥ 2.17 µmol/L) . Five of these high notifications are from Ayurvedic medicines/cosmetics exposure, with the other four having an unknown/unrecorded source.

Data for this indicator

This indicator reports HSDIRT non-occupational and unknown source lead notifications from 2014 to 2021. The data were extracted from the HSDIRT system on 8 March 2022. Updates or additions made to HSDIRT after this date are not reflected in this factsheet.

Crude rates presented in this factsheet do not take into account varying age distributions when comparing between populations.

Age-standardised rates presented in this factsheet take into account varying age distributions when comparing between populations.

All 95% confidence intervals have been presented as error bars on graphs. Unless otherwise stated, all differences mentioned in the text between the two values are statistically significant at the 5% level or less.

For additional information, see the metadata link below.

References

Ministry of Health. 2021. *The Environmental Case Management of Lead-exposed Persons.* Wellington: Ministry of Health. URL: https://www.health.govt.nz/publication/environmental-case-management-lead-exposed-persons (accessed 09 August 2022)

Other related topics include:

Occupational lead absorption notifications

Hazardous substances notifications

Hazardous substances-related deaths reported to the coroner in New Zealand

Hazardous substances-related deaths registered in New Zealand

Unintentional hazardous substances-related hospitalisations

Unintentional hazardous substances exposures in children (0–14 years)

Contact
ehinz@massey.ac.nz

Citation
Environmental Health Intelligence NZ, 2021. *Non-occupational/unknown source lead absorption notifications.* {Factsheet}. Wellington: Environmental Health Intelligence NZ, Massey University.

Further information
For descriptive information about the data Metadata Sheet

Visit our website

Subscribe to our newsletter