OzFoodNet — Enhancing Foodborne Disease Surveillance across Australia.

NSW 2014 OzFoodNet Annual Report

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1. Acknowledgements

The NSW OzFoodNet Annual Report 2014 was possible due to the collaborative work of many people, some mentioned by name here, who contribute in varying capacities to the management of communicable enteric diseases in NSW:

- NSW Public Health Unit staff for surveillance, reporting and investigation of enteric disease cases, clusters and outbreaks
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- HAPS, ICPMR, IMVS, MDU and other public and private laboratory staff in New South Wales, Queensland, Victoria and South Australia
- Clinicians across NSW who assist in the diagnosis and follow up enteric disease
- The New South Wales Food Authority for management of environmental aspects of outbreak investigations
- Local Councils in NSW that contribute to enteric disease investigations
- Sheena Adamson, Laboratory Liaison Officer with Health Protection, NSW
- All OzFoodNet epidemiologists and collaborators
- Partners in Department of Primary Industries and associated stakeholders

2. Contents

3. Introduction

This report describes enteric diseases and conditions that are notifiable in NSW. The data in this report are derived from disease surveillance and outbreak investigation activities undertaken by staff from NSW public health units, Communicable Diseases Branch (CDB), Health Protection NSW, OzFoodNet (OFN) staff and the NSW Food Authority (NSWFA).

There are two OzFoodNet (OFN) sites in NSW - one based in Sydney at the Communicable Diseases Branch, Health Protection NSW and the other in Newcastle at Hunter New England Public Health Unit.

The Sydney site's primary role is to coordinate, monitor and report state-wide enteric disease surveillance, investigate state-wide outbreaks and to contribute to enteric disease related policy development in NSW. The team at this site consists of an OFN epidemiologist and an OFN surveillance officer.

The Newcastle site's primary role is to investigate outbreaks that occur within the Hunter New England area, assist with the investigation of state-wide outbreaks, and assist in enteric disease research. The Hunter OFN site comprises an OFN epidemiologist and a research officer. Both sites work closely with the Manager, Enteric Diseases and other Communicable Disease Branch staff.

The management of suspected foodborne disease outbreaks in NSW is the shared responsibility of NSW public health units, Health Protection NSW, NSW OFN sites and the NSW Food Authority. NSW Health is responsible for the human health and epidemiological aspects of outbreak investigations and the NSW Food Authority is responsible for the environmental investigation, food testing and food trace-back components of an outbreak investigation. A Memorandum of Understanding between NSW Health and the NSW Food Authority outlines the roles and responsibilities of each agency, and the Investigation of Foodborne Illness Response Protocol describes the interaction and communication between NSW Health and the NSW Food Authority in relation to foodborne illness surveillance and investigations of food-related outbreaks and complaints in NSW.

3.1 Notifiable enteric diseases in NSW

Under the Public Health Act 2010 (NSW), the following enteric diseases and conditions are notifiable in NSW: cholera, cryptosporidiosis, giardiasis, hepatitis A, haemolytic uraemic syndrome (HUS), hepatitis E, listeriosis, paratyphoid, rotavirus, shiga toxin producing *Escherichia coli* (STEC/VTEC) infections, shigellosis, salmonellosis, typhoid, institutional gastroenteritis in two or more people, and foodborne disease in two or more people.[1] Individual cases of other enteric diseases such as campylobacter and norovirus infection are not notifiable in NSW.

NSW laboratories report cases of notifiable enteric diseases to public health units (PHUs). Outbreaks of foodborne or suspected foodborne illness and institutional gastroenteritis are reportable by doctors, hospitals, child care centres and aged care facilities. Notifiable disease data are routinely entered by public health unit staff into the NSW Notifiable Conditions Information Management System (NCIMS).

3.2 Data sources for this report

Data in this report has been extracted from the NSW Notifiable Conditions Information Management System, NSW OFN Outbreak Database and the NSW Gastroenteritis in Institutions Database, all held by Health Protection NSW.

3.3 Methods

We analysed data for the following notifiable enteric pathogens; *Salmonella* (including *Salmonella* Paratyphi),[*] *Salmonella* Typhi, *Listeria monocytogenes*, *Shigella*, HUS and STEC, *Cryptosporidium*, *Giardia*, rotavirus and hepatitis A & E viruses. On 16 March 2015, 2014 data was extracted from NCIMS using Secure Analytics for Population Health Research and Intelligence (SAPHaRI)[2] using the date of onset of disease. The counts of each notifiable enteric disease[†] for 2014 were compared with the average annual count for the years 2009 to 2013. The NSW estimated resident population for 30 June of each year from 2009-2014 was used to calculate crude incidence rates for each disease.[3]

Laboratory testing data from 14 public and private laboratories is available for 2012 and 2013 for cryptosporidium and giardia. In January 2014, an additional private laboratory was added. Care should be taken when interpreting trends using data from 2014. In addition, there is some duplication of the number of tests undertaken where more than one method of testing is used. Faecal specimens are tested for both cryptosporidium and giardia by nucleic acid amplification test (NAAT). The laboratory testing data does not provide any information on whether there are repeat tests performed on the same individual.

Notification data for cryptosporidium and giardia were analysed for the period between 1 January 2012 and 31 December 2014, based on the specimen date. The ratio of positive notifications was calculated by dividing the overall positive results notified to NSW Health by all laboratories, by the total number of tests performed as reported from the participating laboratories. The overall positive results included in the analysis are for individual people notified with each condition reported from all laboratories. However, the testing data are for individual tests reported from participating laboratories and may include multiple specimens per individual. As such, the ratio of positive notifications per test may be an underestimate of the per cent of people tested that are positive for the condition.

Data for outbreaks of suspected point-source foodborne enteric diseases were collected from the NSW Food Authority Notification of Foodborne Illness Outbreak Form, the Public Health Unit Environmental Request Form and the OFN Outbreak Summary Form and entered into an MS Access database. Data for enteric disease outbreaks in institutions with suspected person-to-person transmission of a viral pathogen were entered directly into NCIMS by public health units. Data from these registers are analysed using MS Excel at Health Protection NSW. Data were reported as received by Communicable Diseases Branch on 28 March 2014.

[*] We define *Salmonella* as all *Salmonella* serovars, excluding *S*. Typhi, in accordance with the definition of *Salmonella* endorsed by the Communicable Diseases Network of Australia (CDNA).

[†] Notifiable enteric diseases in NSW include cryptosporidiosis, giardiasis, haemolytic uraemic syndrome, rotavirus, salmonellosis (including paratyphoid), shigellosis, listeriosis, hepatitis A, hepatitis E, typhoid and Shiga toxin-producing *Escherichia coli* (STEC) infection

4. Summary

- In 2014, there were 8,794 notifications of the enteric diseases (cryptosporidiosis, giardiasis, hepatitis A, hepatitis E, rotavirus, HUS, listeriosis, salmonellosis (including paratyphoid), shigellosis, typhoid and infection with shiga toxin producing *Escherichia coli*) in NSW. This was a 17% increase compared with the annual average notifications for the previous five years.

- Salmonellosis (including paratyphoid) was the most frequently reported enteric condition in NSW during 2014 with a total of 4,317 notifications reported. This is a 32% increase on the annual average of salmonellosis notifications for the previous five years and a 20% increase in notifications compared to 2013.

- Giardiasis was the second most frequently reported enteric condition in 2013. There were 2,955 notifications in the year, an increase of 34% compared with the annual average for the previous five years. No clustering of cases or outbreaks were identified.

- Rotavirus was the third most frequently reported enteric condition in 2014. It became a notifiable condition in 2010. There were 717 notifications of rotavirus received in 2014, a 39% decrease when compared to the average notification for the previous four years (2010-2013).

- There were 414 notifications of cryptosporidiosis, a decrease of 48% compared with the annual average for the previous five years.

- There were 30 notifications of Shiga toxin producing *Escherichia coli* (STEC) in 2014, the highest number of notifications on record and an increase of 92% compared to the annual average for the previous five years. One of the causes for this increase was an outbreak linked to a kebab shop. There was no associated increase in haemolytic uraemic syndrome (HUS) with the notification of 6 cases in 2014 remaining consistent with the annual average for the previous five years.

- There were 23 listeriosis notifications received in 2014. This represented a decrease of 19% compared to the annual average for the previous five years.

- There were 37 cases of hepatitis E notified in 2014, an increase of 131% compared with the annual average for the previous five years. This increase is due to the locally acquired cluster linked to pork pate.

- In 2014, 44 foodborne or probable foodborne disease outbreaks were reported affecting at least 505 people, as well as 461 viral or probable viral gastroenteritis outbreaks in institutions affecting 7,080 residents. This was a 13% increase in the number of reported foodborne or probable foodborne disease outbreaks compared to 2013 (n=39), and a 1% decrease in the number of reported gastroenteritis outbreaks in institutions compared to 2013 (n=466).

- Of the point-source foodborne outbreaks, *Salmonella* Typhimurium was the causative pathogen in 59% (26/44). Fifty per cent of these (13/26) implicated a food vehicle, of which raw or only partially cooked eggs was the source of infection in ten outbreaks.

5. Activity during 2014

5.1 Overview

There were 8,794 enteric disease notifications in 2014, a 17% increase compared to the average number of notifications for the previous five years. Results by disease are listed in Table 1.

Table 1: Number of selected enteric disease notifications during 2014 compared with the average number of notifications, NSW 2009-2013

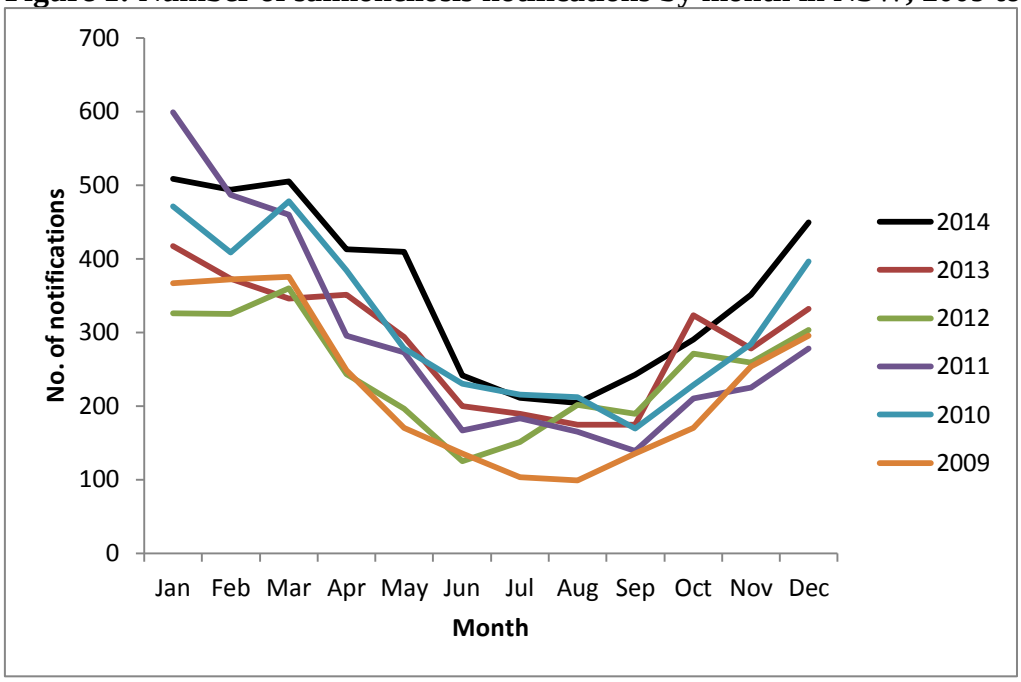
Condition	2014	5 year average	% change
Botulism	0	1	-100%
Cholera	0	2	-100%
Cryptosporidiosis	414	793	-48%
Giardiasis	2950	2196	34%
Haemolytic Uremic Syndrome	6	6	0%
Hepatitis A	80	68	17%
Hepatitis E	37	16	131%
Listeriosis	23	28	-19%
Rotavirus*	717	1172	-39%
Salmonellosis (including paratyphoid)	4300	3271	31%
Shigellosis	195	134	45%
STEC	30	16	92%
Typhoid	45	45	0%
Total	**8794**	**7517**	**17%**

*Data only available since 2010 for Rotavirus

5.2 Salmonellosis (including paratyphoid)

Salmonellosis (including paratyphoid) was the most frequently reported enteric condition in NSW during 2014. There were a total of 4,317 notifications, which is the highest total number of notifications ever reported. In 2014 salmonellosis notifications were 32% above the average annual count, for 2009-2013 and a 20% increase in notifications compared to 2013. Figure 1 shows the monthly comparison of salmonellosis notifications from 2009-2014.

Figure 1: Number of salmonellosis notifications by month in NSW, 2009 to 2014



*Including paratyphoid cases

5.2.1 Age and sex distribution of people with salmonellosis

The age distribution of cases in 2014 was very similar to that of previous years with 28% of cases aged 20 to 39 years and 21% of cases aged 0 to 4 years. The age specific rate was higher for each age group in 2014 compared with the average rate for the previous five years (Table 2). The sex distribution of cases was the same as 2013 with 50% female.

Table 2: Number and rate* of salmonellosis cases 2014, compared with 2009-2013 average by age group, NSW

Age group (in years)	No. cases 2014	% of all cases 2014	Rate* 2014	Average no. cases 2009 - 2013	% of all cases 2009-2013	Average rate* 2009 - 2013
0-4	913	21%	184.4	753	23%	158.1
5-9	377	9%	79.9	278	9%	61.8
10-19	418	10%	45.8	368	11%	40.5
20-39	1198	28%	57.4	841	26%	41.4
40-59	750	17%	38.0	514	16%	26.9
60+	657	15%	41.9	501	15%	34.7
TOTAL	4313	100%		3254	100%	

*rate per 100,000 population

5.2.2 Seasonal trends in salmonellosis infections

In 2014, salmonellosis notifications followed the typical seasonal patterns with an increase in the warmer months. Unlike previous years, this increase was sustained during May which may have been due to the exceptionally prolonged autumn warm spell that occurred (Figure 1, above).

5.2.3 Ten most frequently notified *Salmonella* infections

In 2014, as in previous years, the most frequently notified *Salmonella* serovar was *S.* Typhimurium (59% of all *Salmonella* notifications). *S.* Enteritidis and *S.* Virchow were the next most common serovars which is also similar to previous years (Table 3).

Table 3: Top ten *Salmonella* infections*, NSW 2014

Rank	*Salmonella* serovar	No. notifications
1	Typhimurium	2547
2	Enteritidis	156
3	Virchow	120
4	Paratyphi B bv Java	99
5	Wangata	88
6	Infantis	80
7	Birkenhead	79
8	Saintpaul	47
9	Stanley	40
10	Chester	36

*excludes 349 specimens that were not typed

Multiple-Locus Variable number tandem repeat Analysis (MLVA) typing is used in NSW. MLVA results were available for 95% (2427/2547) of the *S.* Typhimurium notifications. In total, 353 distinct MLVA types were reported. The ten most commonly reported MLVA types shown below represent 44% of all typed notifications (Table 4).

Table 4. Top ten *S.* Typhimurium MLVA patterns, NSW 2014

Rank	STM MLVA	No. notifications	Phage Type*
1	3-17-9-11-523	209	135
2	3-12-11-14-523	143	135a
3	3-12-12-9-523	134	135a
4	3-10-7-12-523	99	170
5	3-9-7-12-523	97	170
6	3-9-8-12-523	94	170
7	3-17-10-11-523	93	135
8	3-16-9-11-523	91	135
9	3-10-13-11-496	52	9
10	3-16-9-12-523	50	6 var 1

*Phage typing was not performed on these isolates, the corresponding phage type was determined by historical associations of the MLVA with a Phage Type if available.

5.2.4 *Salmonella* Enteritidis

In 2014, there were 156 notifications of *S.* Enteritidis infections of varying phage types, which is a 4% increase compared to 149 in 2013. The infection was likely acquired overseas for 85% (n=132) of cases with 42% (55/132) of overseas infections acquired in Indonesia. For the remaining cases, 3% (n=5) were locally acquired and the place of acquisition was unknown for the remaining 12% (n=19) of cases.

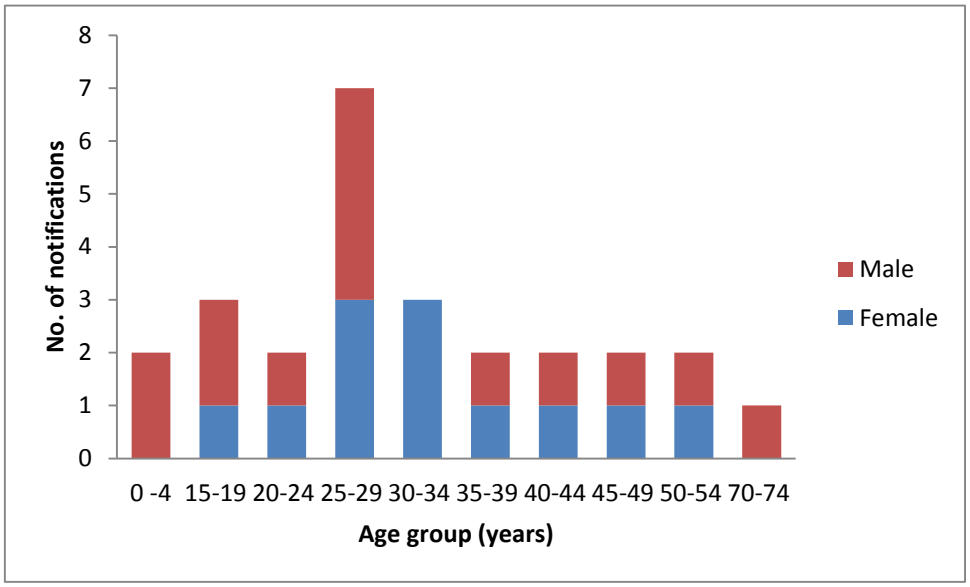
5.2.5 *Salmonella* Paratyphi

In 2014 there were 125 *Salmonella* Paratyphi notifications. Of these 21% (26/125) were *S.* Paratyphi A and 79% (99/125) were *S.* Paratyphi B bv Java.

Paratyphoid A

In 2014, 26 notification of *S.* Paratyphi A were reported which is equivalent to the average annual count from 2011 to 2013. Approximately 40% of cases were aged between 20 and 29 years and 54% (14/26) were male (Figure 2).

Figure 2. Paratyphoid A cases by age and sex in NSW, 2014



All of these cases with the exception of one acquired their infection while travelling overseas with 40% acquiring their infection in India. The source of infection for the locally acquired case remains unclear.

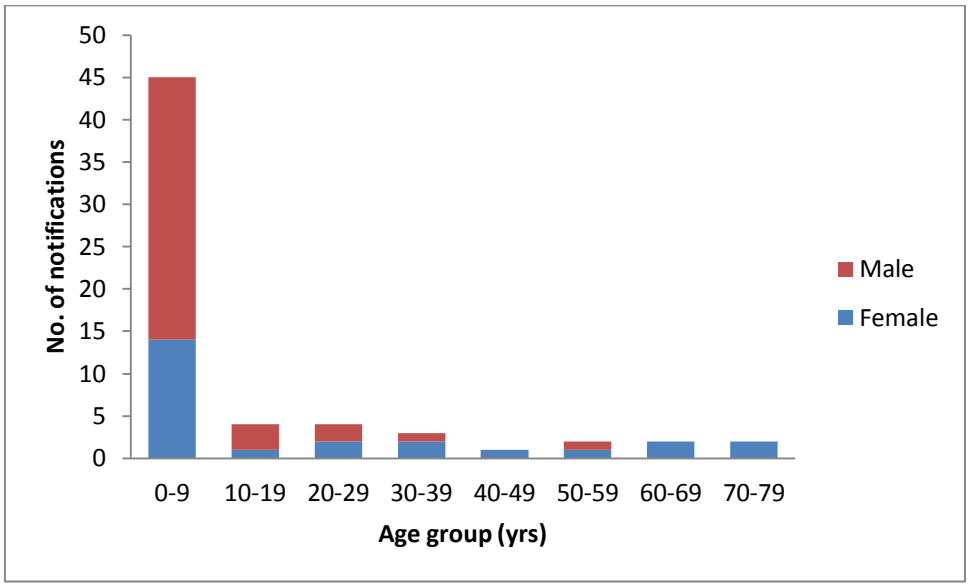
Salmonella Paratyphi B. Biovar Java

Salmonella Paratyphi B. Biovar Java (also called Salmonella Java) notifications remained stable with 99 reported in 2014 (vs 98 in 2013). The place of acquisition was overseas for 28% (28/99) and within Australia for 64% (63/99) of cases. The remaining 8% (8/99) of cases were not able to be interviewed and so the source remains unclear.

For cases acquired locally, 71% (45/63) were less than 10 years of age (Figure 3). In previous years, infections have been epidemiologically and microbiologically associated with sandpits in children's playgrounds in northern Sydney. Of the 63 locally acquired cases, 70% (44/63) lived in Northern Sydney Local Health District (NSLHD). This is an increase on the 32 cases reported from this area in 2013. While contact with aquariums and reptiles are known to be associated with Salmonella Java infections this was not reported by the remaining 19 locally acquired cases.

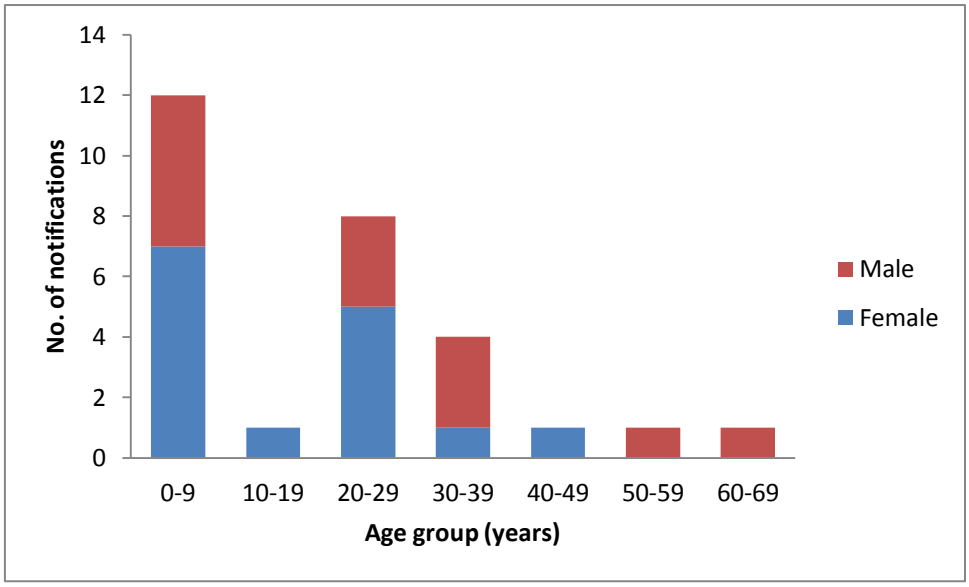
Of these 19 cases, one reported contact with another possible case acquired overseas and the likely exposure is unclear for the remaining cases.

Figure 3. Locally acquired Salmonella Java cases by age and sex in NSW, 2014



The age and sex distribution of the overseas acquired Salmonella Java cases is shown in Figure 4. Approximately half of the cases were male and were older than the locally acquired cases. However, unlike paratyphoid A, the majority of cases (82% (23/28)) were Australian born. Indonesia was the most commonly reported travel destination accounting for 50% (14/28) of cases. A further 25% (7/28) of cases reported travel to Thailand and the remaining travel destinations were geographically scattered.

Figure 4. Overseas acquired Salmonella Java cases by age and sex in NSW, 2014



5.3 Typhoid fever

In 2014, there was a decrease in the number of typhoid notifications with 45 cases compared with 59 in 2013. The majority were acquired overseas, with India being the most commonly reported travel destination (Table 6). Hospitalisation was required for 89% of cases (40/45). Seventy eight per cent (35/45) of cases were aged less than 30 years and 55% (25/45) were male. There were 16 Australian born cases compared with an average of 10 for 2010-2013. These cases acquired their infection in India (n=4), Bangladesh (n=4), Australia (n=4), Pakistan (n=2), Cambodia (n=1) and the Philippines (n=1). Of the 28 cases born overseas, 79% (n=22) acquired their infection while travelling to their country of birth. Seven cases reported no overseas travel. Of these, two likely acquired their infection from a household contact. The source for the remaining five cases remains unclear. Despite extensive interviewing no common links were found between these cases.

Table 6: Country of acquisition for overseas acquired typhoid cases, 2010-2014

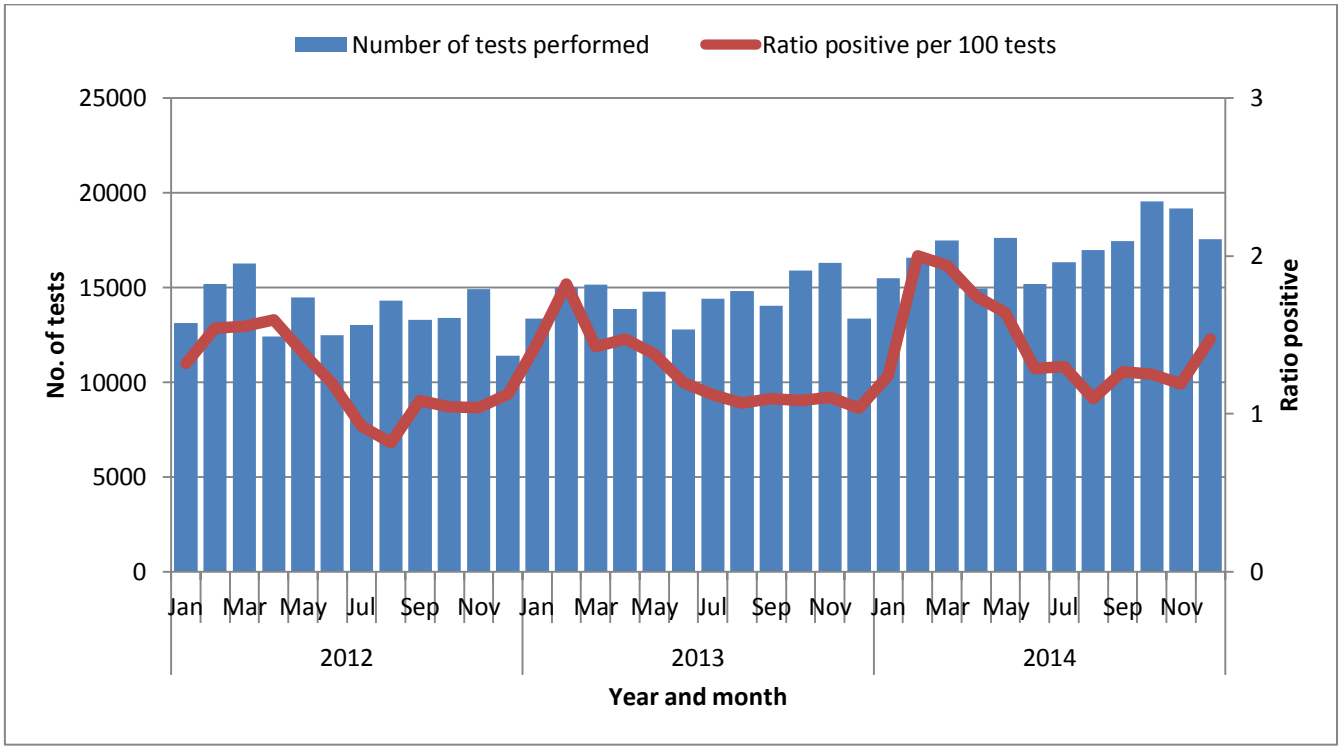
Country of acquisition	2010	2011	2012	2013	2014
Afghanistan	0	0	1	0	0
Bangladesh	2	7	9	5	7
Burma (Myanmar)	0	0	0	1	1
Cambodia	0	0	1	1	1
Fiji	2	1	0	1	0
Hong Kong (SAR of China)	0	1	0	0	0
India	16	24	24	35	16
Indonesia	2	3	3	3	0
Iran	0	1	0	0	0
Malaysia	0	0	0	0	1
Nepal	1	1	0	5	0
Pakistan	3	4	2	2	6
Papua New Guinea	2	0	0	0	0
Philippines	0	0	0	0	6
Samoa	1	3	0	1	0
Sri Lanka	0	0	1	0	0
Thailand	2	0	0	0	0
Total	**31**	**45**	**41**	**54**	**38**

5.4 Giardiasis

In 2014, there were 2,955 giardiasis notifications received which was a 25% increase when compared to 2013 (n=2,207). The median age of cases was 28 years, with ages ranging from 0-98 years. Fifty one per cent of cases were male, and 61% (n=1,791) were residents of the greater Sydney metropolitan area. No clustering of cases or outbreaks were identified, however individual cases of giardiasis are not routinely investigated in NSW.

The average number of giardia tests performed per month by 15 NSW laboratories has increased by 24% since 2012 (13,689 in 2012 to 17,025 in 2014). In 2014, around two notifications per 100 tests performed was seen at the beginning of the year which dropped to around one notification per 100 tests by midyear. This same pattern was also seen in 2012 and 2013 (Figure 5).

Figure 5: Number of giardia tests performed by 15 laboratories and ratio positive by month and year, NSW, 2012-2014 *



* These 15 laboratories account for approximately 90% of all tests performed in NSW.

5.5 Shigellosis

In 2014, 198 cases of shigellosis were reported in NSW, which is a 25% increase compared to 2013 (n=148).

Table 7: Place of acquisition for shigellosis 2011-2014

Place of acquisition	2011	2012	2013	2014
Acquired in NSW	41	30	62	106
Acquired interstate	1	2	2	4
Acquired overseas	50	70	71	51
Unknown	39	22	13	37
Total	**131**	**124**	**148**	**198**

Overseas travel was reported by 26% (51/198) of cases. As was seen in 2013, the most commonly reported travel destination was India (n=10, 20%) followed by Indonesia (n=8, 16%). Over 60% (32/51) of the cases known to be acquired overseas were Australian born and approximately half (28/51) were male. The median age was 32 years (range 0 to 75 years). *Shigella sonnei* biotype G was the most common overseas acquired subtype of *Shigella* (n=18, 35%) followed by *Shigella flexneri* 2A (n=5, 10%).

Table 8: Reported risk exposure for shigellosis cases with no travel history

Reported risk exposure	2011	2012	2013	2014
Homosexual sex	24	9	29	68
Household contact with confirmed overseas acquired case	1	2	0	0
Household contact with symptomatic overseas traveller	0	4	0	1
Unknown	16	15	33	37
Total	41	30	62	106

While the number of cases that were acquired overseas decreased slightly, there was an increase in the number of cases in men who reporting having homosexual sex (68 in 2014 vs 29 in 2013). The most commonly reported subtype in these men was *Shigella sonnei* biotype G, accounting for 66% (45/68) followed by *Shigella sonnei* biotype F, 15% (10/68).

5.6 STEC and HUS

Notifications of Shiga toxin producing *Escherichia coli* (STEC) were the highest on record with 31 reports received in 2014 (Figure 6). This was due to an outbreak in January (refer to Section 6.2, page 30). The median age of cases was 21 years, with an age range of 0–85 years. Forty five per cent of cases (14/31) were male. Serotype information was available for sixteen cases (Figure 7). Outside of the January outbreak no other links between cases were found.

Figure 6. STEC and HUS notification by year, NSW 2010-2014

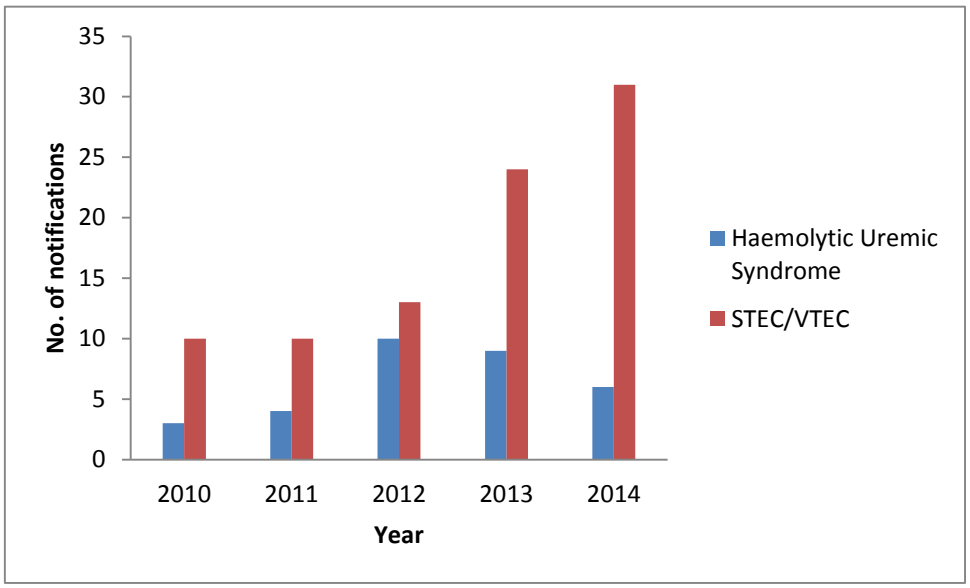
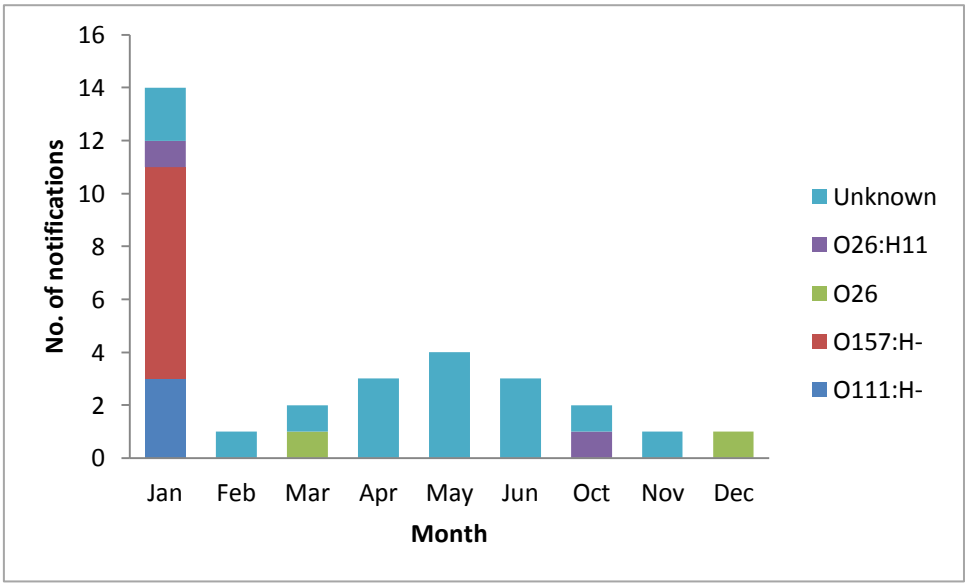


Figure 7. STEC serotypes by month of onset, NSW 2014



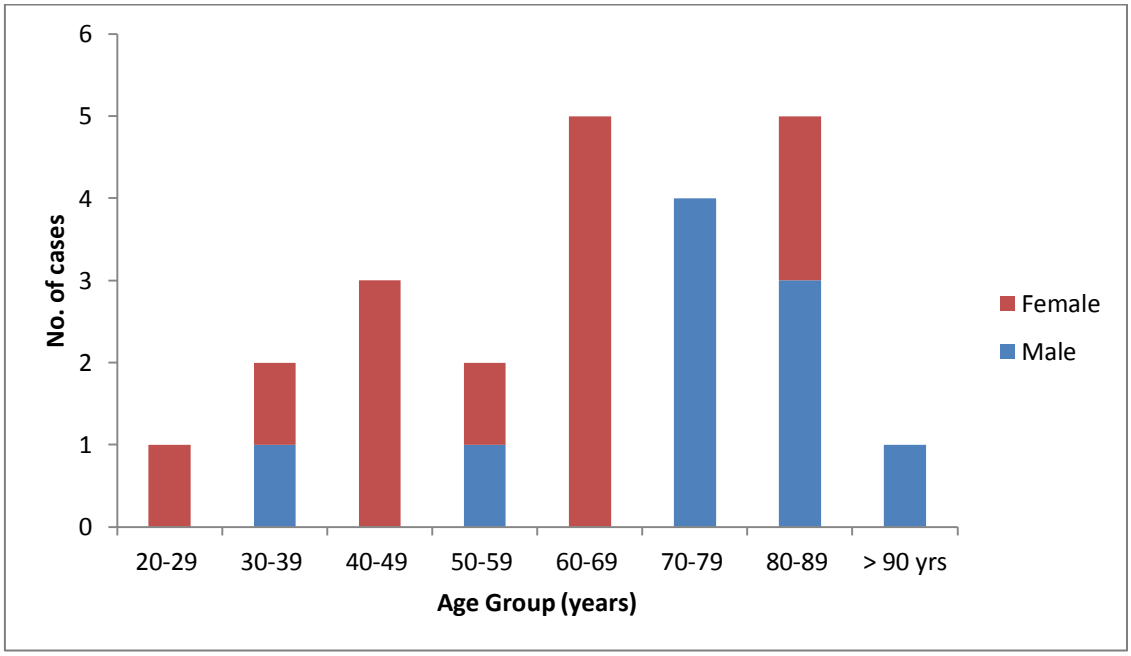
There were six cases of haemolytic uraemic syndrome (HUS) notified in 2014 which is in line with previous years. The average age was seven years (range 0-24 years). All six cases had both HUS and STEC infection.

5.7 Listeriosis

There were 23 notifications of listeriosis reported in 2014 which is slightly lower than the previous five year average of 28.4. Three of these notifications were linked to a cluster associated with sandwiches served at a private chemotherapy clinic.

The majority of cases were aged over 60 years and had immunosuppressive conditions. Just over half (13/23) of the cases were female (Figure 8). Five cases died (22%) aged 46, 69, 82, 83 & 85 years. There were two perinatal cases. The first baby was miscarried at 12 weeks, the second baby survived.

Figure 8. Listeriosis notifications by sex and age group, NSW 2014



5.8 Cryptosporidiosis

There were 418 notifications of cryptosporidiosis reported in NSW in 2014 which is a 62% decrease compared to 2013. Notifications were highest in January and November (Figure 9). With the exception of Tamworth and Wollongong all public health units reported lower annual counts than the average for the previous five years (Table 9).

In line with previous years, 52% (217/418) of cases were male. The majority of cases were reported in children. Infants aged less than five years accounted for 30% (126/418) of cases.

As with giardia, the average number of cryptosporidium tests performed per month by 15 NSW laboratories has increased by 24% since 2012 (13,689 in 2012 to 17,025 in 2014). In 2014, there was an average each month, 0.2 notifications per 100 tests performed. At the height of the outbreak in early 2013, there were 1.6 notifications per 100 tests (Figure 10).

Table 9: Cryptosporidiosis notifications during 2014 compared with the average number of cases, NSW 2009-2013

Public Health Unit	2014	Average annual count 2009-2013
Albury	18	23
Bathurst	22	24
Broken Hill	1	1
Camperdown	32	70
Dubbo	11	18
Gosford	11	32
Goulburn	8	13
Hornsby	32	143
Lismore	36	40
Liverpool	20	47
Newcastle	35	77
Parramatta	39	74
Penrith	19	45
Port Macquarie	15	23
Randwick	62	116
Tamworth	29	21
Wollongong	28	26
Total	**418**	**793**

Figure 9: Cryptosporidiosis notifications by month, NSW 2009 – 2014

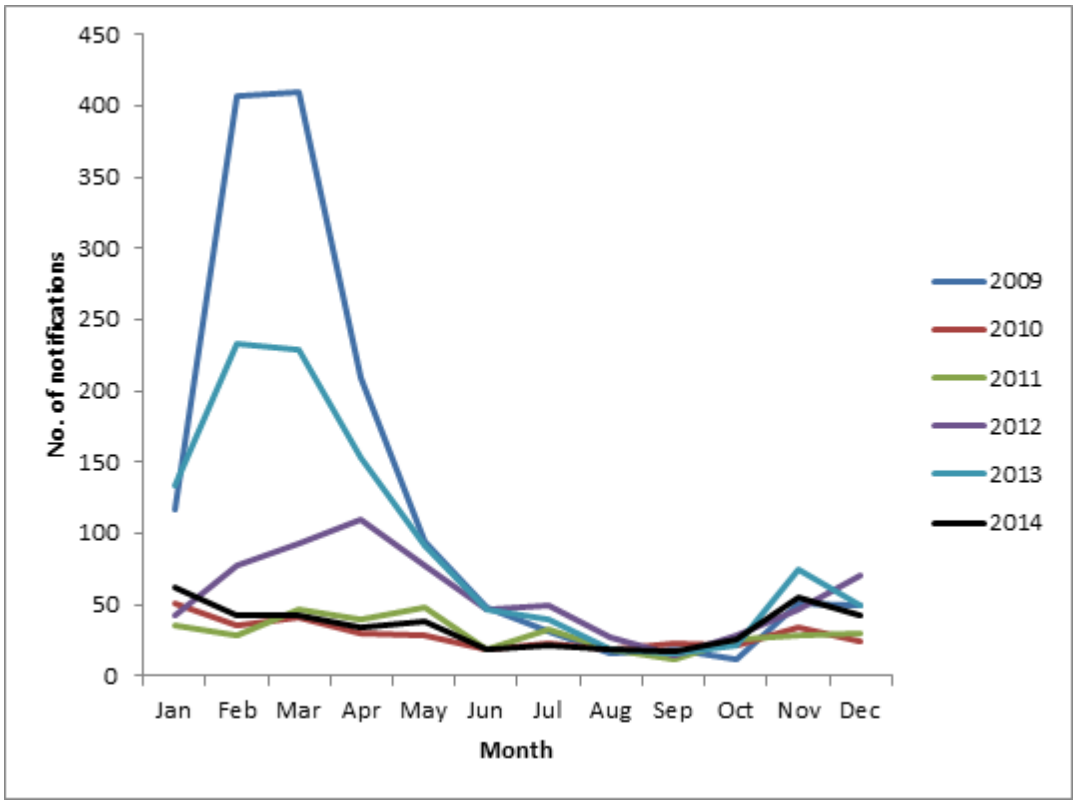
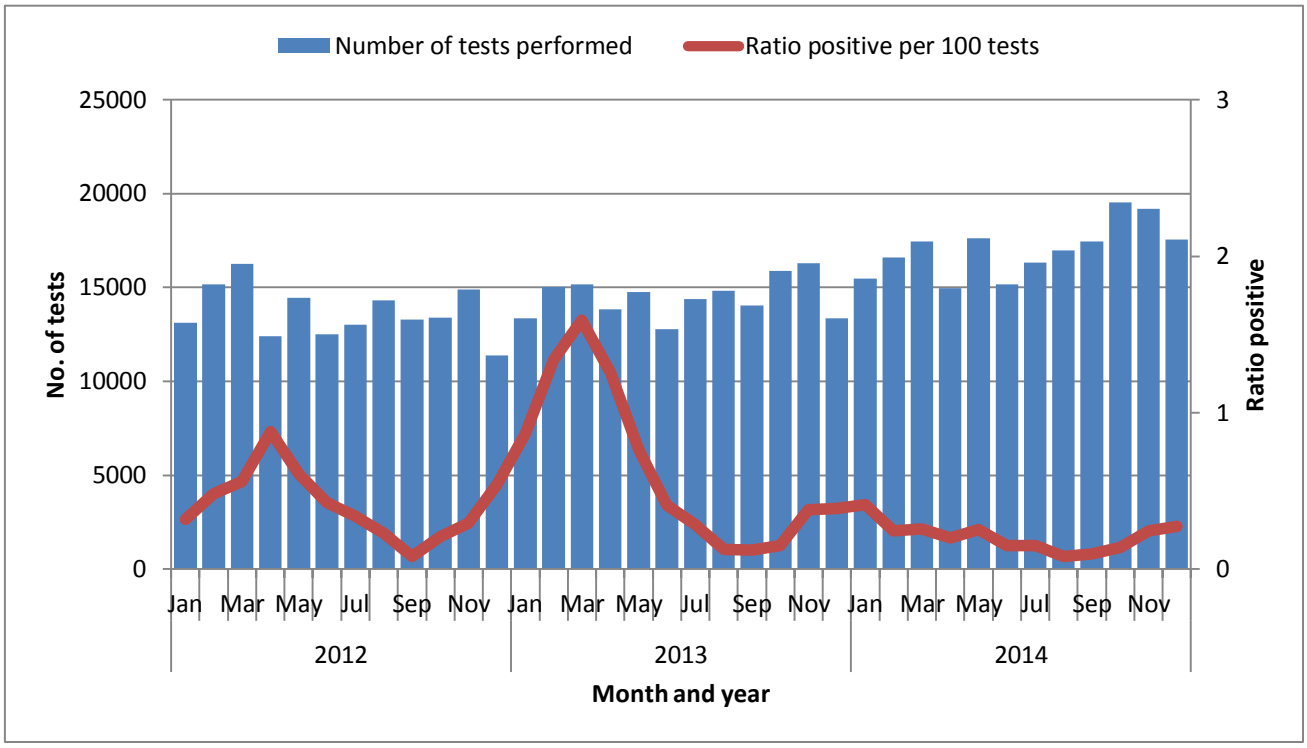


Figure 10: Number of cryptosporidium tests performed by 15 laboratories and ratio positive for NSW by month and year*



* These 15 laboratories account for approximately 90% of all tests performed in NSW.

5.9 Hepatitis A

In 2014, 82 cases of hepatitis A were reported which is notably higher than the annual average for 2011 to 2013 (n=54). The increase was in overseas acquired cases with 70 cases reported in 2014 compared with an annual average of 42 between 2011 and 2013‡.

Of the 12 cases locally acquired cases, one likely acquired their infection from a household member who had travelled. The source of infection was unknown for remaining 10 cases. One case was unable to be contacted for follow up.

Three cases identified as Aboriginal. Two of these were locally acquired and the third was unable to be contacted for follow up.

Hepatitis A cases acquired overseas

Of the 70 overseas acquired cases reported in 2014, 59% (41/70) were male and 81% (57/70) were aged less than 40 years.

The country in which the infection was acquired is present in Table 9. Compared with the average of the previous three years, the biggest increases were seen from travel to Fiji, Pakistan and the Philippines. This includes a cluster of three cases who had travelled to Fiji for a wedding.

‡ Mid 2010 data fields changed for hepatitis A, therefore data prior to 2011 was not included in the analysis.

Table 9: Country of acquisition for overseas acquired HAV cases, 2011 to 2014

Country of acquisition	2014	%	Average 2011-2013*
Fiji	14	20%	2
Pakistan	10	14%	2
India	9	13%	9
Philippines	9	13%	3
Afghanistan	3	4%	0
Bangladesh	3	4%	2
Burma (Myanmar)	3	4%	0
Indonesia	3	4%	4
Lebanon	3	4%	4
Samoa	3	4%	1
China	2	3%	1
Czech Republic	1	1%	0
Egypt	1	1%	2
Hungary	1	1%	0
Iraq	1	1%	1
South Korea	1	1%	1
Papua New Guinea	1	1%	0
Thailand	1	1%	2
Unknown	1	1%	1
Total	**70**	**100%**	

*pre 2011, the country of acquisition is not complete

Table 10: Overseas acquired Hepatitis A cases by country of birth, 2014

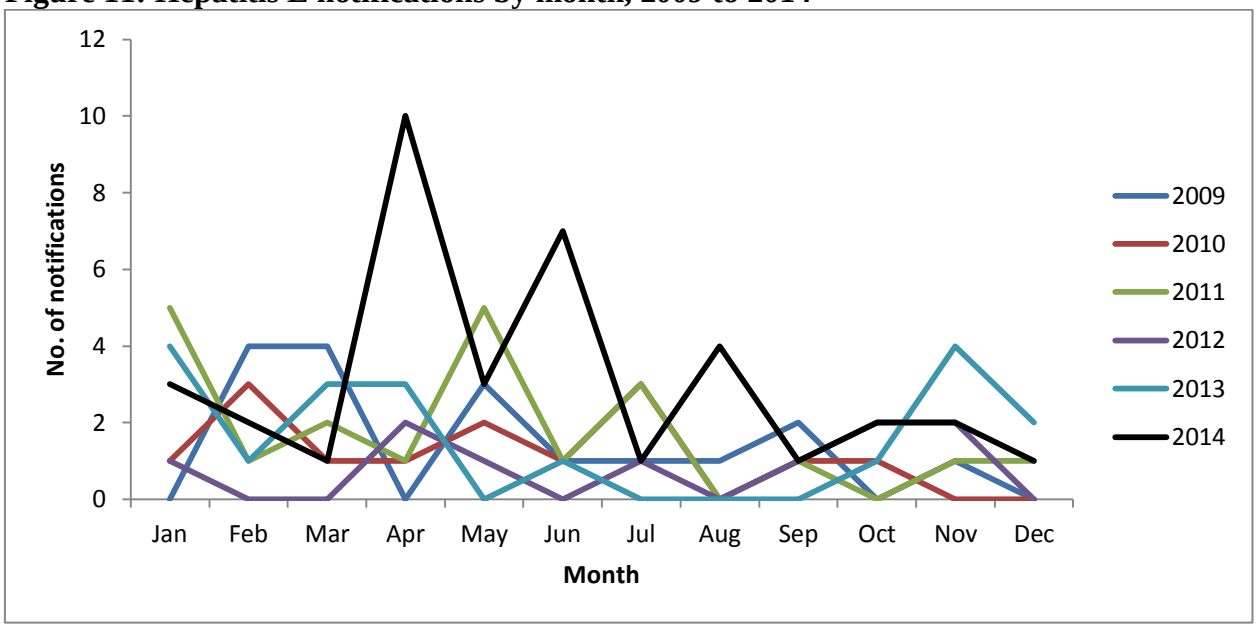
Country of birth	Number	%
Australia	28	40
Hepatitis A endemic country	33	47
Other country	6	9
Unknown	3	3
Total	**70**	**100**

Forty per cent (28/70) of the overseas acquired cases were Australian born (Table 10). As has been noted in previous years, almost all (27/33) of the cases who were born in a country where hepatitis A is endemic, acquired their infection while visiting their country of birth.

5.10 Hepatitis E

In 2014, there were 37 notifications of hepatitis E in NSW which is notably higher than the previous five year average (n=16). This increase was mainly due to the locally acquired outbreak of hepatitis E linked to pork pate served at a single restaurant (refer to Section 6.2, page 30).

Figure 11: Hepatitis E notifications by month, 2009 to 2014



Over half the cases (20/37) were acquired in NSW, 16 cases were acquired overseas and one was unknown. Fifty four per cent of cases were male. The median age was 50 years (range 21 – 77 years).

Of the cases acquired overseas, India (7) was the most frequently reported travel destination, followed by Hong Kong (2) and China (2). Cases also travelled to Greece (1), Iran (1), Italy (1), Sri Lanka (1) & Vietnam (1).

Of the locally acquired cases, 14 were linked to the cluster associated with pork pate and the remaining six all reported frequent pork consumption.

5.11 Rotavirus

Rotavirus became a notifiable disease in 2010. In 2014, 718 notifications of rotavirus were reported. While this is an increase on the 492 notifications reported in 2013, it is well below the annual average of 1,398 notifications reported between 2010 and 2013 (Figure 12).

In line with previous years, 49% (354/718) of notifications were in children aged less than five years. Males and females were equally affected. Rotavirus vaccination has been offered to infants through the National Immunisation Program since 2007 and vaccination rates have remained steady at approximately 86.6% of children fully vaccinated each year since 2010.

Figure 12: Rotavirus notifications by month, 2010 to 2014

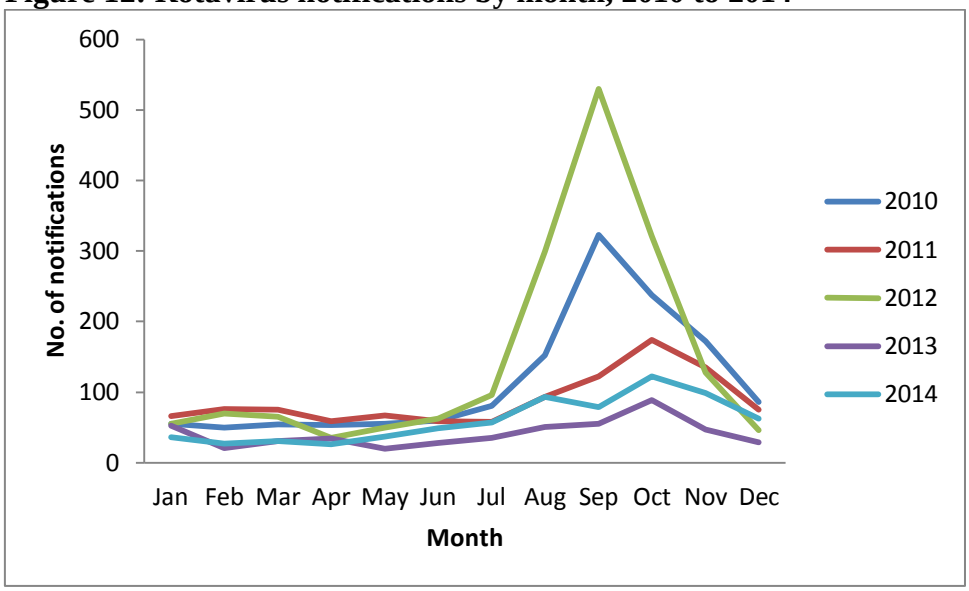
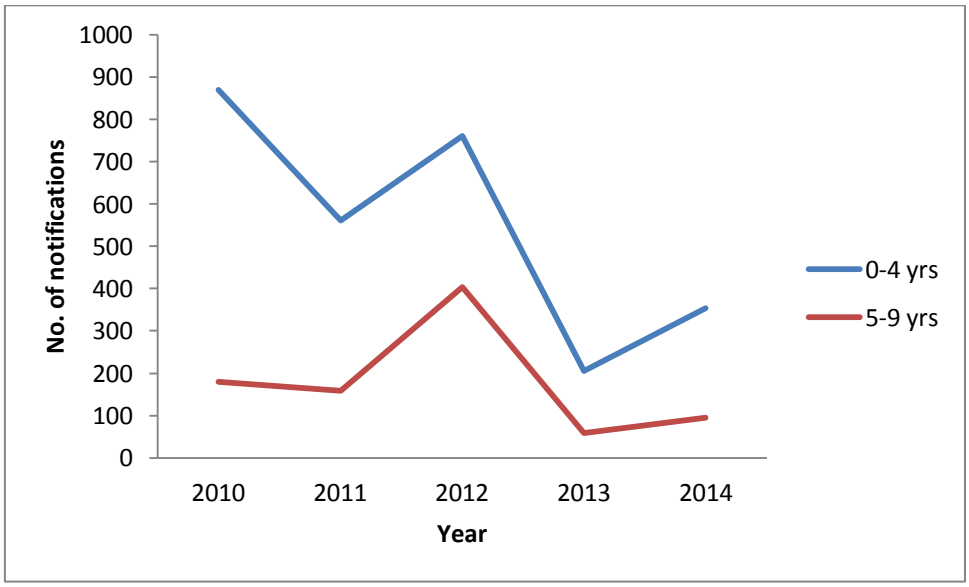


Figure 13: Rotavirus notifications in children aged less than 10 years, 2010 to 2014



6. Enteric Outbreaks in NSW during 2014

In 2014, there were a total of 505 gastrointestinal outbreaks reported to Health Protection NSW. There were 44 suspected foodborne outbreaks and 461 viral or probable viral gastrointestinal outbreaks in institutions.

6.1 Foodborne and suspected foodborne outbreaks

In 2014, 44 foodborne or suspected foodborne disease outbreaks affecting over 480 people were reported. Of these, 86 people (17.9%) were hospitalised compared with 56 of 418 (13.4%) in 2013. In 2014, one death was reported to be associated with a suspected foodborne listeriosis outbreak.

In 2014, 75.6% of all cases (363/480) and 66.3% of all hospitalisations (57/86) associated with the 44 reported foodborne and suspected foodborne disease outbreaks, were due to *Salmonella* infections which was the cause of illness in 59% (n=26) of the outbreaks. All of the 26 outbreaks associated with *Salmonella* infection were caused by *Salmonella* Typhimurium (Table 11).

Of the 26 outbreaks associated with *Salmonella* Typhimurium (see Tables 11 and 12 for MLVA types) infection in NSW in 2014, 13(50%) outbreaks had compelling epidemiological and/or microbiological evidence implicating a food vehicle, while for thirteen outbreaks, the food vehicle could not be determined.

For 77% (10/13) of the *Salmonella* outbreaks where a food item was implicated, the responsible vehicles were items containing raw or undercooked egg. For the remaining three outbreaks, although the food item was determined the route of introduction of the *Salmonella* contamination could not be determined.

In four of the 44 foodborne outbreaks, fish poisoning was identified as the agent responsible, two from ciguatera poisoning and two from Scombroid fish poisoning (Table 11). The two ciguatera outbreaks occurred in people who consumed Spanish mackerel that was caught off the north coast of NSW. The two scombroid outbreaks occurred from consuming tuna steaks that were fished from Australian waters.

Other pathogens isolated in outbreaks included *Staphylococcus aureus* (affecting 11 people) which was associated with sushi, *Listeria monocytogenes* (affecting three people) which was associated with a café (food unknown), hepatitis E virus (affecting 14 people) associated with pork liver pate, norovirus (affecting six people) associated with garden salad, STEC (affecting six people) associated with a take-away kebab store and *Shigella* sonnei (affecting nine people) associated with a catered meeting (food unknown) (Table 11).

For 18% (8/44) of reported outbreaks the pathogen could not be identified. Possible reasons for this include: cases with gastrointestinal disease do not always seek medical care; not every doctor requests a stool specimen from cases; cases may no longer be excreting the pathogen when they submit the stool specimen; and the very low infective dose of a number of pathogens makes it difficult for the laboratories to detect it in one stool specimen. For 48% (21/44) of the reported outbreaks, a (suspected) responsible vehicle could not be found. A possible explanation for this is the delay between consumption of foods and reporting of illness impairs case recall of foods and ingredients consumed. This also reduces the ability of the NSW Food Authority to obtain specimens of implicated foods and timely environmental samples. In addition, not all reported outbreaks can be properly investigated due to factors such as lack of cooperation from cases (an outbreak is often reported by one case, representing many cases who may not want to collaborate) and prioritisation of resources.

Table 11: Foodborne disease outbreaks reported in NSW, 2014

PHU ID number	Month of onset	Setting	Pathogen	No. ill	No. hospitalised	Evidence*	Epi. Study**	Suspected / Responsible vehicle
*Evidence: D=Descriptive evidence implicating the suspected vehicle or suggesting foodborne transmission; A=Analytical association between illness and food; M=Microbiological confirmation in the suspected vehicle and cases; AM=Analytical and microbiological evidence. **Epi Study: C=Cohort study; CC=Case control study; D=Descriptive case series; N=Individual patient data not collected								
HUN0483	Mar	bakery	*Salmonella* Typhimurium MLVA 3-9-7-12-523	10	7	M	D	Cross contamination of multiple foods
SSW38921	Jan	bakery	*Salmonella* Typhimurium MLVA 3-17-10-11-523	24	9	M	D	Vietnamese rolls. The actual ingredient which was the source is unknown
SSW38910	Jan	restaurant	*Salmonella* Typhimurium MLVA 3-24-12-12-523	2	0	D	D	Raw egg caesar salad dressing
SSW201401	Feb	commercial caterer	*Shigella* sonnei biotype f	9	1	D	C	Unknown
SES201401	Feb	bakery	*Salmonella* Typhimurium MLVA 3-16-9-12-523	26	3	M	D	Vietnamese rolls with raw egg butter
NS39137	Feb	other	*Salmonella* Typhimurium MLAV 3-10/11-7-12-523	8	2	D	D	Raw egg mayonnaise
NC201402	Feb	restaurant	Ciguatera Fish Poisoning	5	3	D	D	Spanish mackerel
NC201401	Mar	private residence	Ciguatera Fish Poisoning	9	9	D	D	Spanish mackerel
HUN0482	Jan	cruise/airline	*Salmonella* Typhimurium MLVA 3-12-13-9-523	3	1	D	D	Unknown

PHU ID number	Month of onset	Setting	Pathogen	No. ill	No. hospitalised	Evidence*	Epi. Study**	Suspected / Responsible vehicle
HUN0481	Feb	private residence	Unknown	12	0	D	D	Unknown
SES	Jan	take-away	STEC	6	5	D	D	Cross contamination of multiple foods
HUN0484	Apr	other	*Salmonella* Typhimurium MLVA 3-9-7-12-523	7	1	M	D	Cross contamination of multiple foods
Ill201401	May	restaurant	*Listeria monocytogenes* Binary type 158, MLVA 04-17-16-05-03-11-14-00-16, serotype 1/2b, 3b, 7 and PFGE 4:4:5A	3	3	A	D	Unknown
NS201401	Jun	private residence	*Salmonella* Typhimurium MLVA 3-24-12-10-523 (9) and 3-24-13-10-523 (1)	13	0	D	D	Tiramisu with raw egg
SES201403	Apr	take-away	*Salmonella* Typhimurium MLVA 3-26-7-20-496	11	2	D	D	Raw egg salad dressing
SES39789	Apr	bakery	*Salmonella* Typhimurium MLVA 3-17-10-11-523	33	7	M	D	Raw egg mayo
SES40750	Jun	restaurant	*Salmonella* Typhimurium MLVA 3-12-12-9-523	9	1	D	N	Unknown
SSW201402	Jun	private residence	Scrombroid Fish Poisoning	2	2	D	D	Tuna steaks

PHU ID number	Month of onset	Setting	Pathogen	No. ill	No. hospitalised	Evidence*	Epi. Study**	Suspected / Responsible vehicle
SSW39736	Apr	restaurant	*Salmonella* Typhimurium MLVA 3-13-10-11-523	4	0	D	D	Unknown
SSW40107	May	restaurant	Norovirus	6	0	D	D	Cross contamination of multiple foods
SSW40297	May	take-away	*Salmonella* Typhimurium MLVA 3-10-7-12-523	11	1	D	D	Vietnamese rolls raw egg
NSW201401	Apr	restaurant	Hepatitis E Virus	14	4	A	C	Pork liver pate
GS41116	Jul	restaurant	Scrombroid Fish Poisoning	8	0	D	N	Unknown
NS40920	Jul	restaurant	Unknown	5	0	D	N	Unknown
NS41741	Sep	restaurant	Unknown	8	0	D	N	Unknown
NS41913	Sep	restaurant	Unknown	4	0	D	N	Unknown
NSW201401	Sep	take-away	*Salmonella* Typhimurium MLVA 3-26-13-8-523	13		D	N	Raw egg mayo
SES201404	Jul	restaurant	*Salmonella* Typhimurium MLVA 3-24-12-10-523	4	0	D	N	Unknown
SSW41839	Sep	restaurant	Unknown	3	0	D	N	Unknown
SYD41208	Aug	restaurant	Unknown	3	0	D	N	Oysters suspected

PHU ID number	Month of onset	Setting	Pathogen	No. ill	No. hospitalised	Evidence*	Epi. Study**	Suspected / Responsible vehicle
HUN_X	Sep	restaurant	*Salmonella* Typhimurium MLVA 3-12-11-14-523	20	5	A	C	Chocolate milk contaminated when produced on site
HUN_Y	Sep	aged care facility	Unknown	8	0	D	N	Roast beef
SES201405	Sep	aged care facility	*Salmonella* Typhimurium MLVA 3-25-13-10-523	6	2	D	N	Unknown
SES42075	Oct	restaurant	*Salmonella* Typhimurium MLVA 3-12-12-9-523	13	0	D	D	Unknown
LIV201401	Oct	restaurant	Staphylococcus aureus	11	4	M	N	Sushi - rice
SSW201403	Oct	fair/festival/mobile service	*Salmonella* Typhimurium MLVA 3-12-12-9-523	4	1	D	N	Unknown
NS42411	Oct	restaurant	*Salmonella* Typhimurium MLVA 3-9-7-12-523	4	0	D	N	Cross contamination of beef burger
NS42810	Oct	take-away	*Salmonella* Typhimurium MLVA 3-10-7-12-523	26	0	D	D	Chocolate mousse cake made with raw egg
CAM201401	Nov	restaurant	*Salmonella* Typhimurium MLVA 3-12-11-14-523	35	0	M	C	Cross contamination of pre-prepared meals
LIV201402	Dec	restaurant	*Salmonella* Typhimurium MLVA 3-17-9-11-523	19	4	D	N	Unknown

PHU ID number	Month of onset	Setting	Pathogen	No. ill	No. hospitalised	Evidence*	Epi. Study**	Suspected / Responsible vehicle
HUN0487	Sep	aged care facility	Unknown	8	0	D	N	Unknown
HUN0486	Sep	restaurant	*Salmonella* Typhimurium MLVA 3-12-11-14-523 and 3-12-11-15-523	38	6	D	C	Unknown
HUN0488	Nov	restaurant	*Salmonella* Typhimurium MLVA 3-9-8-12-523 (n=13), 3-10-8-12-523 (n=1)	16	4	M	D	Unknown
HUN0489	Dec	restaurant	*Salmonella* Typhimurium MLVA 3-9-8-11-523	4	1	D	N	Unknown

Table 12: *Salmonella* by serotype and MLVA type associated with foodborne outbreaks in NSW, 2014*

***Salmonella* serotype**	**MLVA type**	**No. of outbreaks (No. of cases)**
Salmonella Typhimurium	MLVA 3-12-12-9-523	3 (26)
Salmonella Typhimurium	MLVA 3-10-7-12-523	3 (45)
Salmonella Typhimurium	MLVA 3-12-11-14-523	3 (93)
Salmonella Typhimurium	MLVA 3-9-7-12-523	3 (21)
Salmonella Typhimurium	MLVA 3-17-10-11-523	2 (57)
Salmonella Typhimurium	MLVA 3-24-12-10-523	2 (17)
Salmonella Typhimurium	MLVA 3-17-9-11-523	1 (19)
Salmonella Typhimurium	MLVA 3-24-12-12-523	1 (2)
Salmonella Typhimurium	MLVA 3-16-9-12-523	1 (26)
Salmonella Typhimurium	MLVA 3-25-13-10-523	1 (6)
Salmonella Typhimurium	MLVA 3-26-13-8-523	1 (13)
Salmonella Typhimurium	MLVA 3-26-7-20-496	1 (11)
Salmonella Typhimurium	MLVA 3-9-8-11-523	1 (4)
Salmonella Typhimurium	MLVA 3-9-8-12-523	1 (16)
Salmonella Typhimurium	MLVA 3-12-13-9-523	1 (3)
Salmonella Typhimurium	MLVA 3-13-10-11-523	1 (4)

* MLVA method and type designation were as described by Wang et al (2008) with modification of the fifth locus designation using the original size[4].

6.2 Summary of significant foodborne outbreaks during 2014

Salmonella Typhimurium (MLVA type 3-17-10-11-523) infection associated with Vietnamese rolls

A PHU was notified of two people who had gastrointestinal illness after eating Vietnamese rolls from a cafe on 24 January 2014. The PHU conducted case finding via emergency department presentations and of *Salmonella* notifications and identified 24 people (16 *Salmonella* Typhimurium with MLVA 3-17-10-11-523 cases and another eight symptomatic cases) with gastrointestinal illness after eating at this cafe on either 23 or 24 January 2014. Nine (38%) of the symptomatic cases were hospitalised. The NSWFA inspected the premises on 29 January 2014 with most procedures satisfactory and commercial mayonnaise in use, however sanitiser was not in use for utensils and equipment. Food samples were taken and the pâté was positive for *Salmonella* Typhimurium with MLVA 3-17-10-11-523. The pâté was made on site and it is possible the chicken liver was not cooked to a temperature necessary to kill any *Salmonella* present, so may have been the source of the salmonellosis. (SSW38921)

Shigella Sonnei biotype F infection associated with a function

A PHU became aware of a cluster of employees with gastrointestinal symptoms after attending a catered training event on 27 February 2014, when following up a shigellosis case. There were approximately 50 staff members in attendance but not all ate the food provided. An online survey was conducted and 15 attendees who had consumed the food completed the survey. Seven of these had experienced gastrointestinal symptoms and two were diagnosed with *Shigella* Sonnei biotype F. No specimens were collected for the five others who had symptoms. One person was admitted to hospital after this event although no stool tests were collected. The NSWFA conducted an inspection of the catering company that supplied the food and found no major concerns. The facility reported no staff illness. Another company had also been provided

with food by the same caterers on the 26, 27 and 28 February 2014. Those attending the training were also asked to fill in an online survey relating to food items eaten and gastrointestinal symptoms. Twelve out of 14 attendees responded to the survey. Out of this group, two individuals reported experiencing gastrointestinal symptoms after eating the food provided by the catering company but no samples were taken to confirm the illness. The food served to the groups included sandwiches and some hot finger foods, though from the surveys no food items showed an association with illness. (SSW201401)

STEC infection associated with a take away food store

A PHU was notified of five STEC cases serotype O157-H (Stx genes 1 & 2 positive), from the same local health district. One further symptomatic case was reported by a doctor but no stool specimen was taken. Interviews with the cases revealed a common take away food premises that sold kebabs and pide. Foods were consumed between 4 and 17 January 2014 and included a mix of items and no one common ingredient. The kebab shop was closed on 17 January 2014 by the NSWFA and food and environmental samples were taken. The results of the samples were negative, but numerous hygiene and process breaches were noted on the inspection that could have led to cross-contamination of foods eaten that did not undergo a final kill step. The business was closed until it could satisfy the requirements of improvement notices regarding the proper handling and cooking of shaved rotisserie meat, ensuring meat handling utensils are not a source of cross-contamination risk and are routinely cleaned and sanitised, ensuring adequate temperature controls are in place and that repair and maintenance work was undertaken. (SES201402)

***Listeria monocytogenes* infection associated with a cancer treatment facility**

A PHU was notified of three *Listeria monocytogenes* cases within a four week period. All three cases reported attending the same chemotherapy treatment facility in a two week period. Listeria isolates from the three cases had the same binary type (158), MLVA (04-17-16-05-03-11-14-00-16) and serotype (1/2b, 3b, 7). Two cases had the PFGE 4:4:5A while the third PFGE is pending. Two of the cases reported eating sandwiches on multiple visits to the facility but the third case denied eating anything. The facility sourced its food from a café next door. This café was inspected by the NSWFA and while considered generally well run, a sample of cucumber tested positive for *Listeria monocytogenes* of the same binary type, MLVA and serotype identified in the human infections (PFGE pending). As the food provider is a public café (rather than a food provider for vulnerable populations which should be registered with the NSWFA), it is not required to be *Listeria* free. Although not all cases reported eating food provided from the café, the identical typing of the cases and the food isolate (a novel type), indicates that it's likely the third case may have eaten something from the cafe but could not recall on interview. The café was advised of ways to help reduce the possibility of having *Listeria* on foods, and the chemotherapy facility was advised on the importance of food safety for vulnerable populations, with particular reference to *Listeria*. (Ill201401).

Hepatitis E infection associated with a restaurant

In May 2014, a case of hepatitis E (HEV) was notified to public health. The interview revealed that the case's work colleague from Victoria also had HEV and the only common exposure for both cases was dinner with seven other people from the same work place at a restaurant on 11 March 2014. Further investigations included interviewing and serological testing of co-dining work colleagues, which revealed a further three cases. Case interviews revealed that pork pâté was the only food consumed by all the cases. An additional 10 infected individuals, unrelated to the work group, were also investigated as part of this cluster. Of the 10 individuals, four had symptoms and were identified through routine surveillance, five were asymptomatic cases identified through screening co-diners and one symptomatic case was identified through retrospective testing of stored sera. All cases report consuming pork pâté at the same restaurant

on different dates to the work group (13 March, 15 March, 3 May and 15 May). The NSWFA inspected the restaurant on two occasions on 15 and 21 May 2014 and witnessed the preparation and cooking of the pork pâté. The restaurant was found to be very well run with no issues identified in food handling, cooking or cleaning. The pork pâté was made with pork livers and included only one short cooking step. Pork samples from the restaurant were tested for HEV. All samples were negative. It is conceivable that on more than one occasion the pork livers had been inadvertently undercooked and so the HEV survived when the pâté was made. Pork liver pâté is no longer sold at the restaurant. Trace back of the pork livers revealed that a single pig farm supplied the livers that were served as pork pâté on the days the cases reported eating at the restaurant. Investigations are ongoing.

In addition to the HEV cases above, three notifications of locally acquired HEV from 2013 with no known source of infection were re-investigated. Interviews revealed that two cases had also eaten pork pâté at the same restaurant during their incubation period (the third case was thought to be person to person transmission). An additional case from October 2013, identified on retrospective testing of stored sera was also linked to the cluster. The viruses from 11 out of the 18 cases linked to the restaurant (three from 2013 and eight from 2014) were genetically sequenced and were found to be closely related, suggesting a common source (NSW201401). Undercooked pork has been associated with cases of food borne hepatitis E overseas. NSW Health convened a hepatitis E expert panel and it was concluded there was no ongoing public health risk associated with the restaurant.

6.3 Institutional gastrointestinal outbreaks

In 2014, PHUs reported 461 gastroenteritis outbreaks in institutional settings likely to be due to person-to-person transmission of viral gastroenteritis. The outbreaks affected 7,080 people compared with 466 outbreaks affecting 7,199 people in 2013. Of these outbreaks, 214 (46.4%) occurred in aged care facilities (average 20 cases per outbreak), 190 (41.2%) in childcare centres (average 12 cases per outbreak), 53 (11.5%) in hospitals (average 12 cases per outbreak), two (0.4%) in military facilities (average 12 cases per outbreak), one (0.2%) in schools (4 cases) and one (0.2%) in a camp facility (32 cases) (Table 13).

One or more stool samples were collected in 226 (49.0%) outbreaks. Norovirus was the most commonly identified pathogen in stool specimens collected during outbreak investigations. Norovirus was identified in one or more stool specimens in 114 outbreak investigations (24.7% of all outbreaks, 50.4% of outbreaks with specimens collected). Rotavirus was identified in stool specimens in 10 outbreak investigations (2.2% of all outbreaks, 4.4% of outbreaks with specimens collected). In 17 outbreak investigations more than one pathogen was identified.

Other pathogens identified in one or more stool specimens collected during outbreak investigations were *Clostridium difficile* (range of 1-5 specimens in 15 outbreaks), *Campylobacter* (1 specimen in 1 outbreak), *Giardia intestinalis* (1 specimen in 1 outbreak), and *Salmonella* (1 specimen in 2 outbreaks). These pathogens were believed to be incidental findings and not the cause of the outbreak, as the clinical symptoms and the epidemiology of the outbreaks indicated person-to-person transmission of a viral pathogen. In the majority (17/21, 81%) of the outbreaks where one of these pathogens was identified, it was identified in tandem with a viral pathogen.

The aetiology was unknown for 335 (72.7%) of the outbreaks. For 235 outbreaks (51.0%) no stool or other samples were collected for testing. Although laboratory evidence was not available for these outbreaks, the epidemiological information indicated person-to-person transmission of a viral pathogen.

Table 13: Number of (probable) viral gastroenteritis outbreaks and number of cases by institution, NSW 2010 – 2014

	2010		2011		2012		2013		2014	
Institution	**No. outbreaks**	**No. cases**	**No. outbreaks**	**No. cases**	**No. outbreaks**	**No. cases**	**No. outbreaks**	**No. cases**	**No. outbreaks**	**No. cases**
Aged Care	248	5166	242	5293	385	8105	189	3772	214	4179
Hospital	73	1603	101	1476	101	1447	75	722	53	643
Childcare	183	2441	164	2052	299	4002	188	2447	190	2199
School	3	29	3	64	2	36	4	70	1	4
Other	10	119	20	333	16	213	10	188	3	55
TOTAL	**517**	**9359**	**530**	**9218**	**803**	**13803**	**466**	**7199**	**461**	**7080**

7. References

[1] New South Wales Health. Information Bulletin 2013_010: Notification of Infectious Diseases under the NSW Public Health Act 2010. Issued 25 February 2013. Sydney: NSW.

[2] NSW Health Notifiable Conditions Information Management System (NCIMS), Communicable Diseases Branch and Centre for Epidemiology and Evidence, NSW Ministry of Health.

[3] Australian Bureau of Statistics. Estimated resident populations based on 2001 Census counts and mid-series experimental population projections.

[4] Wang Q, Kong F, Jelfs P, Gilbert GL. 2008. Extended phage locus typing of *Salmonella* enterica serovar Typhimurium, using multiplex PCR-based reverse line blot hybridization. *J Med Microbiol*, 57:827-38.