

National Hazardous Substances and Lead Notifications

January – December 2017

Report to the Ministry of Health

18 July 2018



Author

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Suggested citation: Environmental Health Indicators Programme. (2018). *National Hazardous Substances and Lead Notifications: Annual Report 2017*. Wellington: Centre for Public Health Research, Massey University.

Disclaimer: The data source is the Hazardous Substances Disease and Injury Reporting Tool (HSDIRT). For more information on the data source see <http://www.ehinz.ac.nz/our-projects/hazardous-substances/hsdirt-notification-tool/>

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The notification data contained in this report is based on information recorded on HSDIRT as at 07 June 2017. Updates or additions made to HSDIRT data after this date are not reflected in this report. Consequently, future data analysis may produce revised results. The data in the HSDIRT are continually improved and updated, so numbers in this report may differ from those previously published, but represent the most accurate record at the time of writing.

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Hazardous Substances and Lead notifications

1. Key Findings

- There were 215 notifications in 2017, including 105 lead absorption, 107 hazardous substances and three suspected agrichemical spray-drift notifications. In 2016, there were 214 notifications - 106 lead absorption, 104 hazardous substances and five agrichemical spray-drift notifications.
- Most notifications in 2017 were reported by laboratories (61 notifications), general practitioners (41 notifications) and ED clinicians (50 notifications). In 2016, the most common reporting sources were Public Health Units (65 notifications), laboratories (56 notifications) and general practitioners (44 notifications).

Lead notifications¹

- The majority of lead notifications were males (83 notifications) and the most common age groups were 45-64 years (44 notifications) and 25-44 years (29 notifications).
- The number of lead absorption notifications generally increased from Quintile 3
- Wairarapa and Hutt Valley DHBs had the highest rates (11.3 and 10.2 per 100,000 population, respectively) of lead absorption notifications in 2017.

Occupational lead exposure

- There were 39 (37%) lead notifications where occupation was recorded as the source of exposure in 2017 compared with 51 (48%) notifications in 2016.
- Six notifications had a blood lead level that exceeded the Biological Exposure Index (1.50 $\mu\text{mol/l}$), five of which were painters.
- No cases were admitted to hospital.
- Painters (24 notifications) were the occupation most exposed to lead in 2017.
- Five cases were enrolled in a workplace monitoring programme.

Non-occupational/unknown lead exposure

- There were 68 lead notifications from non-occupational or unknown exposures, compared with 58 notifications in 2016.
- The highest non-occupational blood lead level (5.8 $\mu\text{mol/l}$) was from exposure in the home.
- Two notifications required hospital admission.
- There were 12 cases under 15 years old.
- Lead-based paint was the most common source of non-occupational/unknown lead exposure for both children and adults.

Hazardous substances notifications

- There were 107 hazardous substances notifications in 2017, eight of which were for children under five years old.
- Sixty-four percent (69 notifications) of hazardous substances notifications were males.

¹ Three notifications were recorded with both occupational and non-occupational/unknown exposures. Those three cases were included in both occupational and non-occupational/unknown cases analyses.

- There were 30 hazardous substances notifications admitted to hospital, including 14 children under 15 years old.
- The number of hazardous substances notifications generally increased with socio-economic deprivation.
- Seventy-seven percent (80 notifications) of hazardous substances notifications were due to unintentional exposures.
- Industrial chemical was the most reported substance category (46 notifications), followed by household chemical (28 notifications).
- Household chemicals were the most common cause of injury for children under 5 years old. These chemicals included bleach, drain cleaner, fly spray, hand sanitizer, laundry detergent, petrol and rat poison
- Forty percent (42 notifications) of hazardous substances notifications occurred at home, followed by 30 percent (31 notifications) at workplaces.

Agrichemical spray-drift notifications

- There were three suspected agrichemical spray-drift notifications in 2017, compared to five notifications in 2016 and four notifications in 2015.
- All three notifications were linked to the same event involving exposure to triadimenol.

2. Introduction

The 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 hazardous substances exposure. Notification is required under the Hazardous Substances and New Organisms (HSNO) Act 1996 and Health Act 1956. The HSDIRT is a short electronic form linked to a Patient Management System.

Following a pilot in one region, development of online resources and training of public health unit (PHU) staff, a phased roll out across PHUs occurred in 2013. A national communications strategy was also implemented to raise awareness about hazardous substances notifications.

Since November 2013, the HSDIRT is operating in all health districts of New Zealand.

3. Methods

3.1 Notifications included

This report records cases entered into the HSDIRT. Notified cases are:

- Injuries and diseases due to hazardous substances (Hazardous Substances and New Organisms Act 1996)
- Lead absorption where blood lead level is greater than or equal to $0.48\mu\text{mol/l}$ (Health Act 1956)², and
- Poisoning arising from chemical contamination of the environment (Health Act 1956)

3.2 Data checking

Notification data supplied by the PHUs via the HSDIRT have been checked by the Environmental Health Indicators Programme. Where an error or duplicate was suspected this was discussed with the PHU and a decision made regarding inclusion or removal of the notification from the analysis.

3.3 Standard procedure regarding repeat lead levels

As stated in the Ministry of Health's Environmental Health Circular Letter April 2013, where a person has had a repeat blood lead level taken within 12 months of the original test, the repeat blood test is not included as a second notification unless further investigation or public health action has resulted.

3.4 Statistical notes

Data are presented primarily as numbers and crude rates – unadjusted for any differences in age. The 2015 and 2016 population projections served as the denominator for primary care notification rates (see Appendix 1).

² Lead absorption can also be notified under the HSNO Act.

4. Total notifications

There were 215³ notifications in 2017. These included 105 lead absorption, 107 hazardous substances and three agrichemical spray-drift notifications (Table 1). This compares to 214 notifications in 2016 - including 106 lead absorption, 104 hazardous substances and five agrichemical spray-drift notifications.

The Auckland Regional Public Health Service had the highest number of lead absorption notifications in 2017 (32 notifications) (Table 1). This PHU also had the highest number of lead notifications in the previous year (21 notifications).

Regional Public Health had the highest number of hazardous substances notifications in 2017 (90 notifications) (Table 1). This PHU also had the highest number of hazardous substances notifications in 2016 (89 notifications). This number is significantly higher than the number of notifications received from the other PHUs.

Table 1: Number of notifications by Public Health Unit, 2017

Public Health Unit	Lead	Hazardous substances	Agrichemical Spray-drift
Auckland Regional Public Health Service	32	4	
Community and Public Health	18	4	
Hawke's Bay Public Health Unit	1	2	
MidCentral Public Health Service	11		
Northland Health			
Nelson-Marlborough Public Health Service	2		
Public Health South			
Regional Public Health	19	90	
Tairāwhiti DHB Public Health Unit	1		
Taranaki District Health Board	7	5	3
Toi Te Ora - Public Health	7	1	
Waikato Population Health Service	7	1	
Total	105	107	3

The majority of lead notifications in 2017 were reported by laboratories (61 notifications), followed by GPs (32 notifications) (Table 2). The majority of hazardous substances notifications were reported by the Public Health Unit (46 notifications), followed by Emergency Department (ED) clinicians.

Table 2: Number of notifications by reporting source, 2017

³There were 17 notifications that were excluded from the 2017 analysis. These included five repeat lead notifications, 9 notifications that were assigned as 'not a case' and 3 notifications that were exposed to substances not subject to HSNO controls or did not constitute poisoning arising from chemical contamination of the environment.

Reporting source	Lead	Hazardous Substances	Agrichemical spray-drift	Total
Laboratory	61			61
ED clinician	3	47		50
Public Health Unit	2	46		48
General Practitioner	32	9	3	44
Other	3	3		6
Other hospital clinician	4	2		6
Total	105	107	3	215

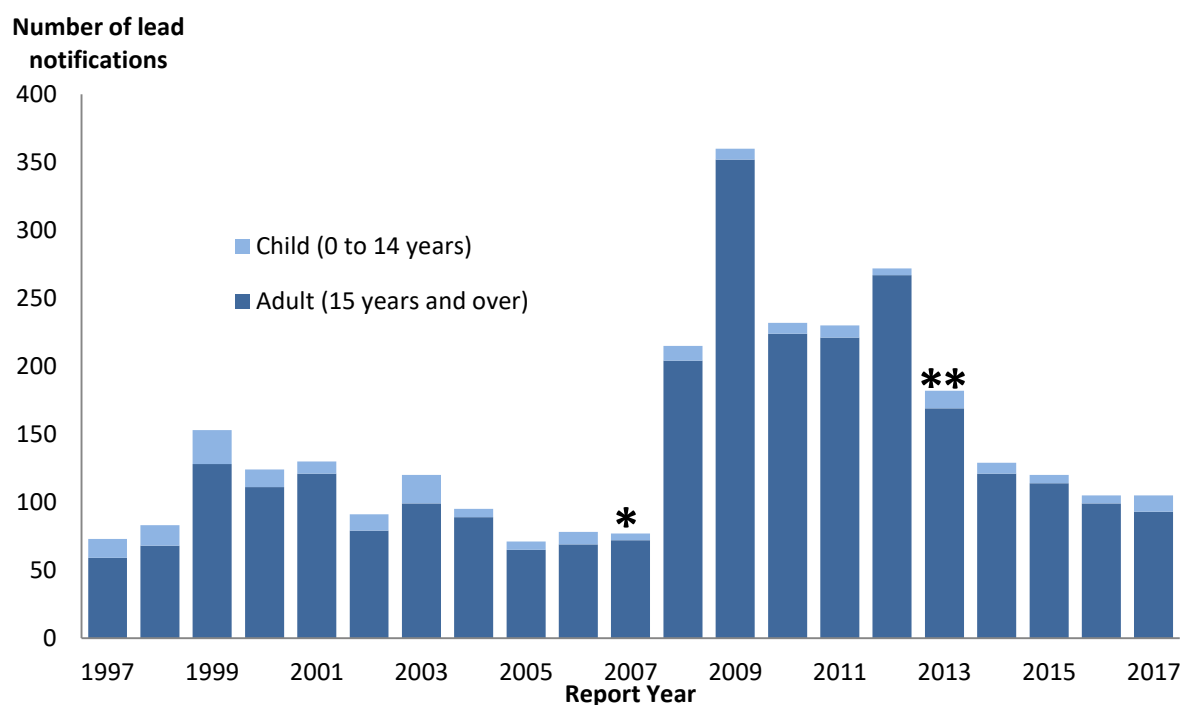
*Note: One case was reported with both lead and hazardous substances exposures.

5. Lead absorption notifications

There were 105 lead absorption notifications in 2017 compared to 106 notifications in 2016

There were 105 notifications of lead absorption in 2017 (2.2 per 100,000 population) compared with 106 notifications in 2016 (2.3 per 100,000 population) (Figure 1).

Figure 1: Number of lead absorption notifications in children and adults by year, 1997 – 2017



Sources: Institute of Environmental Science and Research (1997-2013) and HSDIRT (2013-2017).

* 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 became available to all health districts. Exclusion of repeat blood lead level tests taken within a year of the original test from the data unless further investigation resulted may have partly accounted for the decline in notifications.

Males and adults are the most exposed

In 2017, 79 percent (83 out of 105 notifications) of all lead notifications were males, and the most common age group was 45-64 years (44 notifications), followed by 25-44 years (Table 3). The most common ethnic group was European/Other with 69 notifications.

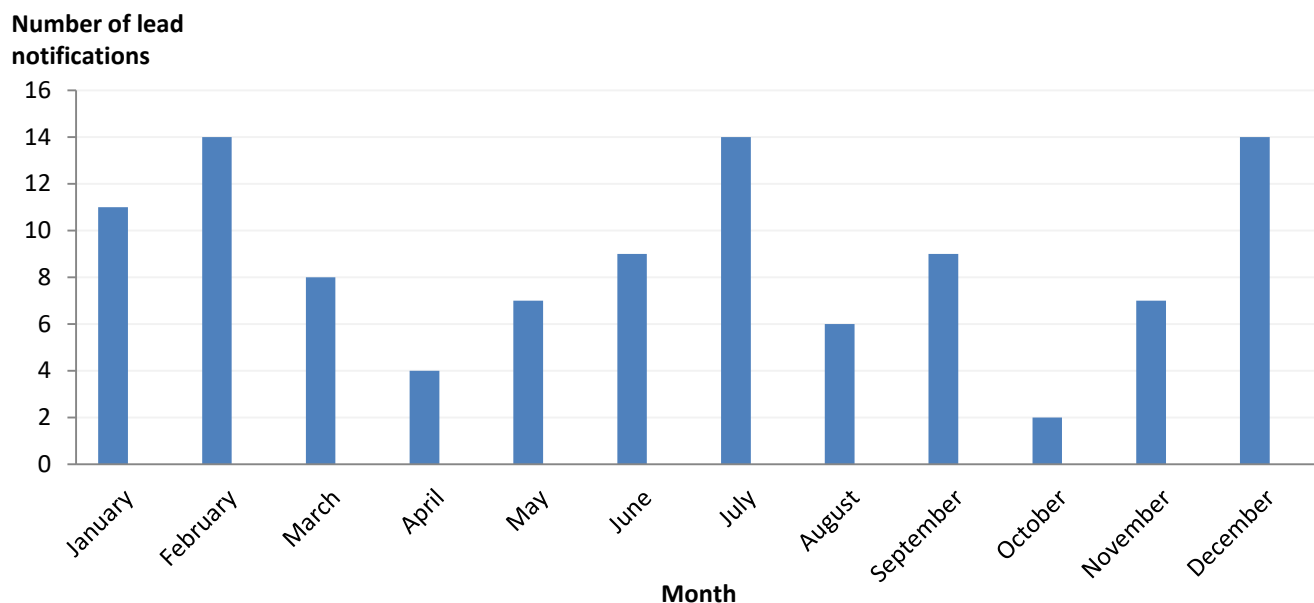
Table 3: Demographics of lead absorption notifications, 2017

Age group (years)	Female	Male	Unknown	Total
0-4	3	3		6
5-14	3	3		6
15-24		6		6
25-44	3	24	2	29
45-64	4	36	4	44
65+	2	11	1	14
Unknown				1
Total	15	83	7	105
Ethnicity				
Māori	2	7		9
Asian	3	5	1	9
European/Other	10	54	5	69
Unknown		17	1	18
Total	15	83	7	105

February, July and December had the highest number of lead notifications

February, July and December (14 notifications) had the highest number of lead notifications in 2017, followed by January (11 notifications) (Figure 2).

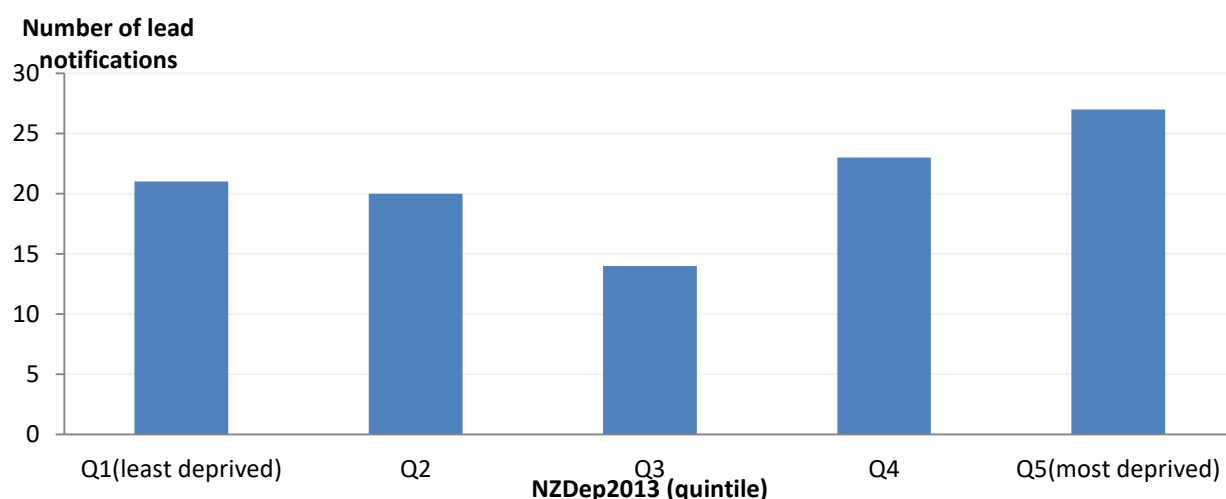
Figure 2: Number of lead absorption notifications by month, January –December 2017



The number of lead absorption notifications generally increased from Quintile 3

In 2017, the number of lead absorption notifications was highest among those who resided in deprivation quintile 5 (most deprived) areas, and lowest in quintile 3 areas (Figure 3).

Figure 3: Number of lead absorption notifications, by deprivation quintile, 2017



Note: NZDep2013 score is based on an individual's residential address. NZDep2013 scores were not allocated to two notifications and they were excluded from this figure.

Wairarapa DHB had the highest rate of lead absorption notifications

Wairarapa District Health Board (DHB) had the highest rate of lead absorption notifications (11.3 per 100,000 population) in 2017, followed by Hutt Valley DHB (10.2 per 100,000 population) (Table 4). In 2016, Wairarapa DHB also had the highest rate of lead notifications (16.06 per 100,000 population), followed by Taranaki DHB (8.56 per 100,000 population) (Table 4).

Table 4: Number and crude rate (per 100,000 population) of lead absorption notifications by DHB and year

DHB	2016		2017	
	Number	Rate	Number	Rate
Auckland	10	2.0	12	2.3
Bay of Plenty	2		1	
Canterbury	11	2.0	8	1.4
Capital and Coast	7	2.3	23	7.4
Counties Manukau	6	1.1	5	0.9
Hawke's Bay	6	3.7	1	
Hutt Valley	3		15	10.2
Lakes	2		2	
MidCentral	8	4.6	9	5.1
Nelson Marlborough	0		1	
Northland	0		1	
South Canterbury	0			
Southern	2			
Tairāwhiti	2			
Taranaki	10	8.6	6	5.0
Waikato	18	4.5	3	
Wairarapa	7	16.1	5	11.3
Waitemata	5	0.9	10	1.6
West Coast	0		2	
Whanganui	5	7.9	1	
Unknown	2			
New Zealand	106	2.3	105	2.2

Note:

- i) 2015 and 2016 population projections were used for the denominator
- ii) Crude rates were not calculated for those with counts less than five
- iii) Spatial analysis was based on an individual's residential address.

5.1 Occupational lead exposure

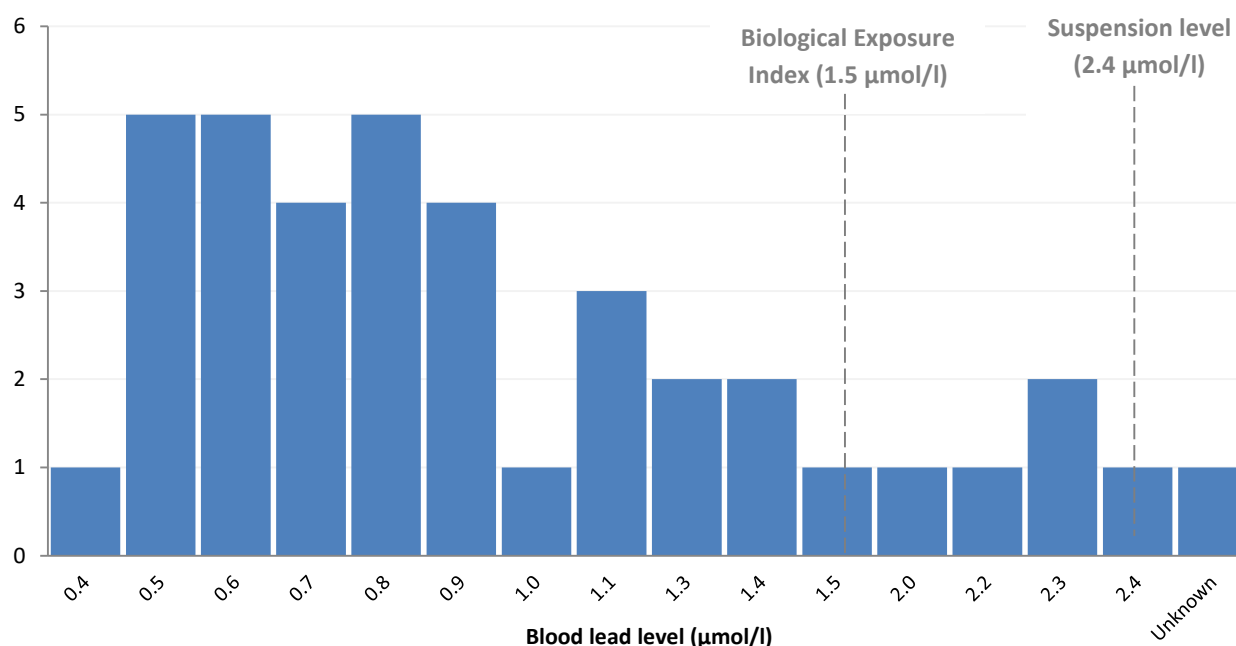
Lead notifications from occupational exposures decreased in 2017

In 2017, there were 39⁴ lead absorption notifications (37% of all lead notifications) where occupation was recorded as the source of exposure, compared to 51 notifications (48% of all lead notifications) in 2016.

The blood lead levels of occupational relevance are 1.50 $\mu\text{mol/l}$ (the Biological Exposure Index) and 2.40 $\mu\text{mol/l}$ (the suspension level). There were six notifications that had a blood lead level that exceeded the Biological Exposure Index. Five out of the six notifications were painters. The highest blood lead level recorded for occupational notifications was 2.4 $\mu\text{mol/l}$ (Figure 4). No cases were admitted to hospital.

Figure 4: Number of occupational lead absorption notifications, by blood lead levels, 2017

Number of occupational lead notifications



⁴ Two notifications were recorded with both occupational and non-occupational/unknown exposures. These two cases were included in both occupational and non-occupational/unknown cases analyses.

Painters were the most exposed to lead

In 2017, painter (24 notifications) was the most commonly reported occupation for occupational lead absorption notifications.

Table 5: Number of lead absorption notifications by occupation, 2017

Occupation	Number
Painter	24
Radiator repairer	2
Sandblaster	2
Battery shop owner	1
Ceramicist	1
Digital print finisher	1
Factory worker	1
Handyman	1
Maintenance fitter	1
Panel Beater	1
Plumber	1
Roofer	1
Spin caster	1
Unknown	1
Total	39*

*Note: 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.

Five lead cases were enrolled in a workplace monitoring programme

Of the 39 occupational lead absorption notifications in 2017, five notifications were enrolled in a workplace monitoring programme and eight notifications were not. This was unknown for the remaining 26 notifications.

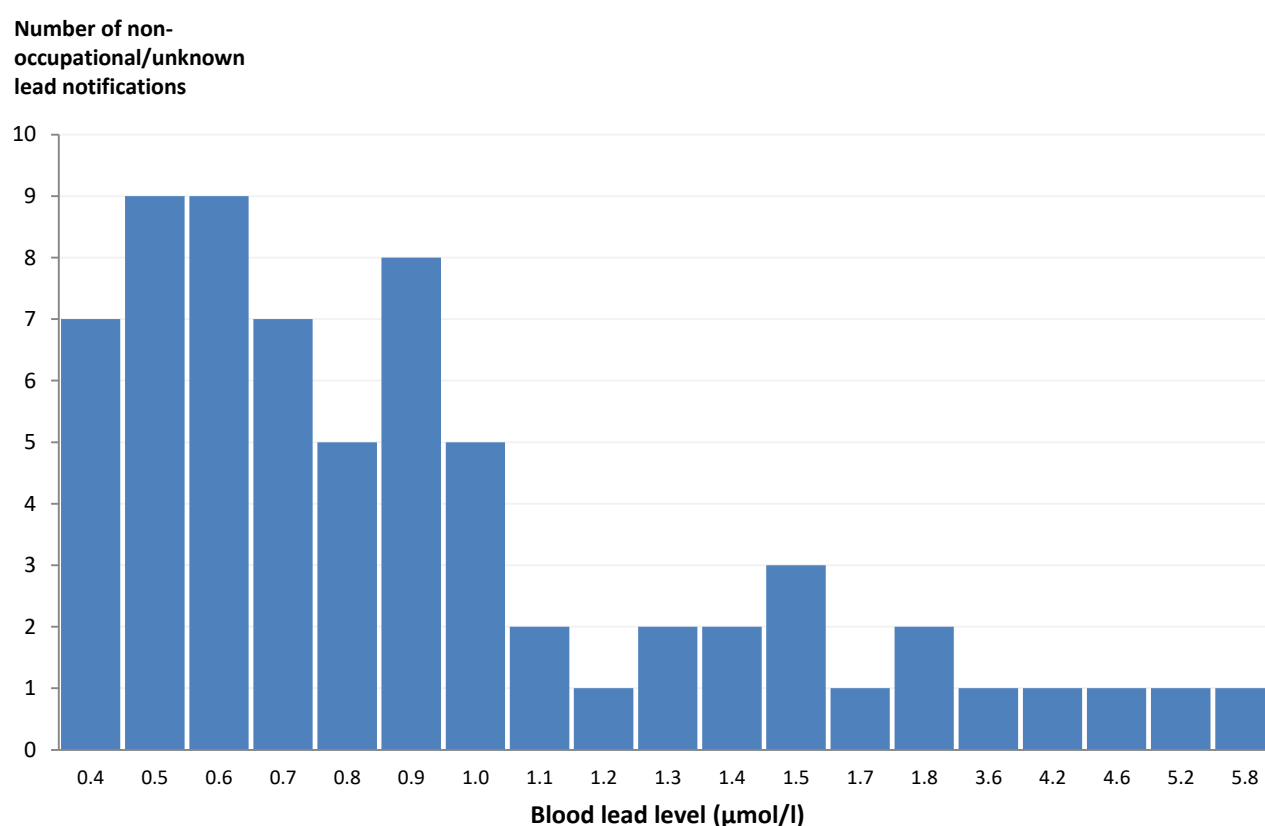
5.2 Non-occupational/unknown lead exposure

Lead notifications from non-occupational and unknown exposures increased in 2017

There were 68⁵ non-occupational/unknown lead absorption notifications in 2017. These included 47 lead absorption notifications from non-occupational lead exposures and 21 notifications from unknown lead exposures. This compares to 58 non-occupational/unknown lead absorption notifications in 2016.

The blood lead levels ranged from 0.5 to 5.8 $\mu\text{mol/l}$ (Figure 5). The highest non-occupational blood lead level was from exposure in the home.

Figure 5: Number of non-occupational/unknown lead notifications, by blood lead level, 2017



Twelve children were reported with lead absorption in 2017

In 2017 there were 12 children under the age of 15 years reported with lead absorption in comparison to six in 2016 (Table 6). Their blood lead level ranged from 0.5 to 5.2 $\mu\text{mol/l}$. In 2016, there were six notifications for children under 15 years old. The high blood lead level (5.2 $\mu\text{mol/l}$) was from a child whose mother used kajal, a traditional eye liner from Afghanistan on them.

⁵ Two notifications were recorded with both occupational and non-occupational/unknown exposures. Those two cases were included in both occupational and non-occupational/unknown cases analyses.

Table 6: Blood lead level of notifications for children 0-14 years old, 2017

Blood lead levels ($\mu\text{mol/l}$)	Age groups	
	0-4	5-14
0.4 – 0.8	4	3
0.9 – 1.4	2	2
≥ 5		1
	6	6

Lead-based paint was the most common source of lead exposure in children

Nine* lead notifications for children less than 15 years old were exposed to lead-based paint. Pica (an eating disorder characterised by eating non-food items) was recorded in three child cases. Traditional cosmetic was recorded as the lead source for one notification.

Lead-based paint was the most common source of lead exposure in adults

There were 83 lead absorption notifications for adults (15+ years) in 2017. Lead-based paint (29 notifications) was the most common source of lead exposure, followed by indoor rifle range (8 notifications) (Table 7).

Table 7: Source of lead exposure for adults (15 years and over), 2017

Non-occupational/unknown Lead source	Number
Lead-based paint	29
Indoor rifle range	8
Bullet/sinker	4
Traditional medicine or cosmetic	4
Outdoor shooting	3
Pica	2
Lead lighting	1
Unknown	20
Total	71*

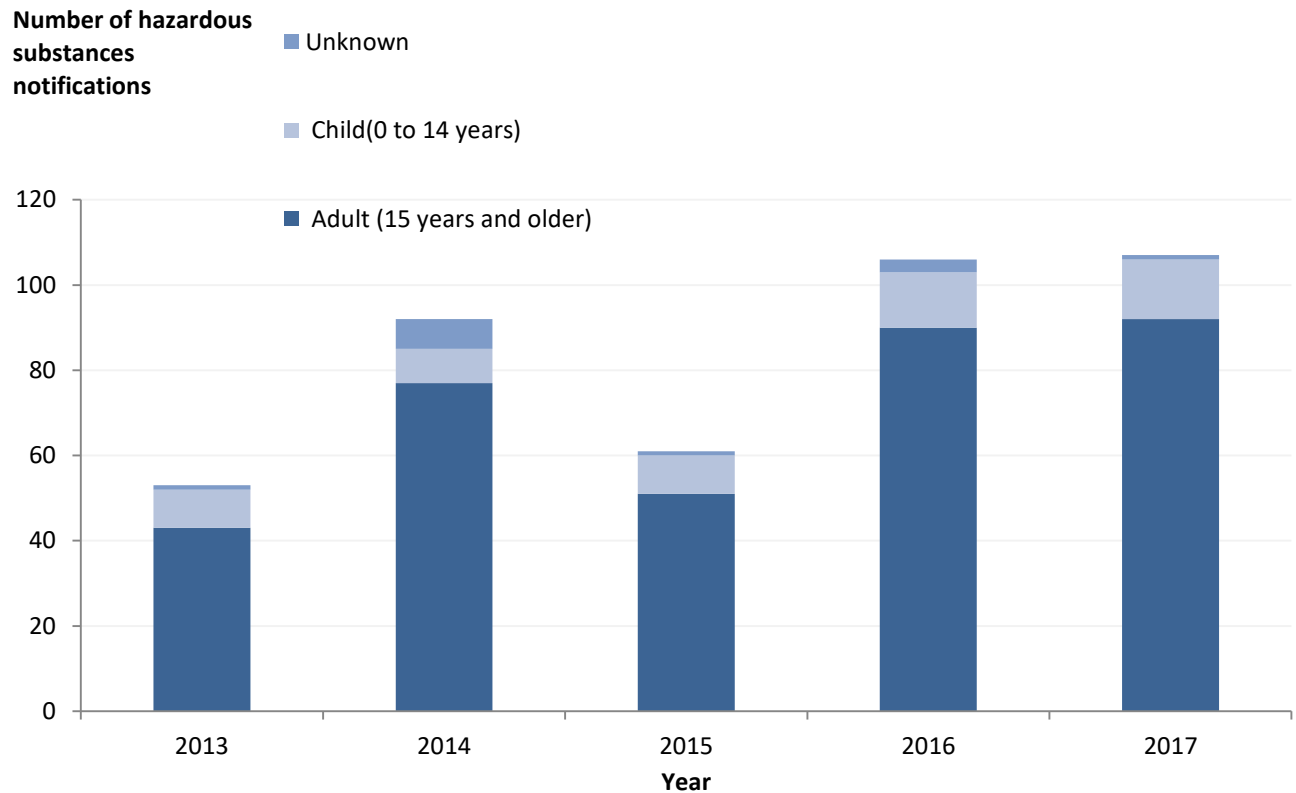
*Note: More than one lead exposure source can be recorded for a single notification. Therefore, the total can add to more than the number of notifications.

6. Hazardous substances notifications

Hazardous substances notifications are similar in 2017 to 2016

There were 107⁶ notifications that were related to hazardous substances in 2017, compared to 104 notifications in 2016 (**Figure 6**).

Figure 6: Number of hazardous substances notifications in children and adults by year, 2013-2017.



Note: National rollout of HSDIRT occurred progressively throughout 2013. Therefore data in 2013 were not complete.

⁶ Twelve hazardous substances notifications were excluded from the 2017 analysis as they were either recorded as 'not a case' or exposed to substances not subject to HSNO controls or did not constitute poisoning arising from chemical contamination of the environment.

Males and adults were the most exposed

Sixty-four percent (69 notifications) of the hazardous substances notifications were males.

Thirty-seven percent (40 notifications) of the hazardous substances notifications were from the 25-44 year age group, followed by 27 percent (29 notifications) from the 45-64 year age group. The most common ethnic group was European/Other (52 notifications) (Table 8).

Thirty notifications required hospital admission, including 14 children under 15 years old.

Table 8: Demographics of hazardous substances notifications, 2017

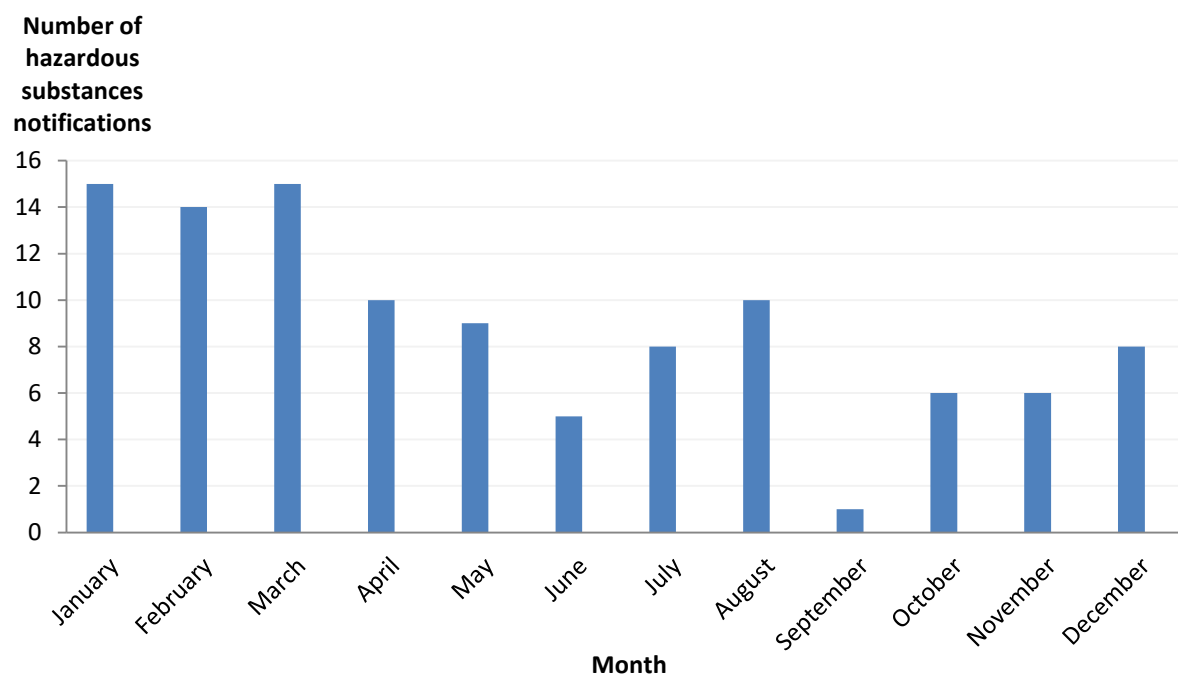
Age group (years)	Female	Male	Unknown	Total
0-4	4	4	1	9
5-14	1	3	1	5
15-24	7	8		15
25-44	11	28	1	40
45-64	8	21		29
65+	3	5		8
Unknown	1			1
Total	35	69	3	107
Ethnicity	Female	Male	Unknown	Total
Māori	3	2		5
Pacific		4		4
Asian		5		5
European/Other	14	36	2	52
Unknown	18	22	1	41
Total	35	69	3	107

January and March had the highest number of hazardous substances notifications

There were 15 hazardous substances notifications each in January and March in 2017, followed by 14 notifications in February and 10 notifications in April and August (Figure 7).

The majority (70%, 73 notifications) of hazardous substances notifications in 2017 occurred in the first half of the year (January to June).

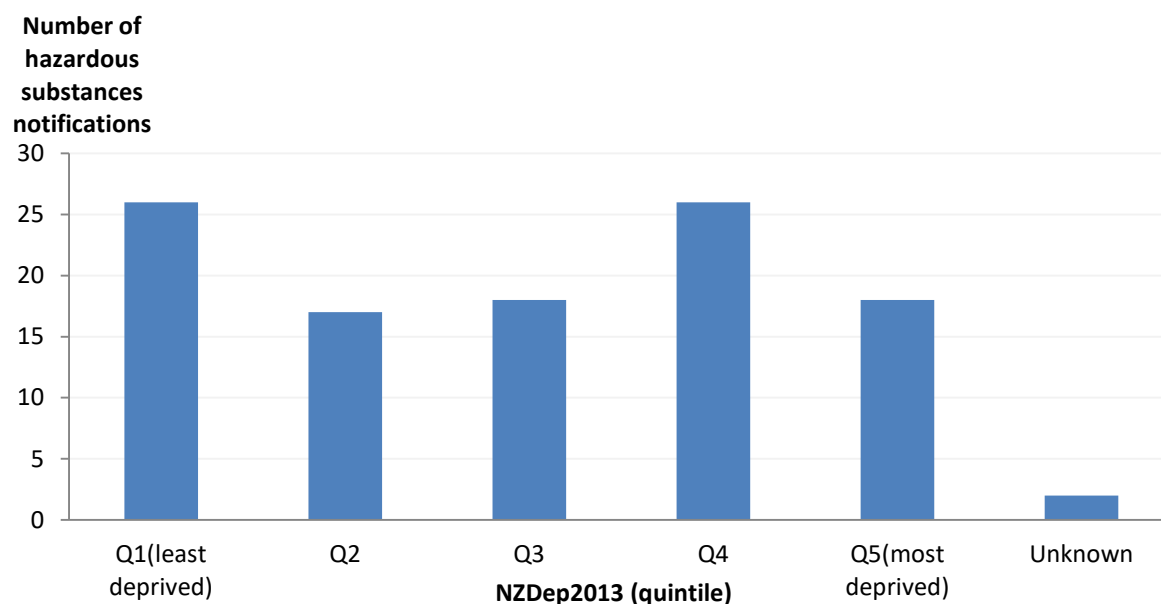
Figure 7: Number of hazardous substances notifications, by month, 2017



The number of hazardous substances notifications is highest in the least deprived area

In 2017, the number of hazardous substances notifications was highest among those who resided in deprivation quintile 1 (least deprived) and Q4 areas, and lowest in quintile 2 areas (Figure 8).

Figure 8: Number of hazardous substances notifications, by deprivation quintile, 2017

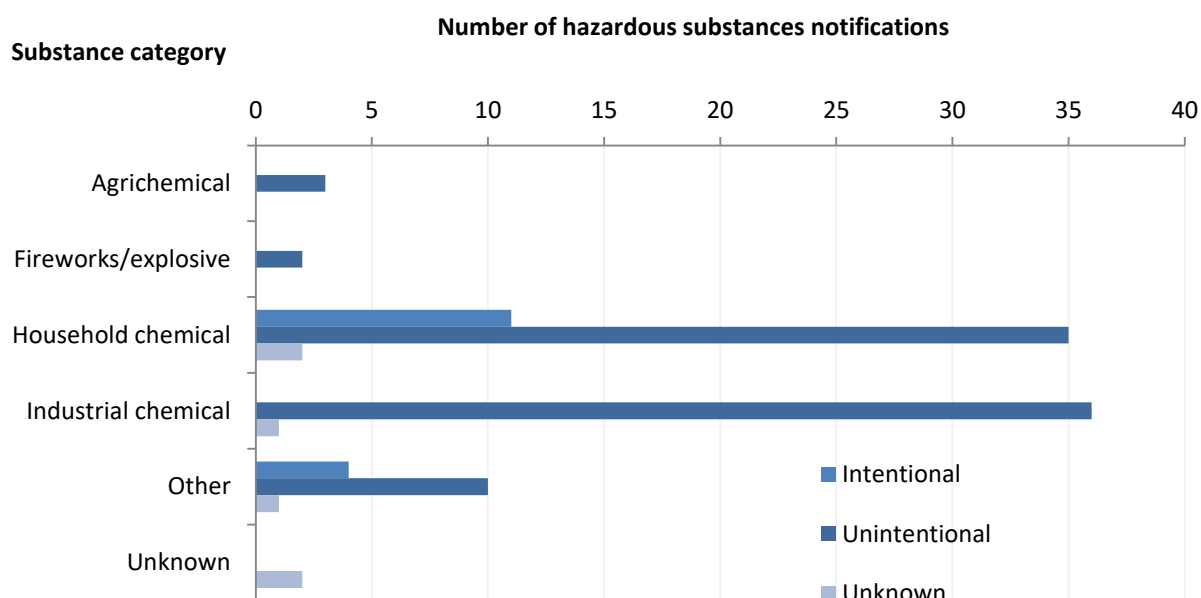


Note: NZDep2013 score is based on an individual's residential address. NZDep2013 scores were not allocated to seven notifications and they were excluded from this figure.

Majority of hazardous substances notifications were due to unintentional exposures

Eighty percent (86 notifications) of hazardous substances notifications were from unintentional exposures. The most common substance category reported was household chemical (52 notifications), followed by industrial chemical (37 notifications) (Figure 9 and Table 9).

Figure 9: Number of hazardous substances notifications, by substance category and intent, 2017



Note: More than one hazardous substance category can be reported for a single notification.

Table 9: Hazardous substances notifications, by substance category and substance⁷, 2017

Substance category and substance	Number of notifications
Household chemical	52
accelerant	2
alkali tile cleaner	1
benzalkonium chloride	1
brake fluid	1
brodifacoum	1
caustic soda	1
cleaning product	2
commercial dishwashing liquid	1
disinfectant deodorant	1
drain unblocker/cleaner	2
Exit Mould	1
hand sanitizer	1
herbicide/weed killer	2
insecticide/fly spray	2
laundry detergent/capsule/powder	3
liquid air freshener	2

⁷ Obvious errors in assigning substances to a substance category have been corrected.

liquified petroleum gas (LPG)	8
methylated spirits	3
outdoor cleaning fluid	1
paint	1
petrol	3
rat poison	1
Rust - Fix	1
sodium hypochlorite/bleach	6
solvents	1
sugar soap	1
Turtle Wax	1
window cleaner	1
Industrial chemical	37
Acticide	2
calcium nitrate	1
chemical moss mould treatment	1
concrete/cement	1
epoxy resin/epoxide	1
fumigant	1
heavy crude/oil	2
hydrogen sulphide	1
Key Trimex	1
paint	2
paint solvent/ thinner	3
petrol/petroleum	6
phosphoric acid	1
polyurethane/diphenylamine di-isocyanate	3
primer glue	1
refrigeration gas/fluorocarbon	3
sodium hydroxide	3
sodium hypochlorite	2
sulphuric acid	2
Other	11
carbon monoxide	7
methamphetamine	1
smoke	3
Agrichemical	3
triadimenol	3
Fireworks/explosive	2
Fireworks	2
Unknown	2
Unknown	2
Grand Total	107

*Note: More than one hazardous substance can be reported for a single notification, therefore the sum of hazardous substances can add to more than the number of notifications.

Household chemicals were the most common cause of injury in the 0-4 year age group

There were 14 hazardous substances notifications for children under the age of five years in 2017. Household chemicals were the most common cause of injury in this age group. These included bleach, drain cleaner, fly spray, hand sanitizer, laundry detergent, petrol and rat poison.

Most hazardous substances injuries occurred in the home

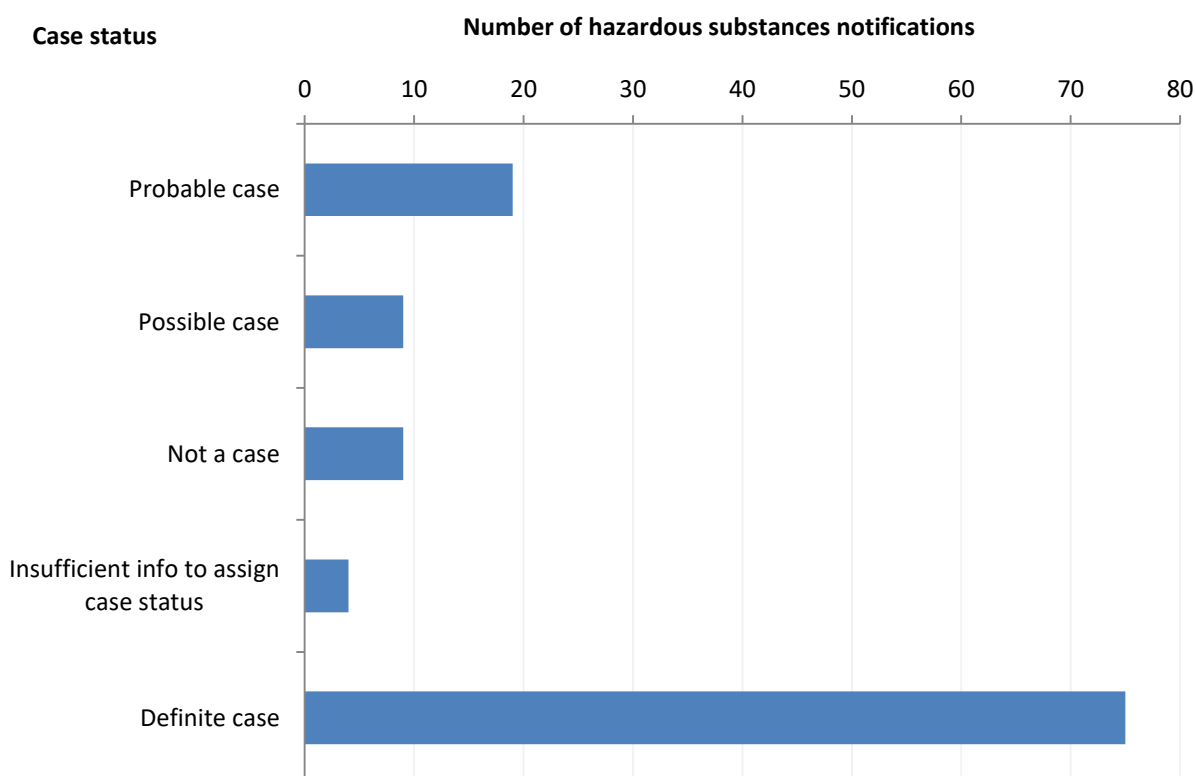
Over 40 percent (48 notifications) of the hazardous substances notifications occurred at home, followed by 33 percent (35 notifications) that occurred at workplaces. There were six notifications that were exposed to hazardous substances in public places and three in a school.

Case status

In 2017, there were 75 hazardous substances notifications that were classified as 'definite cases'. There were 19 'probable cases' and 19 'possible cases' notified. Four notifications had insufficient information to assign case status.

Notifications were excluded from analysis if they were classified as 'not a case' or exposed to substances not subject to HSNO controls or did not constitute poisoning arising from chemical contamination of the environment.

Figure 10: Number of hazardous substances notifications, by case status, 2017



PHU Action?

7. Agrichemical spray-drift notifications

There were three suspected agrichemical spray-drift notifications in 2017

There were three suspected agrichemical spray-drift notifications in 2017, compared to five notifications in 2016 and four notifications in 2015. Two out of the three notifications were females.

All three notifications were in the 45-64 year age group and linked to the same event involving exposure to triadimenol. All three notifications were classified by the PHU as 'insufficient info to assign case status'.

Contact people

If you have questions regarding this report or suggestions on how our data presentation can be improved please contact the following members of the Environmental Health Indicators Programme:

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Appendix 1: DHB population projections 2016 -2017

DHB	Year	
	2016	2017
Auckland	507200	530460
Bay of Plenty	226700	233,590
Canterbury	539800	558830
Capital and Coast	306700	311670
Counties Manukau	534200	551390
Hawke's Bay	161400	163580
Hutt valley	145900	147520
Lakes	106700	108320
MidCentral	174200	175880
Nelson Marlborough	146400	148370
Northland	171400	175220
South Canterbury	59200	60040
Southern	318900	324090
Tairāwhiti	47900	48430
Taranaki	116800	118965
Waikato	399600	411520
Wairarapa	43600	44135
Waitemata	590700	615340
West Coast	32600	32600
Whanganui	63000	63270
Unknown	330	
New Zealand	4693000	4823220

Source: Statistics New Zealand.