

National Hazardous Substances and Lead Notifications

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Report to the Ministry of Health

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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 2 September 2015. 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

Key Findings

- There was a total of 229 notifications in 2014 that included 130 lead absorption and 99 hazardous substances notifications. In comparison, in 2013, there were 238 notifications that included 180 lead absorption and 58 hazardous substances notifications.

Lead notifications

- The majority (106 notifications) of lead notifications were males and the most common age groups were 25-44 years (38 notifications) and 45-64 years (58 notifications).
- The Wairarapa DHB had the highest rate (14.6 per 100,000) of lead absorption notifications in 2014.
- There were 56 lead notifications where occupation was recorded as the source of exposure in 2014 compared with 81 notifications in 2013.
- Five occupational lead cases had a blood lead level of ≥ 1.5 $\mu\text{mol/l}$ including four painters and one radiator repairer. There were no occupationally-related cases reported above the suspension level (2.4 $\mu\text{mol/l}$).
- Painters were the most exposed (20 cases) to lead in 2014.
- There were 79 lead notifications from non-occupational and unknown exposures, eight of which were children under the age of 15 years.
- The highest blood level recorded was 3.6 $\mu\text{mol/l}$. The source of exposure was traditional medicine or cosmetic.
- Lead-based paint was the most common source of non-occupational lead exposure for both children and adults.

Hazardous substances notifications

- There were 99 hazardous substances notifications in 2014, compared to 58 in 2013.
- There were an equal number of hazardous substances notifications for both males and females with 49 notifications each.
- The majority of hazardous substances notifications were unintentional exposures (76 notifications). The most common substance category was industrial chemicals (30 notifications).
- Household chemicals were the most common cause of injury for children less than five years old in 2014. These included Ajax, drain unblocker, Crew Smart Dose Cleaner, dishwasher tablet, and organoil (furniture oil).
- In 2014, over 60 percent (62 notifications) of all hazardous substances notifications were from injuries that occurred in the home.

Introduction

The new 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.

Methods

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)¹, and
- Poisoning arising from chemical contamination of the environment (Health Act 1956)

Data checking

Notification data supplied by the PHUs via the HSDIRT have been checked by the EHI 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.

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.

Statistical notes

Data are presented primarily as numbers and crude rates – unadjusted for any differences in age. The 2013 and 2014 mid-year population estimate served as a denominator for primary care

¹ Lead absorption can also be notified under the HSNO Act.

notification rates. Population estimates were not available by District Health Board for the year 2014, and so the census population served as the denominator for this analysis.

Total number of notifications

There was a total of 229² notifications entered into the HSDIRT in 2014 compared to 238³ notifications in 2013. These included 130 lead absorption notifications and 99 hazardous substances notifications.

Table 1 shows the number of lead and hazardous substances notifications in 2014 for each PHU.

Table 1: Number of notifications by Public Health Unit, 2014

Public Health Unit	Lead notifications	Hazardous substances notifications
Auckland Regional Public Health Service	40	14
Community and Public Health	16	8
Hawke's Bay Public Health Unit	2	0
MidCentral Public Health Service	22	3
Nelson-Marlborough Public Health Service	1	0
Northland Health	0	0
Public Health South	6	2
Regional Public Health	22	56
Tairāwhiti DHB Public Health Unit	1	0
Taranaki District Health Board	3	6
Toi Te Ora - Public Health	7	8
Waikato Population Health Service	10	2
Total	130	99

Lead absorption notifications

There were 130 lead absorption notifications in 2014 compared to 180 notifications in 2013

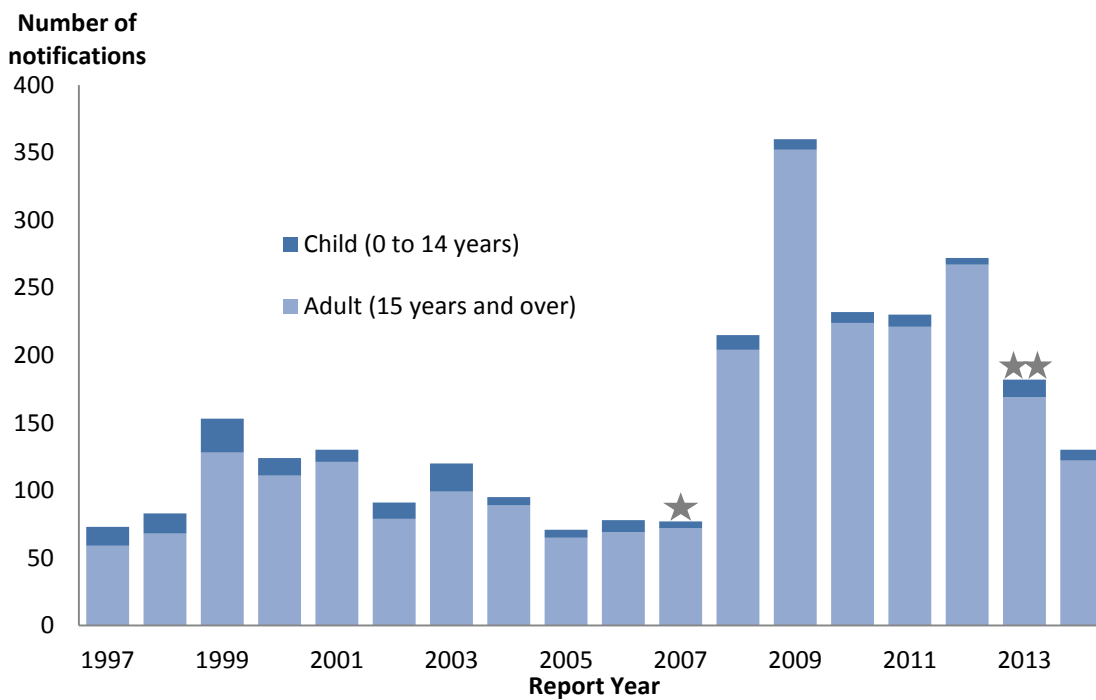
There were 130 notifications of lead absorption in 2014 (2.9 per 100,000 population) compared with 180 notifications in 2013 (4.1 per 100,000 population) (Figure 1).

In 2013, blood lead level tests taken within 12 months of the original test were excluded from the data which may have contributed to the decrease of lead notifications in 2013 and 2014.

² Seven cases were assigned a case status of 'Not a case' and have been excluded from the total.

³ Five cases were assigned a case status of 'Not a case' and have been excluded from the total.

Figure 1: Lead absorption notifications in children and adults by year, 1997 - 2014



* 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 became available 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 investigation has resulted.

Sources: Institute of Environmental Science and Research (1997-2013) and HSDIRT (2013-2014).

Males and adults are the most exposed

Over 80 percent of all lead notifications were males, and the most common age groups were 25-44 years (29%) and 45-64 years (45 percent) (Table 2). The most common ethnic group was European/Other with 95 notifications.

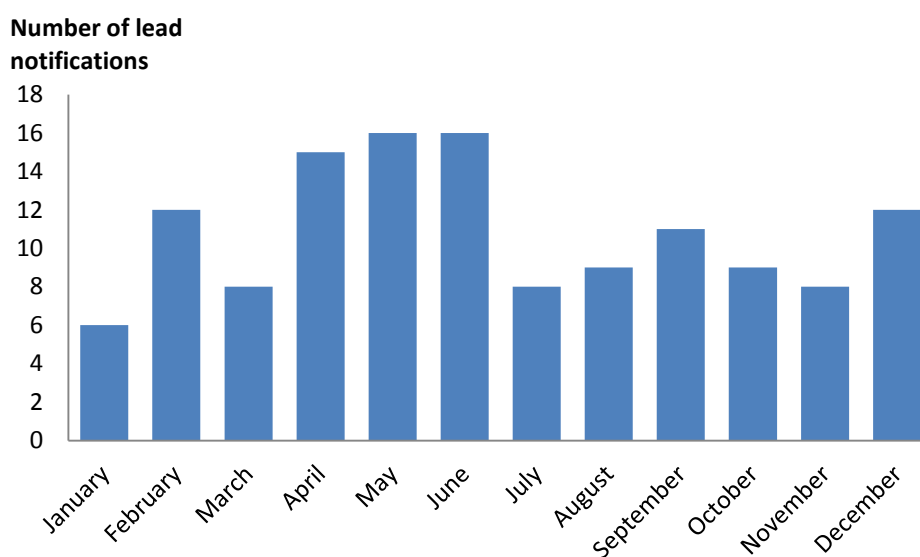
Table 2: Demographics of lead absorption notifications, 2014

Age group (years)	Female	Male	Unknown	Total
00-04	2	2		4
05-14	1	2	1	4
15-24	2	10		12
25-44	4	34		38
45-64	10	48		58
65+	3	10		13
Unknown			1	1
Total	22	106	2	130
Ethnicity				
Māori	1	7		8
Pacific		2		2
Asian	2	4		6
European/Other	14	80	1	95
Unknown	5	13	1	19
Total	22	106	2	130

Most lead notifications were between April and June

May and June had the highest number of lead notifications (16 notifications) followed by 15 notifications in April (Figure 2).

Figure 2: Number of lead absorption notifications by month, January –December 2014



The Wairarapa DHB had the highest rate of lead absorption notifications

Wairarapa DHB had the highest lead notification rate (14.6 per 100,000 population), followed by MidCentral DHB (9.8 per 100,000 population) (Table 3). These two DHBs also had the highest rates of lead absorption notifications in 2013.

Table 3: Number and crude rates per 100,000 population of lead absorption notifications by DHB, 2014

DHB	Notifications	Rate
Auckland	26	6.0
Bay of Plenty	4	-
Canterbury	8	1.7
Capital and Coast	9	3.2
Counties Manukau	6	1.3
Hawke's Bay	2	-
Hutt Valley	6	4.3
Lakes	2	2.0
MidCentral	16	9.8
Nelson Marlborough	1	-
Northland	0	-
South Canterbury	4	-
Southern	6	2.0
Tairāwhiti	1	-
Taranaki	3	-
Waikato	8	2.2
Wairarapa	6	14.6
Waitemata	7	1.3
West Coast	4	-
Whanganui	3	-
Area outside DHB	8	-
Total	130	

Note: i) The crude rates were not calculated for those with counts less than five; ii) Spatial analysis is based on an individual's residential address.

Occupational lead exposure

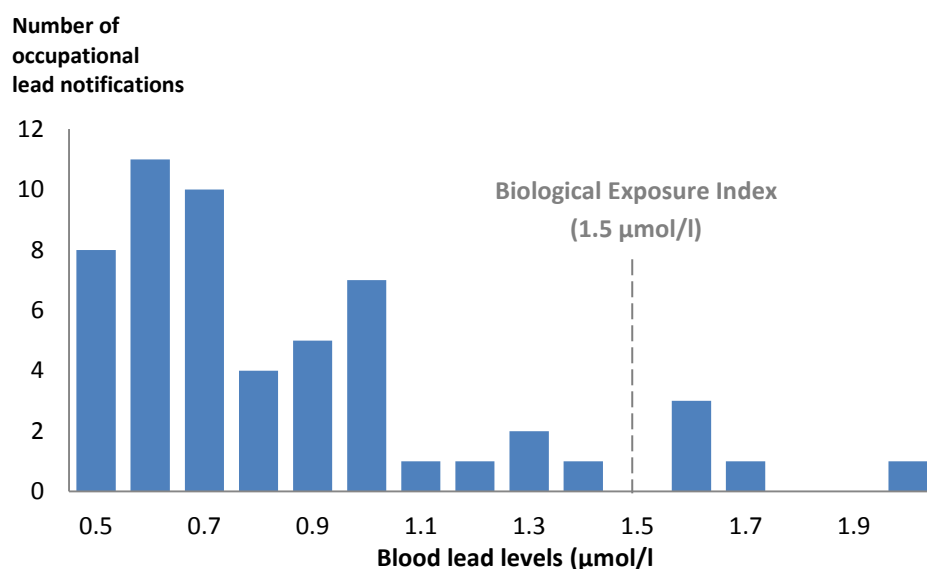
Fifty-six lead notifications from occupational exposure in 2014

In 2014, there were 56⁴ lead absorption notifications where occupation was recorded as the source of exposure compared with 81 lead notifications in 2013.

⁴ Five cases have been recorded with both an occupational and non-occupational exposure. Therefore, the number of occupational and non-occupational lead exposures could add to more than the total number of lead notifications.

The blood lead levels of occupational relevance are 1.5 µmol/l (the Biological Exposure Index) and 2.4 µmol/l (the suspension level). There were five cases with a blood lead level of ≥1.5 µmol/l (Figure 3). These included four painters and one radiator repairer. There were no occupationally-related cases reported above the suspension level (2.4 µmol/l), with the highest blood lead level belonging to a painter (2.0 µmol/l).

Figure 3: Number of occupational lead absorption notifications, by blood lead levels, 2014



Painters are the most exposed to lead

The most common occupational exposures were for painters (30%), metal worker (8%), and mechanics (7%) (Table 4). Painters had the highest number of lead notifications for the previous year as well.

Table 4: Number of lead absorption notifications by occupation, 2014

Occupation	Notifications
Painter	20
Metal worker	5
Mechanic	4
Bricklayer	3
Artist / handyman	1
Carpenter	1
Factory hand - organ company	1
Fibreglass Worker	1
Jeweller	1

Joiner	1
Lab Technician	1
Mine worker /Semi-retired	1
Construction	1
Panel beater	1
Radiator Fitter	1
Store Manager	1
Store man	1
Self-employed contractor -various jobs	1
Welder	1
Unknown	9
Total	56

Only nine lead cases were enrolled in a workplace monitoring programme

Of the 56 occupational lead notifications, nine were recorded as being enrolled in a workplace monitoring programme, 33 unknown, and 14 not enrolled.

PHU Action

Investigation was recorded as being complete in 22 notifications, investigation underway in four cases, and no further investigation in 29 cases. Only one case, a painter, was recorded as being referred to another agency e.g. WorkSafe NZ.

Non-occupational/ unknown lead exposure

Seventy-nine lead notifications from non-occupational or unknown exposures

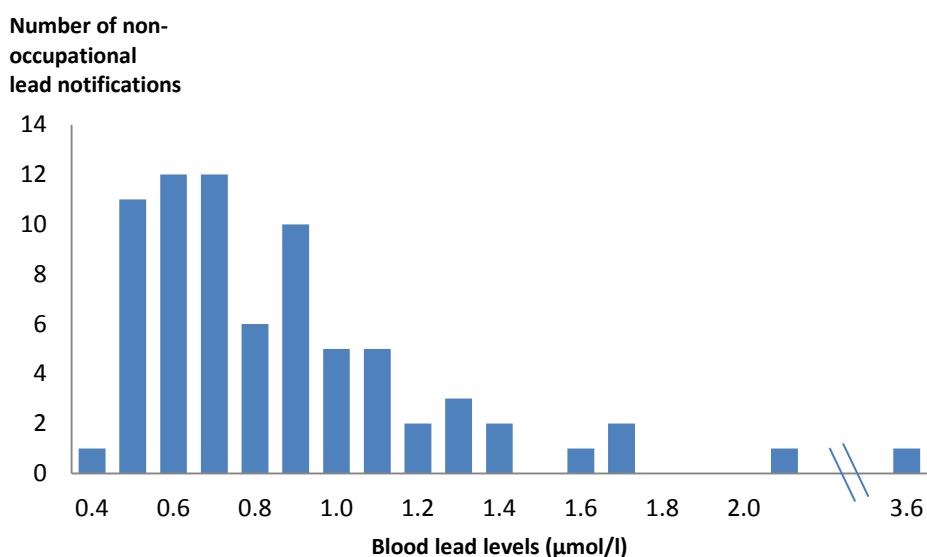
There were 51⁵ lead absorption notifications where a non-occupational source of exposure was recorded and 28 were from unknown exposures (Figure 4).

The blood lead levels ranged from 0.48 to 3.60 µmol/l. The case with the highest blood lead level was exposed to traditional medicine or cosmetic.

Blood lead levels were recorded for 79 notifications and the five notifications that did not have a blood lead level recorded have been excluded from the graph below.

⁵ Five cases have been recorded with both an occupational and non-occupational exposure. Therefore, the number of occupational and non-occupational lead exposures could add to more than the total number of lead notifications.

Figure 4: Number of non-occupational lead notifications, by blood lead level, 2014



Note: Five notifications with an unknown blood lead level have been excluded from this graph.

There were eight child lead notifications in 2014

Of the 79 non-occupational lead absorption notifications, eight were children under the age of 15 years (Table 5). In the previous year, there were 13 child lead notifications. The blood lead level concentrations ranged from 0.53 to 1.1 µmol/l. Three children did not have a blood lead level recorded.

Table 5: Blood lead level notifications for children 0-14 years old, 2014

Blood lead levels (µmol/l)	Age groups	
	00-04	05-14
0.48-0.71		2
0.72-0.95	1	1
0.96-2.16	1	
≥2.17		
Unknown	2	1
Total	4	4

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

There were two lead-based paint exposure events that involved two children each. Pica – an eating disorder characterised by a craving for non-food items – was reported for another two cases and both suffered from autism. Another child was reported with elevated blood lead after playing in lead-contaminated soil. The remaining notification involved a two-month-old child (the youngest in the group) who had a blood lead level of 0.9 µmol/l. The source of lead exposure was not recorded.

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

There were 71 lead absorption notifications for adults (15+ years) in 2014. Lead-based paint (19 notifications) was the most common source of lead exposure followed by lead exposure from an indoor rifle range (17 notifications) (Table 6).

One case had multiple exposures including house renovations, lead sinker assembly, diet medication, soldering and smelting in the garage, and renovating old furniture. Another case was exposed to lead ammunition from a gunshot wound.

Table 6: Sources of lead exposure for adults (15 years and over), 2014

Non-work lead source	Notifications
Lead-based paint	19
Indoor rifle range	17
Bullet/sinker manufacture	8
Traditional medicine or cosmetic	3
Pica	1
Close contact with person whose occupation involves lead exposure	1
Outdoor shooting	1
Gunshot wound	1
Other	2
Unknown (non-occupational source)	27
Total	80^a

^a More than one source of lead exposure can be selected for a single notification, therefore, the total can add to more than the number of notifications.

PHU Action

Investigation was recorded as being complete in 46 notifications, investigation underway in three cases, and no further investigation in 29 cases. One case was recorded as being referred to WorkSafe NZ.

Hazardous substances notifications

Hazardous substances notifications have increased since 2013

There were 99⁶ notifications related to hazardous substances in 2014, compared to 58 in 2013. This represents an average increase of three notifications per month. There were an equal number of notifications (49 cases each) for both males and females. The gender field was not recorded for one case.

⁶ Eleven cases have been excluded from this analysis as they were either recorded as 'Not a case' or they were exposed to substances not subject to HSNO controls.

The 45-64 year age group had the highest number of notifications (32 cases) and the most common ethnic group was European/Other (Table 7).

Of the 99 cases, 35 required hospital admission, including one person who later died from carbon monoxide poisoning.

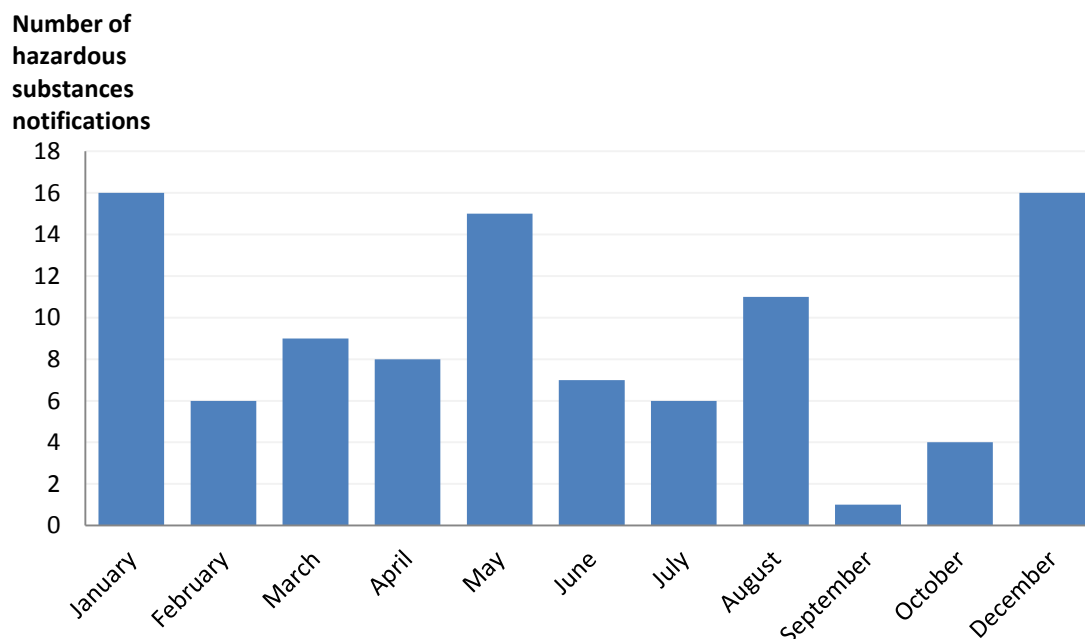
Table 7: Demographics of hazardous substances notifications, 2014

Gender	Female	49
	Male	49
	Unknown	1
	Total	99
Ethnicity	Māori	10
	Pacific	5
	Asian	7
	European/Other	54
	Unknown	23
	Total	99
Age Group	0-4	7
	5-14	3
	15-24	17
	25-44	24
	45-64	32
	65+	8
	Unknown	8
	Total	99

Most hazardous substances notifications were in January

January had the highest number of hazardous substances notifications in 2014 with 16 notifications each (Figure 5). September had the lowest, with only one notification.

Figure 5: Number of hazardous substances notifications, by month, 2014

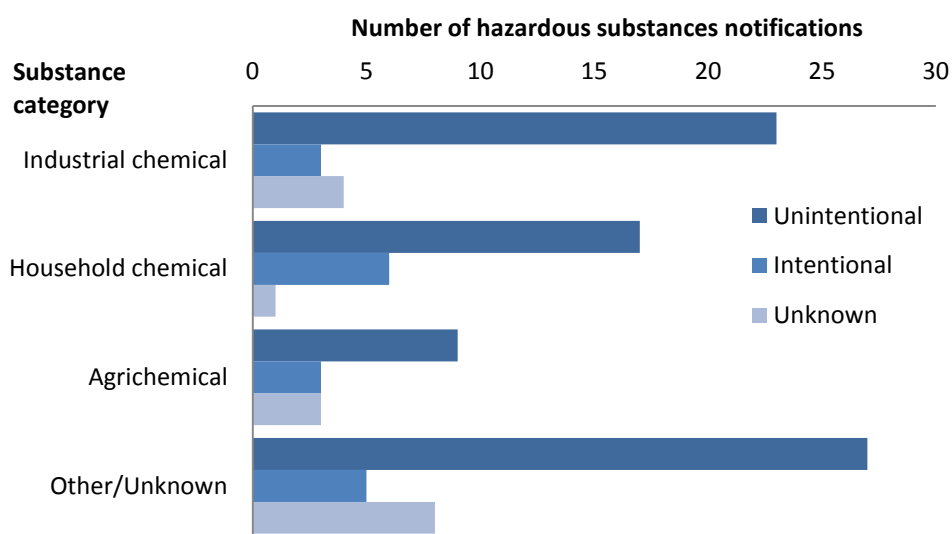


Note: Thirteen cases notified in 2014 were not entered into the HSDIRT until 2015. These cases were assigned a new notification date of 31 December 2014 in order to be included in the 2014 analysis. This explains the high number of notifications in December.

Seventy percent of hazardous substances notifications were unintentional exposures

Seventy percent (76 notifications) of all notifications were unintentional exposures and the most common substance categories were industrial chemicals (30 notifications) and household chemicals (24 notifications) (Figure 6 and Table 8).

Figure 6: Number of hazardous substances notifications, by substance category and intent, 2014



Note: More than one substance category can be selected for a single notification, and so the total adds to more than the number of notifications.

Table 8: Hazardous substances notifications, by substance category⁷, 2014

Substance category	Substance	Notifications
Industrial chemical	glutaraldehyde	4
	chlorine	2
	chromium VI	2
	formaldehyde	2
	methyldiaminoethylether - polycondensate	1
	didecyl dimethylammonium chloride	1
	gas (unidentified)	1
	1,2-Benzisothiazolin-3-one	1
	caustic soda	1
	xylene	1
	window cleaner	1
	sodium nitrate	1
	solvent	1
	simply green all-purpose cleaner	1
	sulphuric acid	1
	fire extinguisher powder	1
	hydrocarbon liquids	1
	turpentine	1
	wipeout flex	1
	turpentine	1

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

	mercury	1
	Total	27
Agrichemical	glyphosate	5
	fertiliser	3
	pyrethrins	3
	lime	3
	bromadiolone	2
	alpha-cypermethrin	1
	organophosphate	1
	carbamate insecticide	1
	hydrogen cyanamide	1
	agritone 750	1
	Total	21
Household chemical	benzalkonium chloride	4
	sodium hypochlorite	2
	sodium hydroxide	1
	methylated spirits	2
	disinfectant	1
	ajax	1
	ammonia	1
	drain unblocker	1
	crew smart dose cleaner	1
	dishwasher tablet	1
	electronic lighter fluid	1
	hydrogen Peroxide	1
	furniture oil	1
	Total	18
Fireworks/Explosive	smoke	3
	Total	3
Other	carbon monoxide	14
	smoke	10
	methamphetamine	2
	methane gas	2
	paint	1
	Total	29
Unknown	Total	10
Total notifications		108

a. More than one substance can be selected for a single notification, therefore, the total adds 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 seven notifications for children under the age of five years in 2014, three of which required hospital admission. Household chemicals were the most common cause of injury in this age

group. These included Ajax, drain unblocker, Crew Smart Dose Cleaner, dishwasher tablet, and organoil (furniture oil).

Most hazardous substances injuries occurred in the home

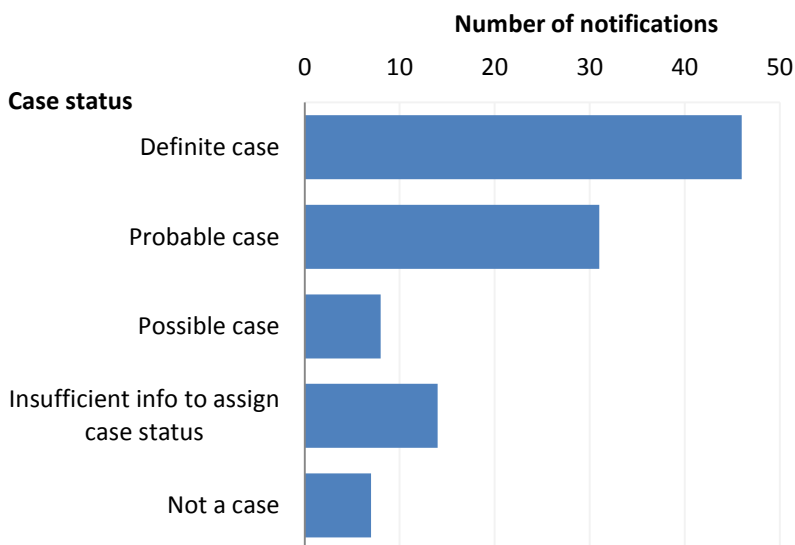
Over 60 percent of injuries (62 notifications) occurred at home. Injuries in the workplace contributed to 22 percent (22 notifications) of all hazardous substances notifications followed by injuries in public (6 notifications).

Case status

Forty-six notifications were classified as ‘definite cases’. Nine of them occurred in the workplace including four cases that were exposed to glutaraldehyde – a chemical used to sterilise medical and dental equipment (Figure 7).

There were 31 ‘probable cases’ and eight ‘possible cases’ notified. Fourteen notifications had insufficient information to assign a case status. Seven notifications were assigned a case status of ‘Not a case’ and have been excluded from this analysis.

Figure 7: Number of hazardous substances notifications, by case status, 2014



PHU Action

In total, investigation was listed as ‘completed’ in 18 cases; ‘investigation underway’ in two cases; ‘no further investigation’ in 66 cases; and 13 cases were referred to WorkSafe NZ.

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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