National Hazardous Substances and Lead Notifications

January – December 2016

Report to the Ministry of Health

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MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

hsss
Hazardous Substances Surveillance System

Author

This report was written by Fei Xu, Analyst, Environmental Health Indicators Programme, Centre for Public Health Research (CPHR), Massey University.

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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.

For any enquiries about these data, or analysis please contact Fei Xu, Analyst, ph: 0800 588 265, email: f.xu@massey.ac.nz.

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Hazardous Substances and Lead notifications

1. Key Findings

- There were 214[1] notifications in 2016, including 106 lead absorption, 104 hazardous substances and five agrichemical spray-drift notifications. In 2015, there were 186 notifications - 121 lead absorption, 61 hazardous substances and four agrichemical spray-drift notifications.
- Most notifications in 2016 were reported by the Public Health Units (65 notifications[2]), laboratories (56 notifications) and general practitioners (44 notifications). In 2015, the most common reporting sources were laboratories (75 notifications) and general practitioners (57 notifications).

Lead notifications[3]

- The majority of lead notifications were males (93 notifications) and the most common age groups were 45-64 years (51 notifications) and 25-44 years (31 notifications).
- The number of lead absorption notifications generally increased with socio-economic deprivation.
- Wairarapa DHB had the highest rate (16.1 per 100,000 population) of lead absorption notifications in 2016.
- Occupational lead exposure
    - There were 51 (48%) lead notifications where occupation was recorded as the source of exposure in 2016 compared with 37 (31%) notifications in 2015.
    - Nine notifications (all painters) had a blood lead level that exceeded the Biological Exposure Index (1.50 µmol/l), four of which exceeded the suspension level (2.40 µmol/l).
    - No cases were admitted to hospital.
    - Painters (29 notifications) were the occupation most exposed to lead in 2016.
    - Four cases were enrolled in a workplace monitoring programme.
- Non-occupational/unknown lead exposure
    - There were 58 lead notifications from non-occupational or unknown exposures, compared with 87 notifications in 2015.
    - The highest non-occupational blood lead level (27.74 µmol/l) was from an adult pica case who swallowed sinkers for weeks.
    - Four notifications required hospital admission.
    - There were six cases under 15 years old.
    - Lead-based paint was the most common source of non-occupational/unknown lead exposure for both children and adults.

[1] One notification was reported with both lead and hazardous substances exposures. This notification was included in both lead and hazardous substances notification analyses.
[2] Some of these notifications were made by the PHU from Emergency Department (ED) data i.e. the case attended an ED and not a general practitioner.
[3] 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.

Hazardous substances notifications

- There were 104 hazardous substances notifications in 2016, eight of which were for children under five years old.
- Sixty-four percent (67 notifications) of hazardous substances notifications were males.
- There were 24 hazardous substances notifications admitted to hospital, including two 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 ethanol-based hand sanitiser, washing powder, sodium hypochlorite (Exit Mould), liquid oven cleaner and Dettol.
- 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 five agrichemical spray-drift notifications in 2016, two of which were for children under six years old.
- All five notifications were exposed to chlorpyrifos - an organophosphate insecticide (Lorsban 50EC) at home. They were all linked to the same event.

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 0.48µmol/l (Health Act 1956)[4], 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).

[4] Lead absorption can also be notified under the HSNO Act.

4. Total notifications

There were 214[5] notifications in 2016. These included 106 lead absorption, 104 hazardous substances and five agrichemical spray-drift notifications (Table 1). This compares to 186 notifications in 2015 - including 121 lead absorption, 61 hazardous substances and four agrichemical spray-drift notifications.

The Auckland Regional Public Health Service had the highest number of lead absorption notifications in 2016 (21 notifications) (Table 1). This PHU also had the highest number of lead notifications in the previous year (38 notifications).

Regional Public Health had the highest number of hazardous substances notifications in 2016 (89 notifications) (Table 1). The PHU also had the highest number of hazardous substances notifications in 2015 (33 notifications). The increase in the number of notifications may be partly due to an increased awareness of the PHU about the notification requirement.

Table 1: Number of notifications by Public Health Unit, 2016

Public Health Unit	Lead	Hazardous substances	Agrichemical Spray-drift
Auckland Regional Public Health Service	21	1	
Community and Public Health	11	5	
Hawke's Bay Public Health Unit	6	2	5
MidCentral Public Health Service	13	3	
Northland Health			
Nelson-Marlborough Public Health Service		1	
Public Health South	2		
Regional Public Health	17	89	
Tairawhiti DHB Public Health Unit	2		
Taranaki District Health Board	11		
Toi Te Ora - Public Health	4	3	
Waikato Population Health Service	19		
Total	**106**	**104**	**5**

The majority of lead notifications in 2016 were reported by laboratories (55 notifications), followed by GPs (41 notifications) (Table 2). The majority of hazardous substances notifications were reported by the Public Health Unit (64 notifications[6]), followed by Emergency Department (ED) clinicians.

[5] There were 40 notifications that were excluded from the 2016 analysis. These included two lead notifications with a blood lead level <0.48 µmol/l, 22 notifications that were assigned as 'not a case' and 16 notifications that were exposed to substances not subject to HSNO controls or did not constitute poisoning arising from chemical contamination of the environment.

[6] Some of these notifications were made by the PHU from Emergency Department (ED) data i.e. the case attended an ED and not a general practitioner.

Table 2: Number of notifications by reporting source, 2016

Reporting source	Lead	Hazardous Substances	Agrichemical spray-drift	Total
Public Health Unit	1	64		65
Laboratory	55	1		56
General Practitioner	41	3		44
ED clinician		28		28
Other	5	4	5	14
Other hospital clinician	3	4		6*
Occupational Health clinician	1			1
Total	**106**	**104**	**5**	**214**

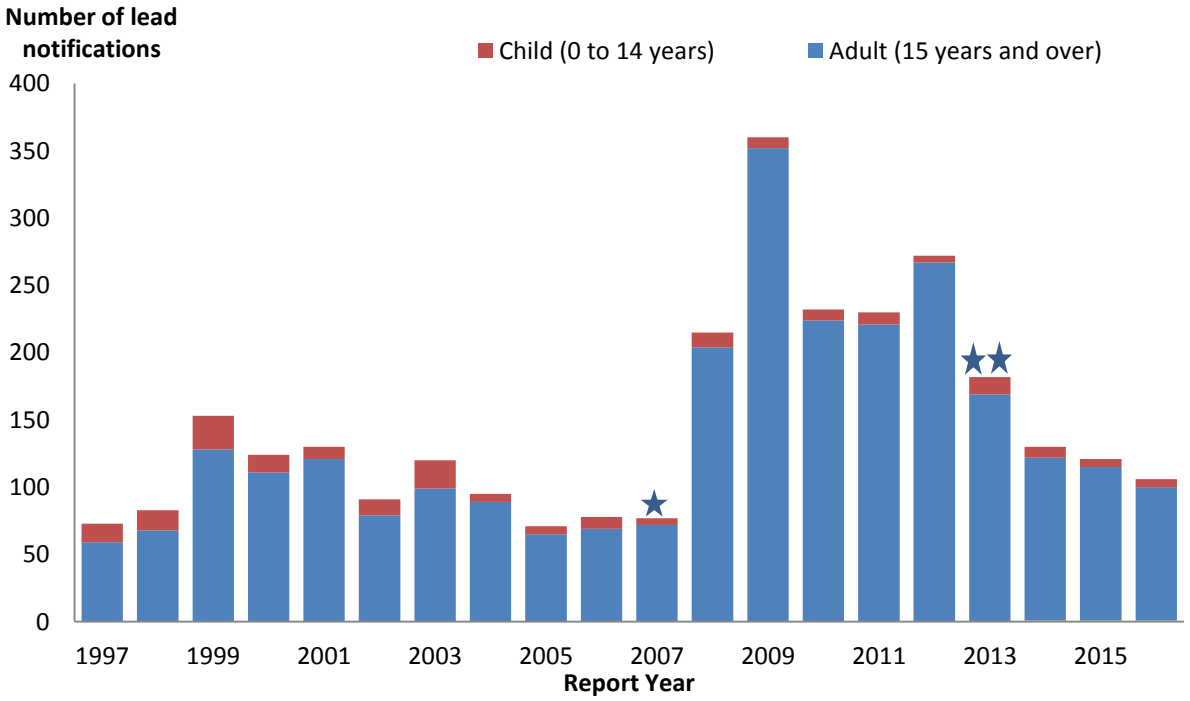
*Note: One notification was reported with both lead and hazardous substances exposures.

5. Lead absorption notifications

There were 106 lead absorption notifications in 2016 compared to 121 notifications in 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).

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



Sources: Institute of Environmental Science and Research (1997-2013) and HSDIRT (2013-2016).

***** 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 2016, 88 percent (93 out of 106 notifications) of all lead notifications were males, and the most common age group was 45-64 years (51 notifications), followed by 25-44 years (31 notifications) (Table 3). The most common ethnic group was European/Other with 64 notifications.

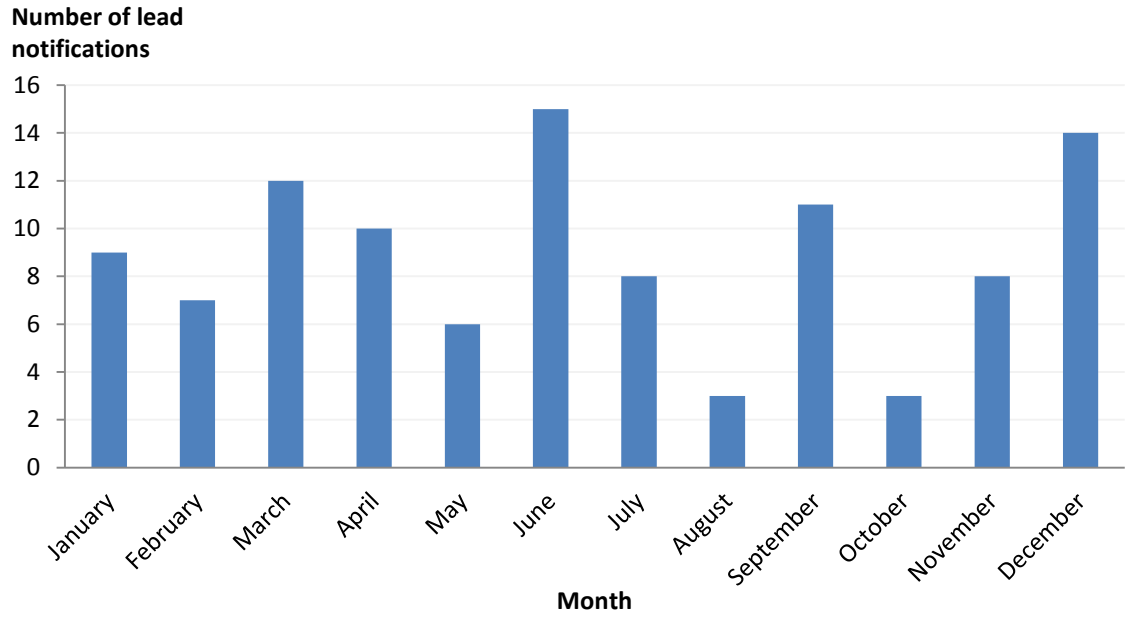
Table 3: Demographics of lead absorption notifications, 2016

Age group (years)	Female	Male	Total
0-4	2		2
5-14		4	4
15-24	1	2	3
25-44	2	29	31
45-64	8	43	51
65+		14	14
Unknown		1	1
Total	**13**	**93**	**106**
Ethnicity			
Māori		8	8
Pacific	2	3	5
Asian		6	6
European/Other	9	55	64
Unknown	2	21	23
Total	**13**	**93**	**106**

June and December had the highest number of lead notifications

June (15 notifications) had the highest number of lead notifications in 2016, followed by December (14 notifications) (Figure 2). There were more lead absorption notifications in the first half of the year (January to June).

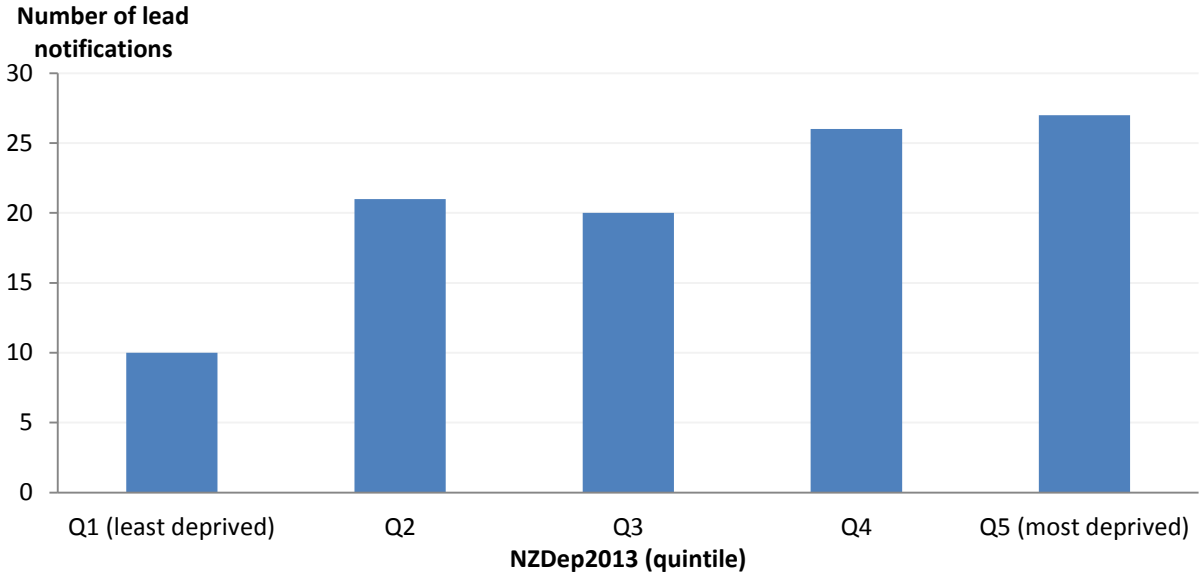
Figure 2: Number of lead absorption notifications by month, January –December 2016



The number of lead absorption notifications generally increased with socio-economic deprivation

In 2016, the number of lead absorption notifications was highest among those who resided in deprivation quintile 5 (most deprived) areas, and lowest in quintile 1 (least deprived) areas (Figure 3).

Figure 3: Number of lead absorption notifications, by deprivation quintile, 2016



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 (16.1 per 100,000 population) in 2016, followed by Taranaki DHB (8.6 per 100,000 population) (Table 4). In 2015, Taranaki DHB had the highest rate of lead notifications (11.2 per 100,000 population), followed by MidCentral DHB (4.1 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	2015		2016	
	Number	Rate	Number	Rate
Northland	0		0	
Waitemata	12	2.1	5	0.9
Auckland	18	3.7	10	2.0
Counties Manukau	6	1.2	6	1.1
Waikato	7	1.8	18	4.5
Lakes	1		2	
Bay of Plenty	4		2	
Tairawhiti	0		2	
Taranaki	13	11.2	10	8.6
Hawke's Bay	1		6	3.7
Whanganui	2		5	7.9
MidCentral	7	4.1	8	4.6
Hutt Valley	5	3.5	3	
Capital and Coast	10	3.3	7	2.3
Wairarapa	3		7	16.1
Nelson Marlborough	3		0	
West Coast	0		0	
Canterbury	18	3.4	11	2.0
South Canterbury	4		0	
Southern	4		2	
Unknown	3		2	
New Zealand	**121**	**2.6**	**106**	**2.3**

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.

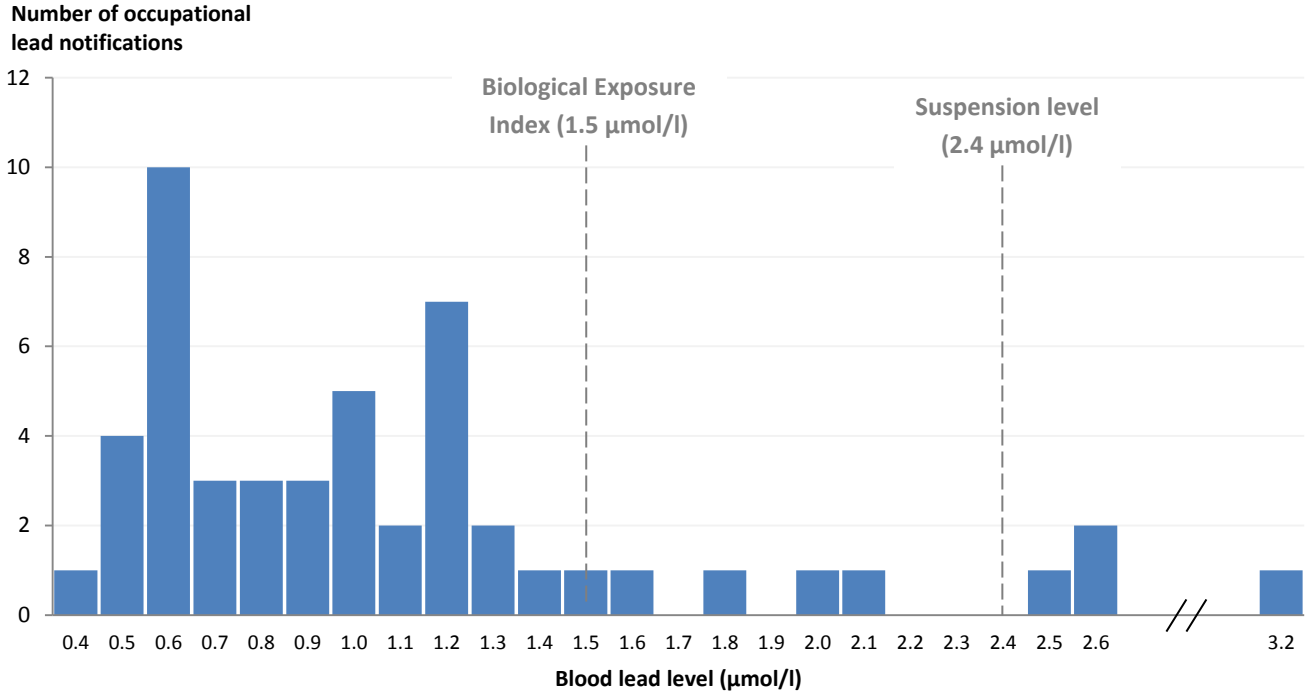
5.1 Occupational lead exposure

Lead notifications from occupational exposures increased in 2016

In 2016, there were 51[7] lead absorption notifications (48% of all lead notifications) where occupation was recorded as the source of exposure, compared to 37 notifications (31% of all lead notifications) in 2015.

The blood lead levels of occupational relevance are 1.50 µmol/l (the Biological Exposure Index) and 2.40 µmol/l (the suspension level). There were nine notifications that had a blood lead level that exceeded the Biological Exposure Index, four of which exceeded the suspension level. All nine notifications were painters. The highest blood lead level recorded for occupational notifications was 3.20 µmol/l in 2016 (Figure 4). No cases were admitted to hospital.

Figure 4: Number of occupational lead absorption notifications, by blood lead levels, 2016



Painters were the most exposed to lead

In 2016, painter (29 notifications) was the most commonly reported occupation for occupational lead absorption notifications (Table 5). Painter was also the most commonly reported occupation in 2015 and 2014, accounting for 16 and 20 notifications respectively.

[7] 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.

Table 5: Number of lead absorption notifications by occupation, 2016

Occupation	Number
Painter	29
Foundry worker	3
Scrap metal worker	3
Radiator technician	2
Brick layer	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***

*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.

Four lead cases were enrolled in a workplace monitoring programme

Of the 51 occupational lead absorption notifications in 2016, four notifications were enrolled in a workplace monitoring programme and seven notifications were not. This was unknown for the remaining 40 notifications.

PHU Action[8]

Of the 51 occupational lead absorption notifications, investigation was recorded as being complete in 38 notifications, underway in five notifications and no further investigation in seven notifications. Two notifications were referred to another agency, e.g. WorkSafe.

[8] A notification can be both investigated by the PHUs and referred to another agency.

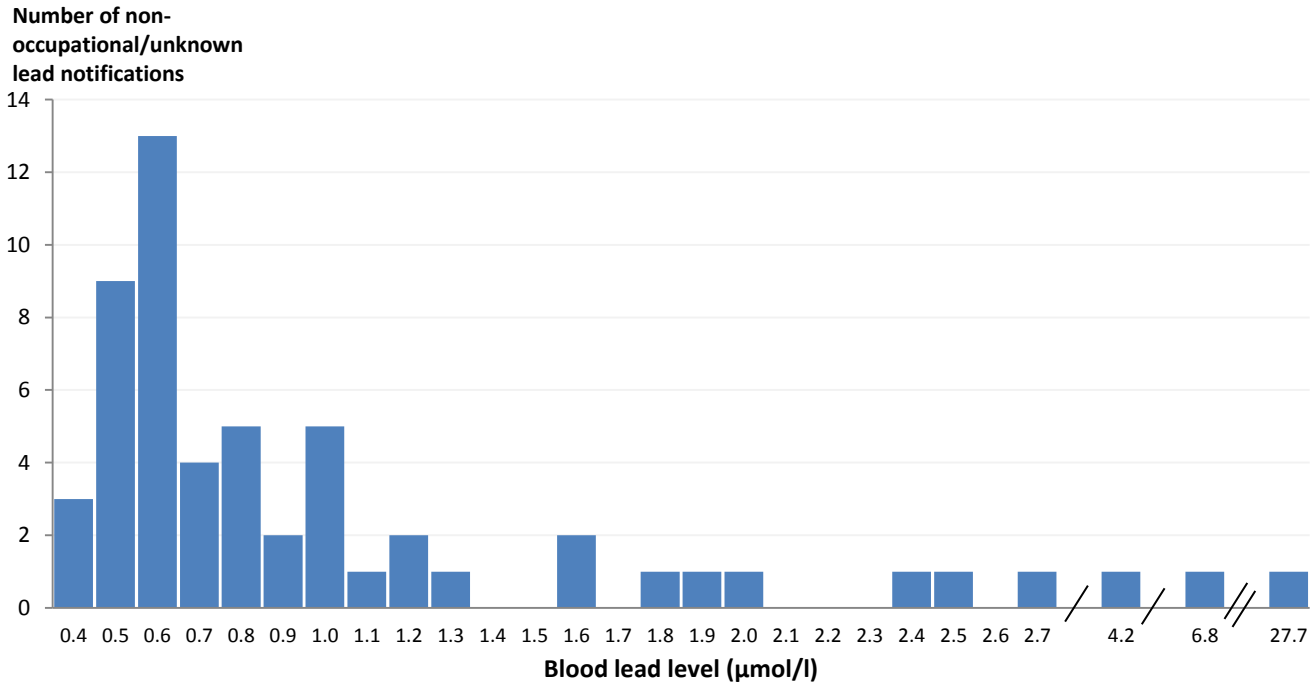
5.2 Non-occupational/unknown lead exposure

Lead notifications from non-occupational/unknown exposures decreased in 2016

There were 58[9] non-occupational/unknown lead absorption notifications in 2016. These included 40 lead absorption notifications from non-occupational lead exposures and 18 notifications from unknown lead exposures. This compares to 87 non-occupational/unknown lead absorption notifications in 2015.

The blood lead levels ranged from 0.48 to 27.74 µmol/l (Figure 5). The highest non-occupational blood lead level was from an adult pica case who swallowed sinkers for weeks. Four cases, all adults, were admitted to hospital.

Figure 5: Number of non-occupational/unknown lead notifications, by blood lead level, 2016



Six children were reported with lead absorption in 2016

Six children under the age of 15 were reported with lead absorption in 2016 (Table 6). Their blood lead level ranged from 0.49 to 0.88 µmol/l. In 2015, there were also six notifications for children under 15 years old.

[9] 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.

Table 6: Blood lead level of notifications for children 0-14 years old, 2016

Blood lead levels (µmol/l)	Age groups	
	0-4	5-14
0.48-0.71	2	3
0.72-0.95		1
0.96-2.16		
≥2.17		
Total	**2**	**4**

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

Four out of the six 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 two child cases. Indoor rifle range was recorded as the lead source for one notification.

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

There were 52 lead absorption notifications for adults (15+ years) in 2016. Lead-based paint (20 notifications) was the most common source of lead exposure, followed by indoor rifle range (11 notifications) (Table 7).

Table 7: Source of lead exposure for adults (15 years and over), 2016

Non-occupational/unknown Lead source	Number
Lead-based paint	20
Indoor rifle range	11
Bullet/sinker	6
Traditional medicine or cosmetic	3
Pica	1
Ceremonial incense and dietary spices	1
Gunpowder	1
Restoration of lino casting machine	1
Unknown	13
Total	**57***

*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.

PHU Action

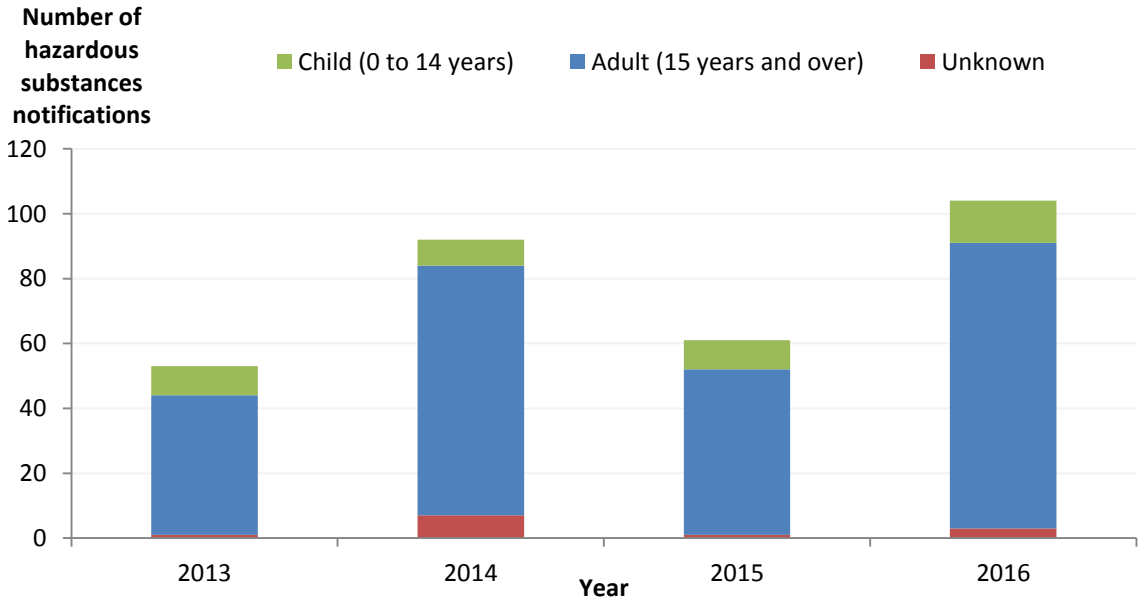
Of the 58 non-occupational/unknown lead absorption notifications, investigation was recorded as being complete in 38 notifications and underway in six notifications. No further investigation was recorded in the remaining 14 notifications.

6. Hazardous substances notifications

Hazardous substances notifications have increased significantly in 2016

There were 104[10] notifications that were related to hazardous substances in 2016, this was a significant increase ($p<0.05$) compared to 61 notifications in 2015 (Figure 6).

Figure 6: Number of hazardous substances notifications in children and adults by year, 2013-2016.



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

Males and adults were the most exposed

Sixty-four percent (67 notifications) of the hazardous substances notifications were males. Thirty-eight percent (39 notifications) of the hazardous substances notifications were from the 25-44 year age group, followed by 20 percent (21 notifications) from the 45-64 year age group. The most common ethnic group was European/Other (67 notifications) (Table 8).

Twenty-four notifications required hospital admission, including two children under 15 years old.

[10] Thirty-eight hazardous substances notifications were excluded from the 2016 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.

Table 8: Demographics of hazardous substances notifications, 2016

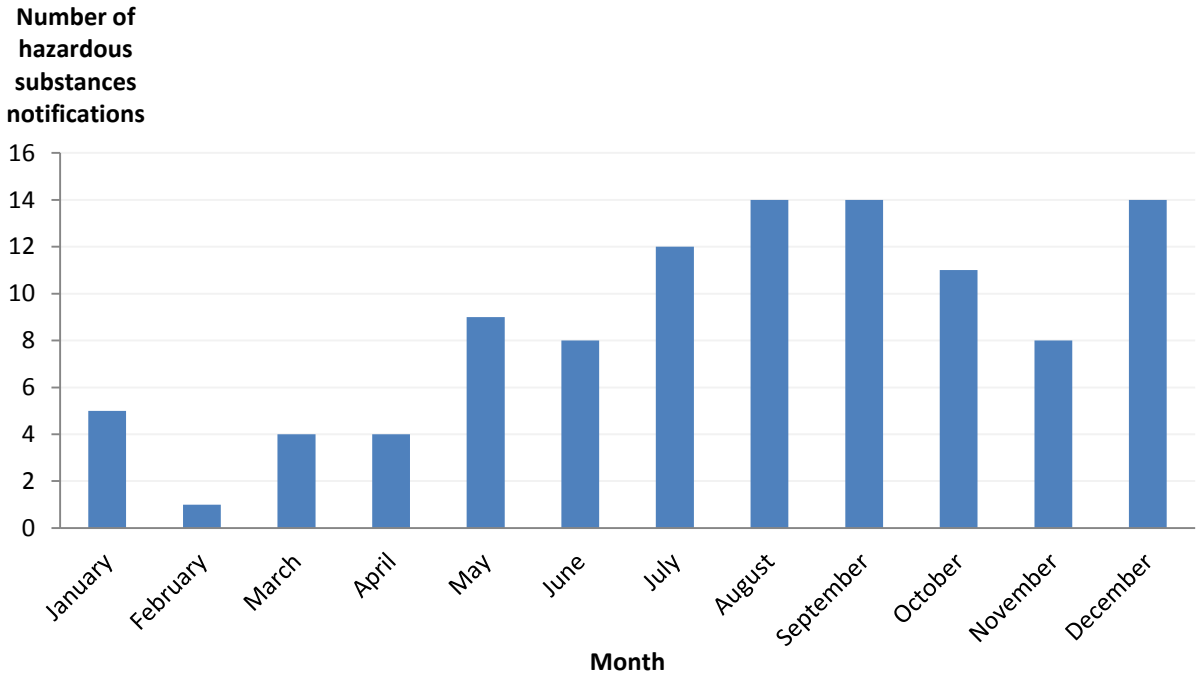
Age group (years)	Female	Male	Unknown	Total
0-4	2	6		8
5-14	1	4		5
15-24	7	10	1	18
25-44	10	28	1	39
45-64	9	12		21
65+	3	6	1	10
Unknown	2	1		3
Total	**34**	**67**	**3**	**104**
Ethnicity	**Female**	**Male**	**Unknown**	**Total**
Māori	3	8		11
Pacific	1	6		7
Asian	2	2		4
European/Other	21	44	2	67
Unknown	7	7	1	15
Total	**34**	**67**	**3**	**104**

August, September and December had the highest number of hazardous substances notifications

There were 14 hazardous substances notifications each in August, September and December in 2016, followed by 12 notifications in July and 11 notifications in October (Figure 7).

The majority (70%, 73 notifications) of hazardous substances notifications in 2016 occurred in the second half of the year (July to December).

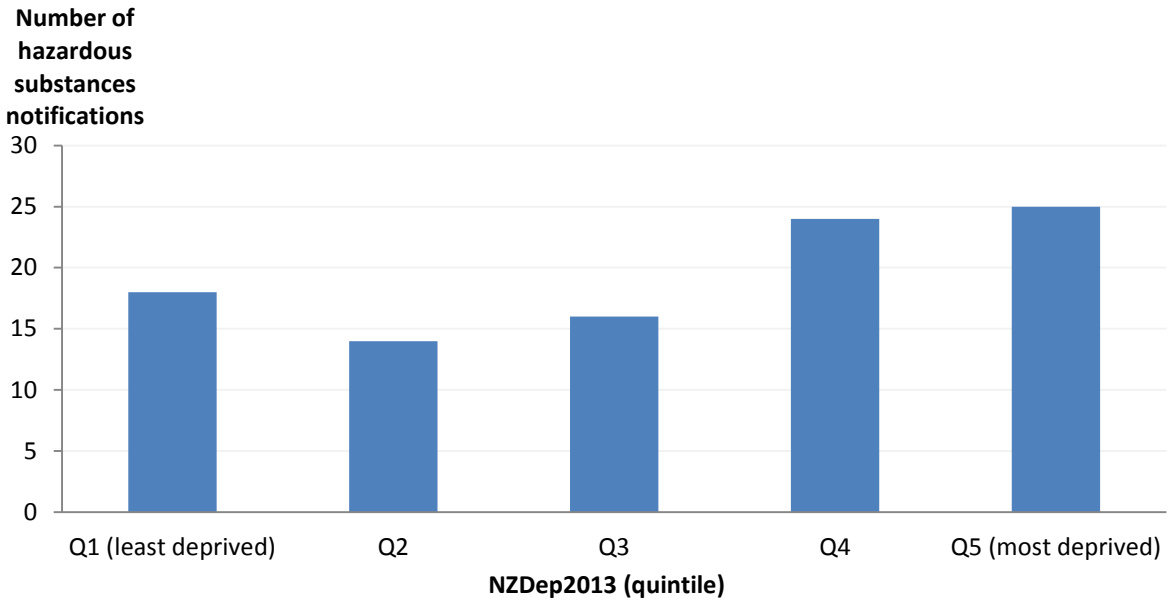
Figure 7: Number of hazardous substances notifications, by month, 2016



The number of hazardous substances notifications generally increased with socio-economic deprivation

In 2016, the number of hazardous substances notifications was highest among those who resided in deprivation quintile 5 (most deprived) areas, and lowest in quintile 2 areas (Figure 8).

Figure 8: Number of hazardous substances notifications, by deprivation quintile, 2016

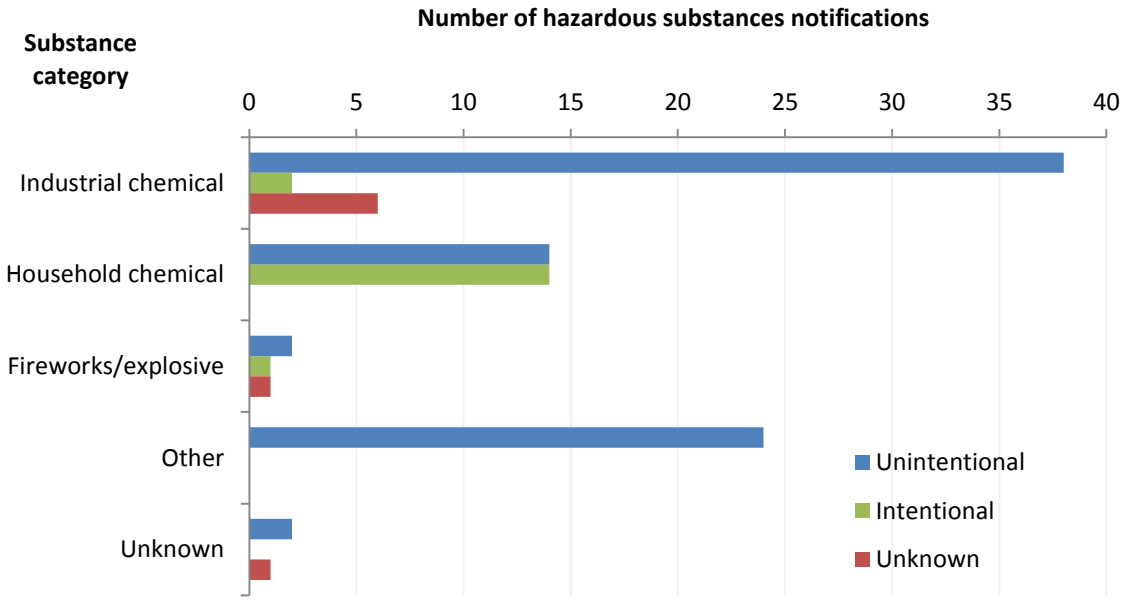


Note: NZDep2013 score is based on an individual's residential address. NZDep2013 scores were not allocated to seven notifications and they were excluded from this figure.

Majority of hazardous substances notifications were due to unintentional exposures

Seventy-seven percent (80 notifications) of hazardous substances notifications were from unintentional exposures. The most common substance category reported was industrial chemical (46 notifications), followed by household chemical (28 notifications) (Figure 9 and Table 9).

Figure 9: Number of hazardous substances notifications, by substance category and intent, 2016



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

Table 9: Hazardous substances notifications, by substance category and substance[11], 2016

Substance category	Substance	Number
Industrial chemical	petroleum	15
	cement	5
	sodium hydroxide	4
	LPG	3
	paint	3
	antifreeze	2
	battery acid	2
	methylene chloride	2
	cutting gas	2
	amyl nitrate	1
	diethylene glycol	1
	flammable liquid	1
	tiling mixture fume	1
	isopropanol	1
	sulphuric acid	1

[11] Obvious errors in assigning substances to a substance category have been corrected.

	mercury	1
	lauryl dimethylamine oxide	1
	aluminium	1
Household chemical	sodium hydroxide	4
	sodium hypochlorite	4
	rat poison	3
	butane	2
	benzalkonium chloride	2
	permethrin	2
	chloride	1
	chlorine	1
	30 second mould cleaner	1
	acid cleaning solution	1
	Cold Power washing powder	1
	Dettol	1
	Eco cleaner	1
	ethanol-based hand sanitizer	1
	ethyl alcohol (methylated spirits)	1
	liquid oven cleaner	1
	phenylenediamine	1
	weed killer	1
Fireworks/explosive	fireworks	3
	gun powder	1
Other	carbon monoxide	14
	smoke	8
	rubber combustion products	1
	methamphetamine	1
Unknown		3
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 eight hazardous substances notifications for children under the age of five years in 2016. Household chemicals were the most common cause of injury in this age group. These included ethanol- based hand sanitiser, washing powder, sodium hypochlorite (Exit Mould), liquid oven cleaner and Dettol.

Most hazardous substances injuries occurred in the home

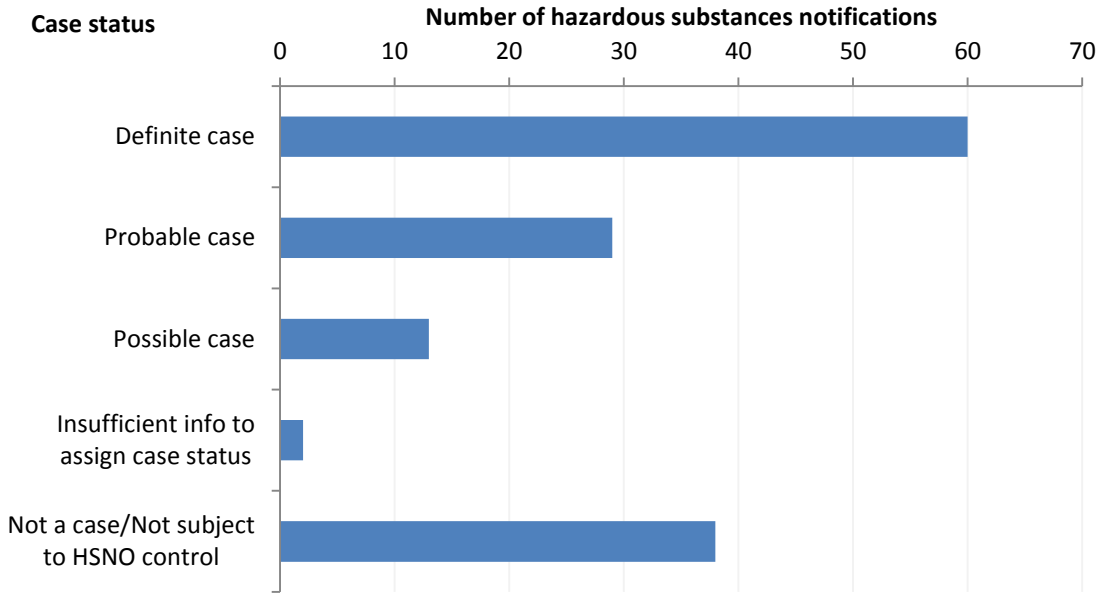
Over 40 percent (42 notifications) of the hazardous substances notifications occurred at home, followed by 30 percent (31 notifications) that occurred at workplaces. There were five notifications that were exposed to hazardous substances in public places and one in a school.

Case status[12]

In 2016, there were 60 hazardous substances notifications that were classified as 'definite cases' (Figure 10). There were 29 'probable cases' and 13 'possible cases' notified. Two 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, 2016



PHU Action[13]

Of the 104 hazardous substances notifications, investigation was recorded as being complete in 72 notifications, underway in 13 notifications and no further investigation in 16 notifications. Eight notifications were referred to another agency, e.g. WorkSafe.

[12] See Appendix 2 for the matrix of selecting a case status.
[13] A notification can be both investigated by the PHUs and referred to another agency.

7. Agrichemical spray-drift notifications

There were five agrichemical spray-drift notifications in 2016

There were five agrichemical spray-drift notifications in 2016, compared to four notifications in 2015 and five notifications in 2014. Four out of the five notifications were females. The ages ranged from 4 to 63 years.

All five notifications, including two children under six years old, were exposed to chlorpyrifos - an organophosphate insecticide (Lorsban 50EC) at home. They were all linked to the same event.

Case status

Of the five agrichemical spray-drift notifications, three were classified as 'probable cases' and two as 'possible cases'.

PHU Action

Investigation was recorded as underway for all five notifications and they were all referred to another agency.

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:

Fei Xu
Analyst
E: f.xu@massey.ac.nz
T: 0800 588 265

Helene Marsters
Senior Analyst
E: t.h.marsters@massey.ac.nz
T: 04 979 3382

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

hsss
Hazardous Substances Surveillance System

Appendix 1: DHB population projections 2015 -2016

DHB	Year	
	2015	2016
Auckland	490200	507200
Bay of Plenty	221500	226700
Canterbury	526800	539800
Capital and Coast	301200	306700
Counties Manukau	521800	534200
Hawke's Bay	160000	161400
Hutt valley	144000	145900
Lakes	104800	106700
MidCentral	172100	174200
Nelson Marlborough	144800	146400
Northland	168300	171400
South Canterbury	58600	59200
Southern	314100	318900
Tairawhiti	47400	47900
Taranaki	115900	116800
Waikato	390700	399600
Wairarapa	43200	43600
Waitemata	575800	590700
West Coast	32700	32600
Whanganui	62600	63000
Unknown	330	330
New Zealand	**4596700**	**4693000**

Source: Statistics New Zealand.

Appendix 2: The matrix of selecting a case status

The process for assigning case status is based on that used by the National Institute for Occupational Safety and Health of the US Centers for Disease Control for pesticide exposure cases.

Choose a category from each part and use the matrix to select a case status.

Part 1 Exposure history

A1Lead Confirmed lead level of ≥0.48µmol/L with or without exposure history

A1 Exposure history is corroborated by
- Environmental samples, OR
- Observation of the environment post exposure by a trained professional (e.g. HPO, MOH) confirms exposure e.g. pesticide residue observed, OR
- Clinical/Laboratory findings verified by a medical professional which meet the B1 criteria and are characteristic of the hazardous substance

A2 Evidence of exposure is based on report only

A3 Strong evidence that no exposure occurred

A4 Insufficient data on exposure available

Part 2 Health effects

B1 Abnormal signs or laboratory sample reported by medical practitioner (note that symptoms alone are not enough to meet this criterion)

B2 Abnormal symptoms only

B3 No new abnormal symptoms, signs or laboratory samples

B4 Insufficient data on health effects available

Part 3 Evidence supporting causal relationship between exposure and health effects

C1Lead Confirmed lead level of ≥0.48µmol/L

C1 All of the following apply
- Health effect/s are characteristic of those known for the hazardous substance/chemical from a reputable source (e.g. TOXINZ, CHEMFIND or other database, safety data sheet, toxicology text, government publication etc.)
- The temporal relationship between the exposure and health effect is plausible
- The exposure dose was known/is likely to be sufficient to produce the symptoms experienced

C2 No evidence of relationship between exposure and health effect
Any of the following apply
- Health effect/s are NOT characteristic of those known for the hazardous substance/chemical from a reputable source (e.g. TOXINZ, CHEMFIND or other database, safety data sheet, toxicology text, government publication etc.)
- The temporal relationship between the exposure and health effect is NOT plausible
- The exposure dose was NOT known/NOT likely to be sufficient to produce the symptoms experienced

C3 Definite evidence of non-hazardous substance cause

C4 Insufficient data are available to establish causal relationship between exposure and health effects (e.g. minimal human data available)

Part 4 Integration/Matrix

	Definite case	**Probable case**		**Possible case**	**Insufficient information to assign status**	**Not a case**		
A Exposure	A1/A1Lead	A1	A2	A2	A1 or A2 or A4	A3	Any	Any
B Health effects	B1	B2	B1	B2	B1 or B2 or B4	Any	B3	Any
C Causal relationship	C1/C1Lead	C1	C1	C1	C2 or C4	Any	Any	C3