OzFoodNet — Enhancing Foodborne Disease Surveillance across Australia.

NSW 2012 OzFoodNet Annual Report

NSW OzFoodNet Site
Communicable Diseases Branch
NSW Department of Health
Locked Mail Bag 961
North Sydney 2059

1. Acknowledgements

The NSW OzFoodNet Annual Report 2012 was possible due to the collaborative work of many people, 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
- Enteric diseases and OzFoodNet team Communicable Diseases Branch, Health Protection, NSW
- Hunter New England OzFoodNet team & Hunter New England Local Health Network
- Health Protection, NSW.
- 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
- All OzFoodNet epidemiologists and collaborators
- Partners in Department of Agriculture and associated stakeholders

2. Contents

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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.

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 NSW Public Health Act, 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 CDB.

3.3 Methods

We analysed data for the following notifiable enteric pathogens; *Salmonella*[1] (including *Salmonella* Paratyphi), *Salmonella* Typhi, *Listeria monocytogenes*, *Shigella*, HUS and STEC, *Cryptosporidium*, *Giardia*, rotavirus and hepatitis A virus. On 25 February 2013, 2012 data was extracted from NCIMS using Secure Analytics for Population Health Research and Intelligence (SAPHaRI)[2] using the date of onset of disease. The NSW estimated resident population for 30 June of each year from 2007-2012 was used to calculate crude incidence rates for each disease[3].

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 a NetEpi database ("EntEpi") by public health units. Data from these registers are analysed using MS Excel at the NSW Ministry of Health. Data were reported as received by the Communicable Diseases Branch on 25 February 2013.

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

4. Summary

- In 2012, there were 7,669 notifications of the enteric diseases (cryptosporidiosis, giardiasis, hepatitis A, rotavirus, HUS, listeriosis, salmonellosis (including paratyphoid), shigellosis, typhoid and infection with shiga toxin producing Escherichia coli) in NSW. This was a 6% increase compared with the average annual disease count for the previous five years.

- Salmonellosis (including paratyphoid) was the most frequently reported enteric condition in NSW during 2012 with a total of 2,945 notifications reported. This is comparable to the average annual count of salmonellosis for the previous 5 years and a 15% decrease in notifications compared to 2011.

- Giardiasis was the second most frequently reported enteric condition in 2012. There were 2,006 notifications in the year, a decrease of 4% compared with the annual average for the previous five years. No clustering of cases or outbreaks were identified.

- There were 39 listeriosis notifications received in 2012. This represented an increase of 50% compared to the annual average for the previous five years (n=26). Five NSW cases were part of a multijurisdictional outbreak associated with soft cheese made by a Victorian cheese producer. The outbreak started in August 2012 and continued into 2013.

- Rotavirus became a notifiable condition in 2010. There were 1754 notification of rotavirus received in 2012, a 30% increase when compared to the average notification for the previous 2 years (2010-2011). This was mainly due to a huge increase in cases from August to October with the peak of 530 cases in September, the vast majority of cases occurring in 5 to 9 year old children.

- In 2012, 61 foodborne or probable foodborne disease outbreaks were reported affecting over 662 people, as well as 803 viral or probable viral gastroenteritis outbreaks in institutions affecting 13,803 people. This was a 27% increase in the number of reported foodborne or probable foodborne disease outbreaks compared to the year 2011 (n=48), and a 52% increase in the number of reported gastroenteritis outbreaks in institutions compared to the year 2011 (n=530).

- Of the point-source foodborne outbreaks of *Salmonella* Typhimurium, 57% (13/23) were associated with the consumption of food that contained raw or only partially cooked eggs, such as raw egg salad dressing or fried ice-cream. The cases in these egg related outbreaks constituted 76% (162/212) of all *Salmonella* Typhimurium outbreak related cases.

5. Activity during 2012

5.1 Overview

The counts of each notifiable enteric disease[2] for 2012 were compared with the average annual count for the years 2007 to 2011. Results are presented in Table 1. Overall, there were 7,669 enteric disease notifications in 2012, a 6% increase compared to the average number of cases for the previous 5 years. This increase was mainly due to the reported rise in the number of rotavirus cases.

Table 1: Number of selected enteric disease notifications during 2012 compared with the average number of cases, NSW 2007-2011

Condition	2012	5 year average	% change
Cholera	2	2	0
Cryptosporidiosis	682	640	6%
Giardiasis	2006	2098	-4%
HUS	9	8	11%
Hepatitis A	42	74	-43%
Hepatitis E	10	15	-33%
Listeriosis	39	26	50%
Rotavirus	1754	1221*	30%
STEC Infection	13	18	-28%
Salmonellosis (including Paratyphoid)	2945	2940	0.2%
Shigellosis	123	116	6%
Typhoid	43	40	7%
TOTAL	7669	7197	6%

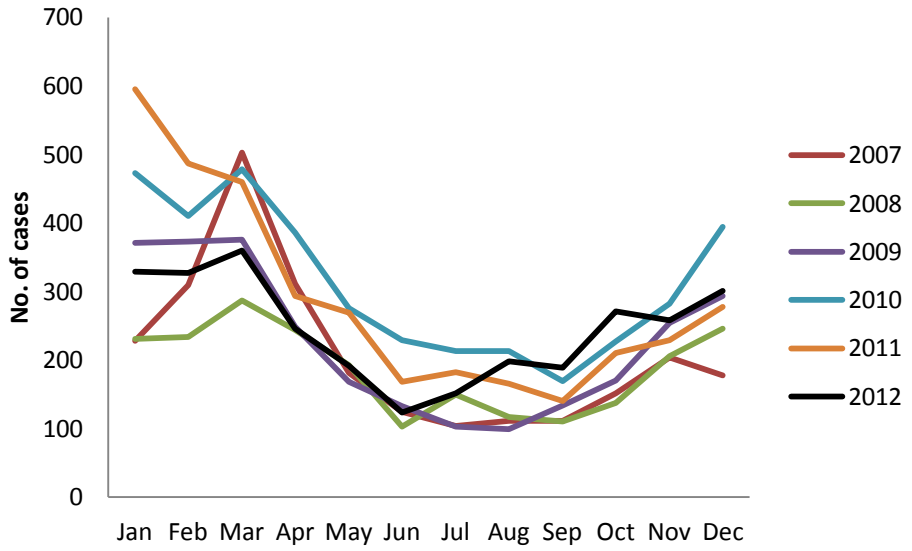
*Data only available since 2010 for Rotavirus

5.2 Salmonellosis (including Paratyphoid)

Salmonellosis (including paratyphoid) was the most frequently reported enteric condition in NSW during 2012. There were a total of 2,945cases, which is about equal to the average annual count, 2007-2012 and a 15% decrease in notifications compared to 2011. Figure 1 shows the monthly comparison of salmonellosis cases from 2007-2012. The highest number of cases was reported in 2010.

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

Figure 1: Number of salmonellosis cases by month in NSW, 2007 to 2012



* Including paratyphoid cases

5.2.1 Age and sex distribution of people with salmonellosis

The age distribution of cases in 2012 was very similar to that of previous years with 26% of cases aged 20 to 39 years and 24% of cases aged 0 to 4 years. The age specific rate was lower or roughly the same for each age group in 2012 compared with the average rate for the previous 5 years, except the 5-9 years group which was slightly higher than the average (Table 2). The sex distribution of cases was similar to 2011 with 50% females 50% males.

Table 2: Number and rate of salmonellosis* cases 2012, compared with 2007-2011 average by age group, NSW

Age group (in years)	No. cases 2012	% of all cases 2012	Rate 2012	Average no. cases 2007 - 2011	% of all cases 2007-2011	Average rate 2007 - 2011
0-4	693	24%	144.6	700	24%	152.9
5 - 9	271	9%	59.6	245	8%	55.8
10-19	329	11%	36.2	337	11%	36.9
20-39	776	26%	38.2	764	26%	38.1
40-59	434	15%	22.5	461	16%	24.5
60+	442	15%	29.8	430	15%	31.2
TOTAL	2945	100%		2937	100%	

5.2.2 Seasonal trends in salmonellosis infections

In 2012, salmonellosis notifications followed the typical seasonal patterns with an increase in the warmer months (Figure 1, above).

5.2.3 Ten most frequently notified *Salmonella* infections

In 2012 as in previous years, the most frequently notified *Salmonella* serovar was *S.* Typhimurium (53% of all *Salmonella* cases). The most marked differences compared with 2011 was the emergence of *Salmonella* monophasic serovar 4,5,12:i-, which is similar to *S.* Typhimurium however it was investigated separately in a multijurisdictional investigation, and the increase in *Salmonella* Singapore to levels similar to 2010 (57 in 2012, 27 in 2011 & 56 in 2010) (Table 3).

Table 3: Top ten *Salmonella* infections*, NSW 2012

Rank	*Salmonella* serovar	No. notifications
1	Typhimurium	1571
2	Enteritidis	153
3	Monophasic (ser.4,5,12:i-)#	104
4	Virchow	86
5	Paratyphi B bv Java	83
6	Birkenhead	60
7	Singapore	57
8	Wangata	52
9	Infantis	42
10	Saintpaul	36

*excludes 112 cases that were not typed
#*Salmonella* monophasic ser. 4,5,12:1- are most likely S.Typhimurium. They were investigated but no common links were found.

MLVA (Multiple-Locus Variable number tandem repeat Analysis) typing is used in NSW. MLVA results were available for 99% (1558/1571) of the S. Typhimurium cases. In total, 295 distinct MLVA types were reported. The ten most commonly reported MLVA types shown below represent 46% of all typed cases (Table 4).

Table 4. Top ten S. Typhimurium MLVA patterns, NSW 2012

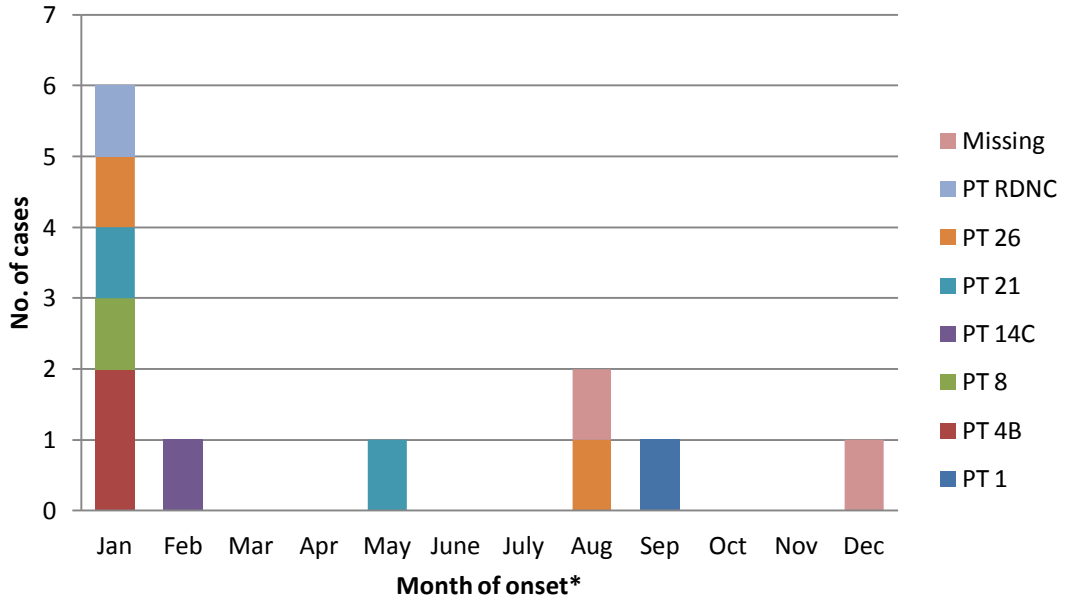
Rank	STM MLVA	No. cases	PT (historical)
1	3-17-9-12-523	155	135
2	3-9-8-13-523	142	170
3	3-9-7-13-523	107	170
4	3-16-9-12-523	61	135
5	3-10-8-9-523	56	44
6	3-12-15-13-523	42	9
7	3-9-8-14-523	38	170
8	3-9-8-12-523	37	170
9	3-9-9-13-523	37	170
10	3-9-9-12-523	35	170

*excludes 13 S. Typhimurium cases not further typed

5.2.4 *Salmonella* Enteritidis

In 2012, there were 153 cases of *S.* Enteritidis infections of varying phage types, which is a 12% decrease compared to 174 cases in 2011. The infection was likely acquired overseas for 82% (n=125) of cases with 50% (62/125) of infections acquired in Indonesia. For the remaining cases, 8% were locally acquired and the place of acquisition was unknown for 10 % cases. Amongst the locally acquired cases, seven different subtypes were detected. There were two cases, PT 4B, who were linked to an outbreak at a party held at a private residence. No other common links among cases were identified (Figure 2).

Figure 2: Locally acquired *Salmonella* Enteritidis cases in NSW by month of onset and subtype, 2012



*taken as earlier of symptom onset and specimen date

5.2.5 *Salmonella* Paratyphi

In 2012 there were 109 *Salmonella* Paratyphi cases reported. Of these 20% (22/109) were *S.* Paratyphi A and 76% (83/109) were *S.* Paratyphi B bv Java. Typing was not available for four cases.

Paratyphoid A

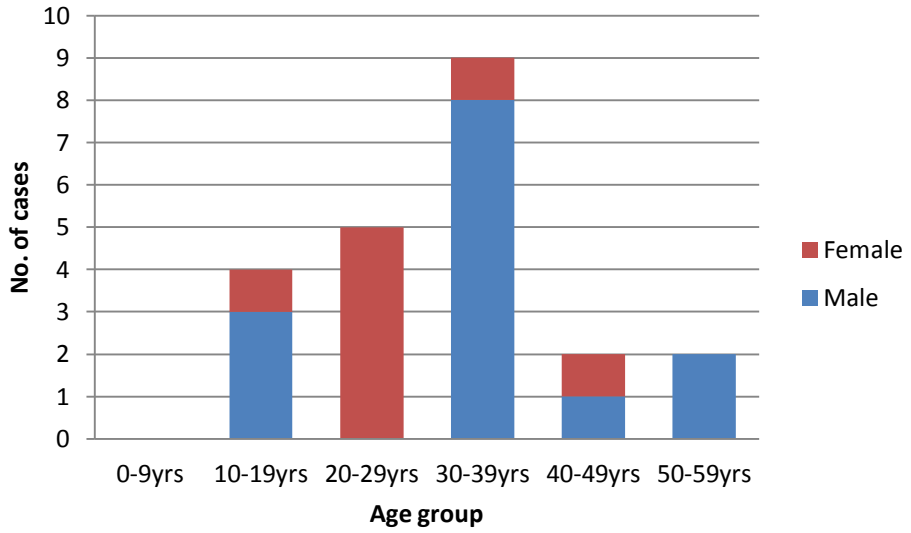
Similar to 2011, there were 22 S. Paratyphi A cases notified. The symptom profile is shown in Table 5 with fever reported in all cases for which information was available. Hospitalisation was required for 64% (14/22) of cases with a median length of stay of 3.5 days (range 1 to 12 days, unknown length of stay for 4 cases).

Table 5. Symptoms reported for paratyphoid A cases in NSW, 2012

Symptom	Yes (%)	No (%)	Unknown (%)
Fever	20 (91%)	0 (0%)	2 (9%)
Diarrhoea	13 (59%)	7 (32%)	2 (9%)
Abdominal pain	8 (36%)	9 (41%)	5 (23%)
Headache	12 (55%)	4 (18%)	6 (27%)
Vomiting	8 (36%)	10 (45%)	4 (18%)

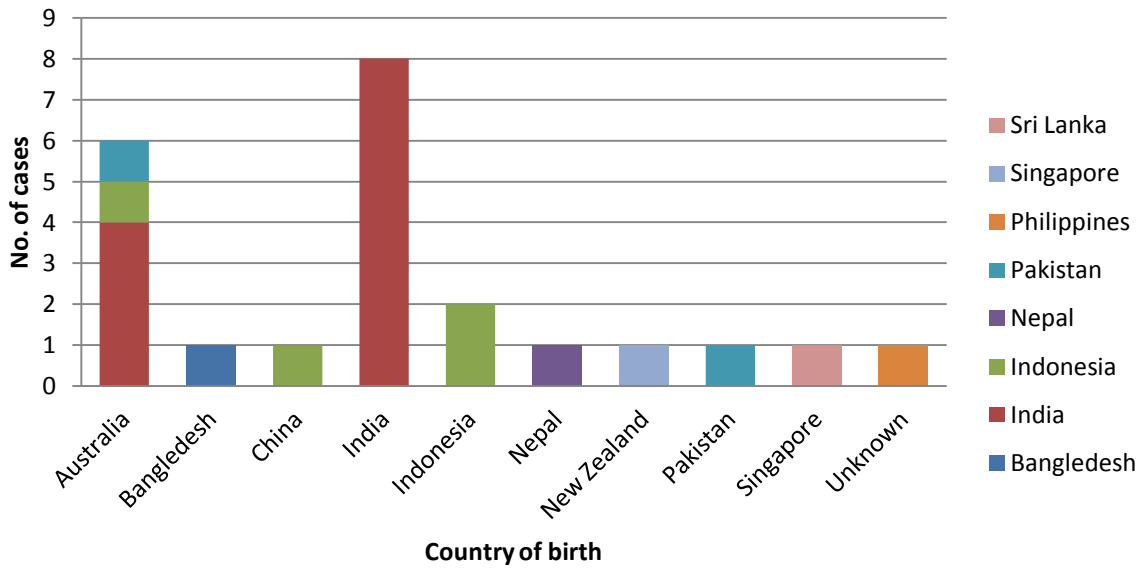
The majority of cases were aged between 20 and 39 years. 64% (14/22) of cases were male (Figure 3).

Figure 3. Paratyphoid A cases by age and sex in NSW, 2012



All of these cases acquired their infection while travelling overseas with 50% (11/22) acquiring their infection in India. Sixty-eight percent (15/22) of cases were born outside Australia, 32%, (7/22) born in India and 59% (13/22) acquired their infection while travelling to their country of birth (Figure 4). Travel was not part of an organised tour for 95% (21/22) of cases and unknown for 1 case. English was the primary language spoken for 64% (14/22) of cases. Twenty seven percent (6/22) of cases were non English speaking and this information was not known for one case.

Figure 4. Country of birth by country of disease acquisition for Paratyphoid A cases in NSW, 2012

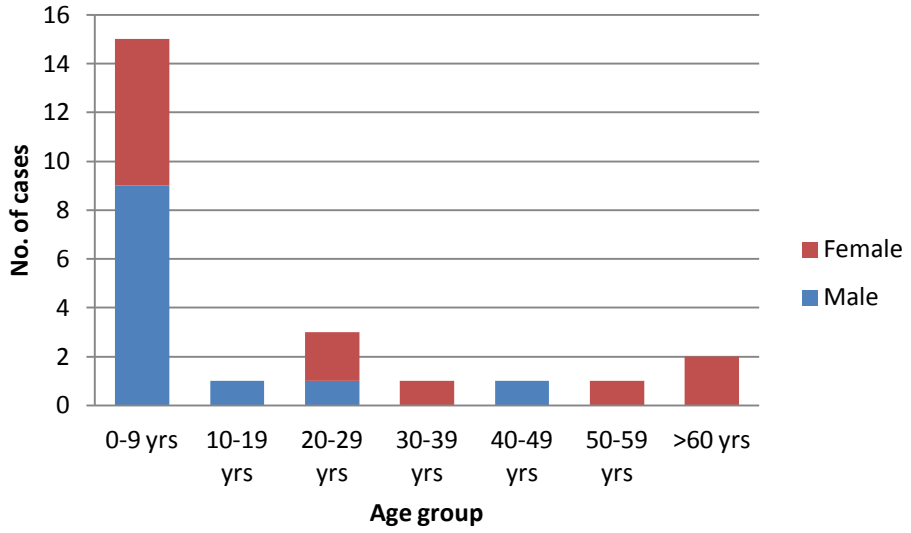


Salmonella paratyphi B. Biovar Java

The number of *Salmonella paratyphi B. Biovar* Java cases (also called *Salmonella* Java) in 2012 (n=83) was slightly higher than the number reported in 2011 (n=72). The place of acquisition was overseas for 25% (21/83) of cases, within Australia for 29% (24/83) and unknown for 46% (38/83) of cases.

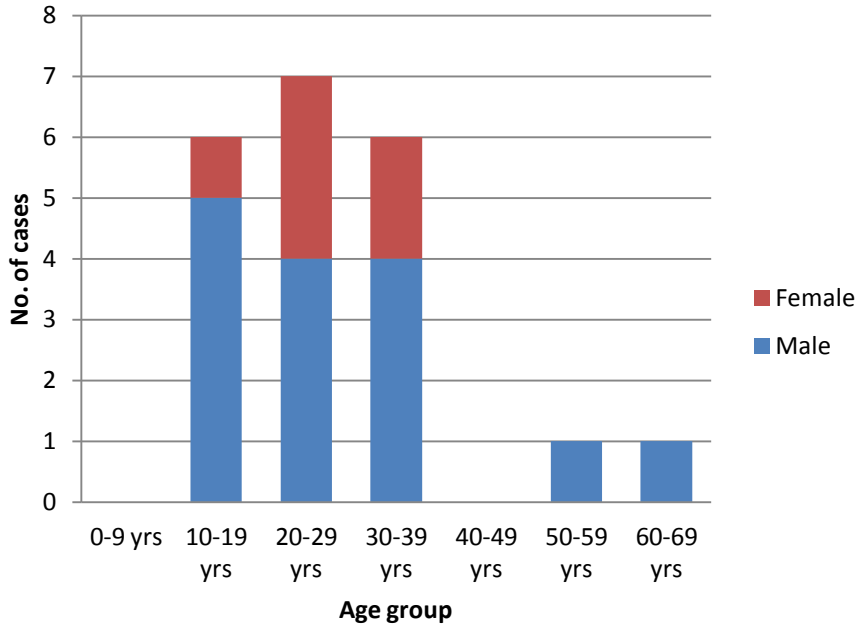
For cases acquired locally, 63% (15/24) were less than 10 years of age (Figure 5). Contact with fish tanks or reptiles is known to be associated with *Salmonella Java* infections and in previous years, infections have been epidemiologically and microbiologically associated with sandpits in children's playgrounds in northern Sydney. Of the 24 locally acquired cases, exposure to fish tanks or reptiles was reported for 8% (2/24) of cases and 54% (13/24) of cases lived/visited northern Sydney. Five cases (21%) did not report either fish tank or northern Sydney exposure and the likely source of infection was not available for the remaining 17% (4/20) of cases.

Figure 5. Locally acquired *Salmonella* Java cases by age and sex in NSW, 2012



The overseas *S.* Java cases were most commonly aged between 20 and 29 years and 71% (15/21) were male (Figure 6). However, unlike paratyphoid A, the most commonly reported country of birth was Australia (57% of all cases and 92% of cases where country of birth was known). Travel to Indonesia was reported for 48% (10/21) of cases with travel to Bali specifically reported for 90% (9/10) of these cases. Other countries where cases acquired *S.* Java were Thailand (n=4), Vietnam (n=2), Cambodia, India, Nepal and Singapore (one case each).

Figure 6. Overseas acquired *Salmonella* Java cases by age and sex in NSW, 2012



5.3 Typhoid fever

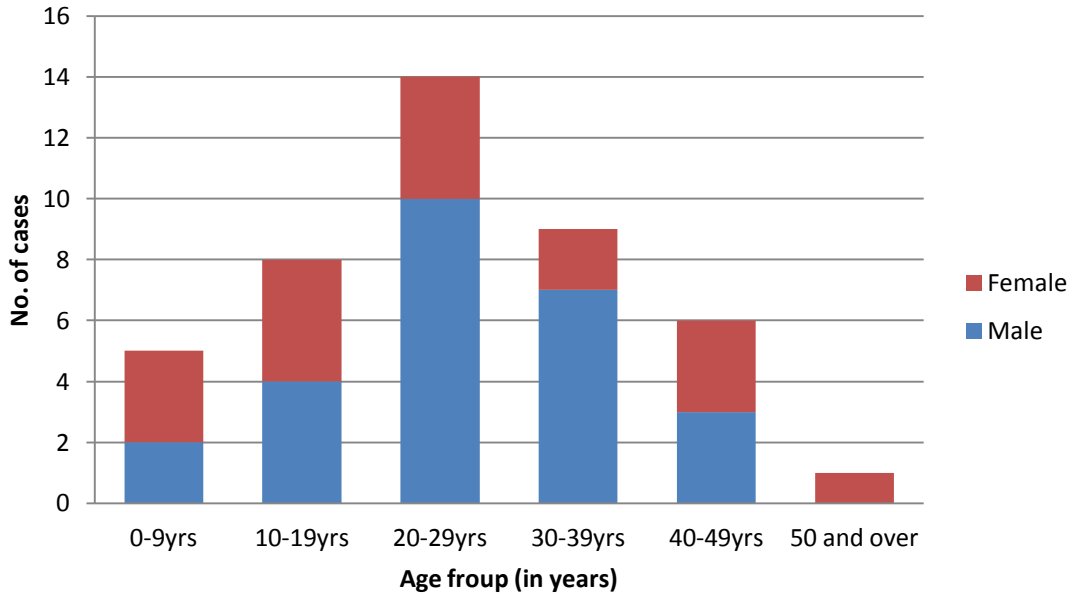
In 2012, there were 43 cases of typhoid fever reported, which is similar to the 45 cases reported in 2011. The symptom profile is shown in Table 6 with fever being present for 86% of cases. Hospitalisation was required for 70% (30/43) of cases. Of the 16 cases with available data on the length of hospitalisation, the median length of stay was 5.5 days (range 3 to 25 days).

Table 6. Symptoms reported by typhoid cases in NSW, 2012

Symptom	Yes (%)	No (%)	Unknown (%)
Fever	37 (86%)	0 (0%)	6 (14%)
Headache	21 (49%)	5 (12%)	17 (39%)
Diarrhoea	20 (47%)	11 (25%)	12 (28%)
Constipation	5 (12%)	16 (37%)	22 (51%)

The majority of typhoid cases were aged between 20 and 29 years. Over half (60%) of the cases were male. (Figure 7).

Figure 7. Typhoid cases in NSW by age group and sex, 2012

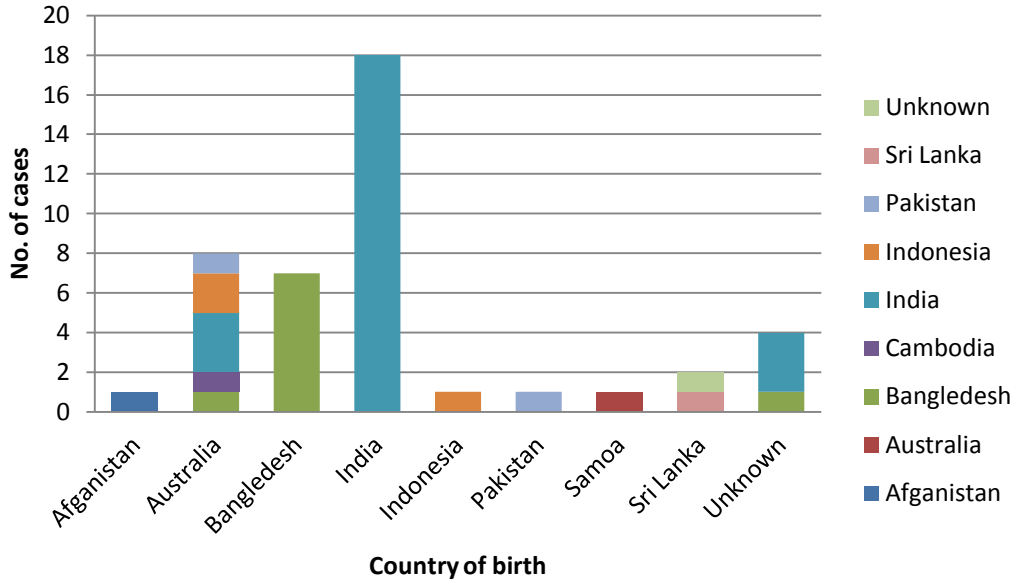


95% of cases were acquired overseas with 59% of these acquired in India. There was one case acquired in Australia who had household contact with recent returnees from Samoa and one other case who was likely a chronic carrier for unknown duration.

Of the 22 cases with information on the number of days spent overseas, the median length of stay was 27 days (range 5 to 154 days). This travel was not part of an organised tour for 42% (18/43) cases. The type of travel was unknown for the remaining 58% (25/43) cases.

The country of birth was outside Australia for 72% (31/43) of cases, Australia for 16% (7/43, all non Aboriginal or Torres Strait Islanders) and unknown for 12% (5/43). India was the most commonly reported country of birth accounting for 42% (18/43) of cases. Of the overseas born cases, 67% acquired their infection while travelling to their country of birth (Figure 8). The primary language was English for 65% (28/43) of cases, language other than English for 21% (9/43) of cases and not reported for 14% (6/43) of cases.

Figure 8. Country of birth by country of disease acquisition for typhoid cases in NSW, 2012



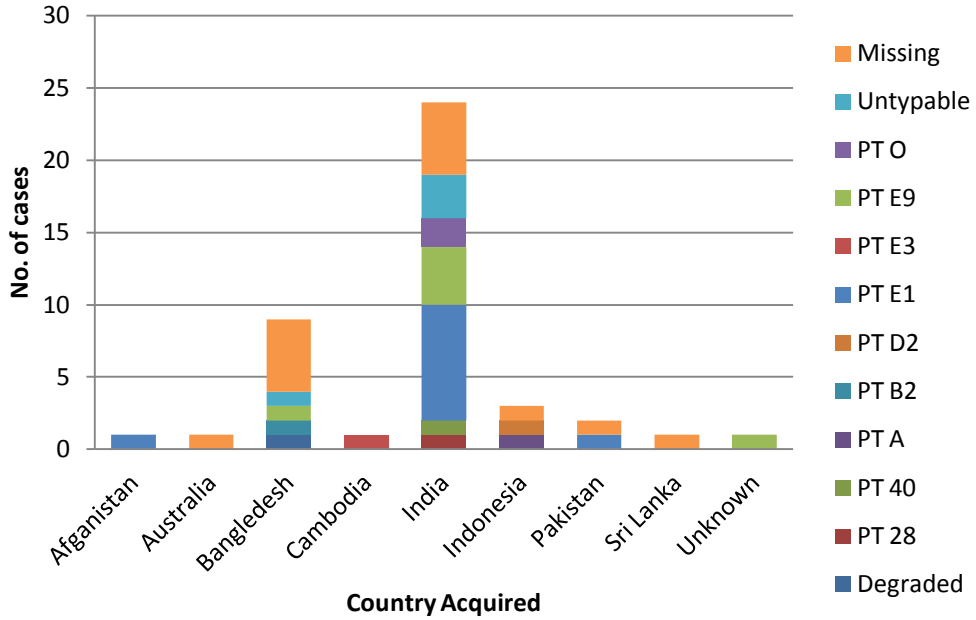
The majority of cases were not employed in an occupation that is considered at high risk of transmission to others (Table 7).

Table 7. Occupation of notified typhoid fever cases, NSW 2012

Occupation	No. cases
No high risk occupation	28
Food Handler (includes Cook, Chef, Waiter)	3
Unknown	10
Healthcare Worker	1
Other	1
Total	43

There were 9 different phage types (PT) reported. PT E1 was the most common with 23% (10/43) of cases (Figure 9).

Figure 9. Phage type of organism by country of disease acquisition for typhoid cases in NSW 2012



5.4 Giardiasis

Giardiasis was the second most frequently reported enteric disease in NSW in 2012. There were 2006 giardiasis notifications received which was a 15% decrease when compared to 2011 (n=2362). The median age of cases was 30 years, with ages ranging from 0-96 years. Fifty percent of the cases were male, and 57% of cases 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.

5.5 Shigellosis

In 2012, 123 cases of shigellosis were reported in NSW, which is a 6% decrease compared to 2011 (n=131).

The most common *Shigella* species reported was *Shigella sonnei* (including biotype A and biotype G) (n=76; 62%) followed by *Shigella flexneri* (n=37; 30%) (Table 8). The median age and mean age of shigellosis cases in NSW in 2012 was 35.5 and 36.2 years respectively. Ages ranged from 1 year to 85 years. Males (n=65) represented 53% of cases.

Overseas travel was reported by 57% (70/123) of cases. The most frequently reported travel destination was India (16 cases, 23%) followed by Indonesia (13 cases, 19%). *Shigella sonnei* biotype G was the most common overseas acquired subtype of *Shigella* (29 cases, 41%).

Table 8. Number of *Shigella* cases for 2012 by species and sex, compared with the 2007-2011 average, NSW

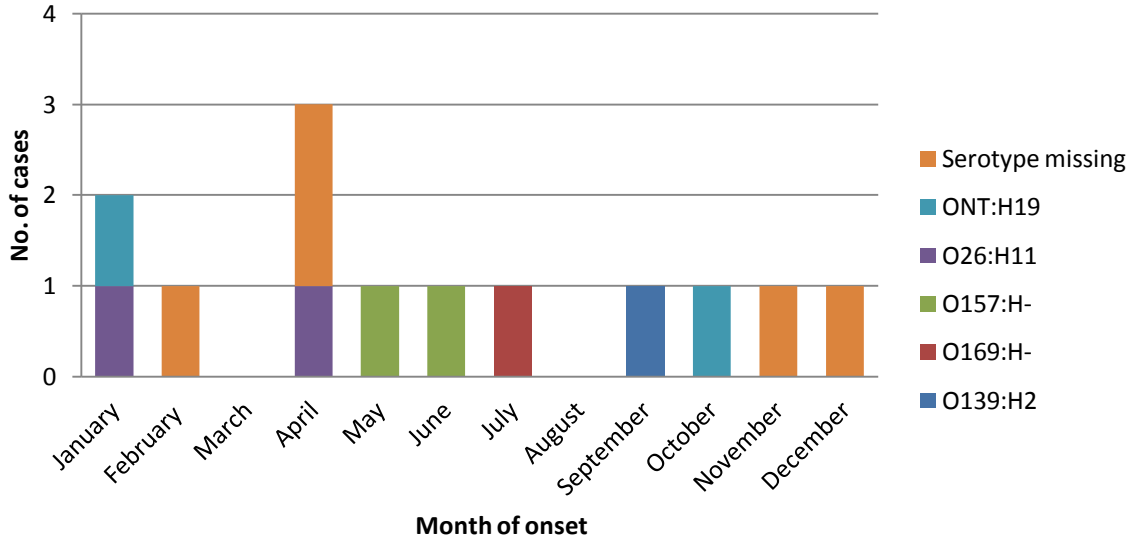
	Average no. notifications 2007-2011			Notifications 2012		
***Shigella* species**	**Female**	**Male**	**Total**	**Female**	**Male**	**Total**
Shigella sonnei biotype G	16	38.2	54.2	25	20	45
Shigella flexneri	10.4	15.6	26	12	25	37
Shigella sonnei (untyped or other)	4.4	9.6	14	6	7	13
Shigella sonnei biotype A	3	7.8	10.8	8	10	18
Shigella boydii	1.2	2	3.2	2	0	2
Unknown	2.8	3	5.8	3	1	4
Shigella dysenteriae	0.2	0.8	1	2	2	4
TOTAL	**38**	**77**	**115**	**58**	**65**	**123**

5.6 STEC and HUS

Notifications of Shiga toxin producing Escherichia coli (STEC) remained steady when compared to the previous year with 13 reports received in 2012. This represented a 28% decrease in notifications when compared to the annual five year average from 2007-11 (18 cases) (Figure 11).

The median age of cases was 57 years, with an age range of 20 –79 years. Fifty four percent of cases were male (n=7). Serotype information was available for eight cases (Figure 10), no links between cases were found.

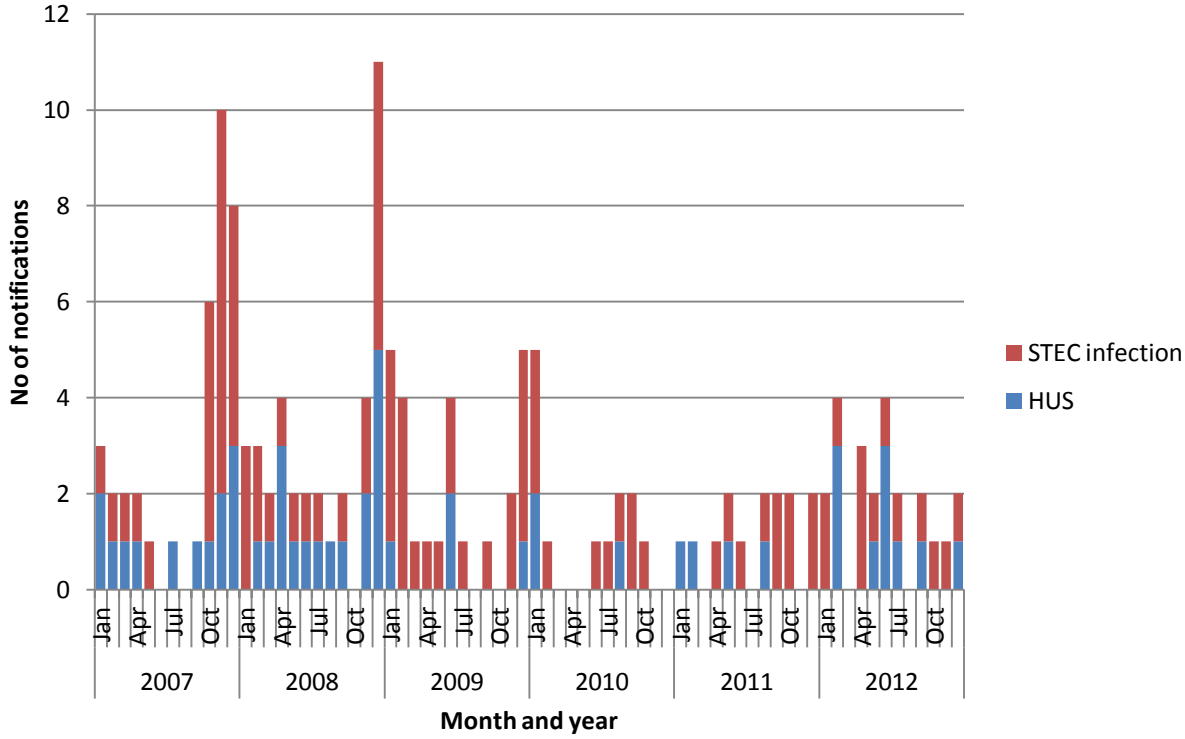
Figure 10. STEC serotypes by month of onset



There were 9 cases of haemolytic uraemic syndrome (HUS) notified in 2012 which is comparable to the average annual count for the previous five years (8 cases). The median and mean age was 26 and 23.4 years respectively, the age range was 1.9-60.3 years. Two cases had both HUS and STEC infection (serotypes O169:H- & O157:H-). Six other cases reported having a diarrhoeal illness prior to onset of HUS symptoms; however STEC was not detected in stool

specimens collected from the patient as a result of the HUS diagnosis. One case had HUS associated with *Streptococcus pneumoniae*.

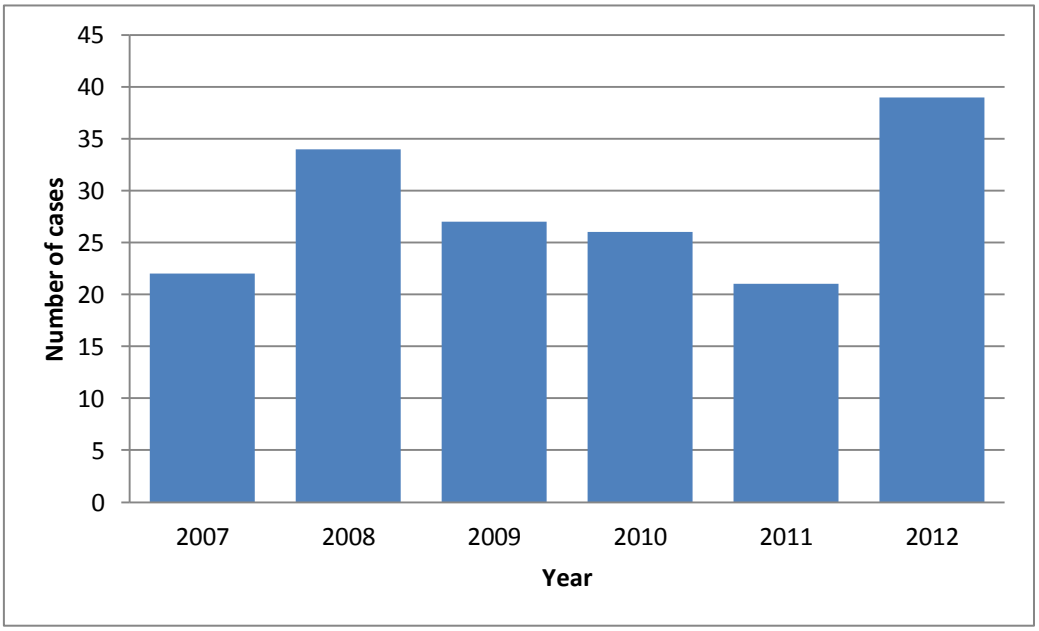
Figure 11. STEC and HUS notification by month, NSW 2007-2012



5.7 Listeriosis

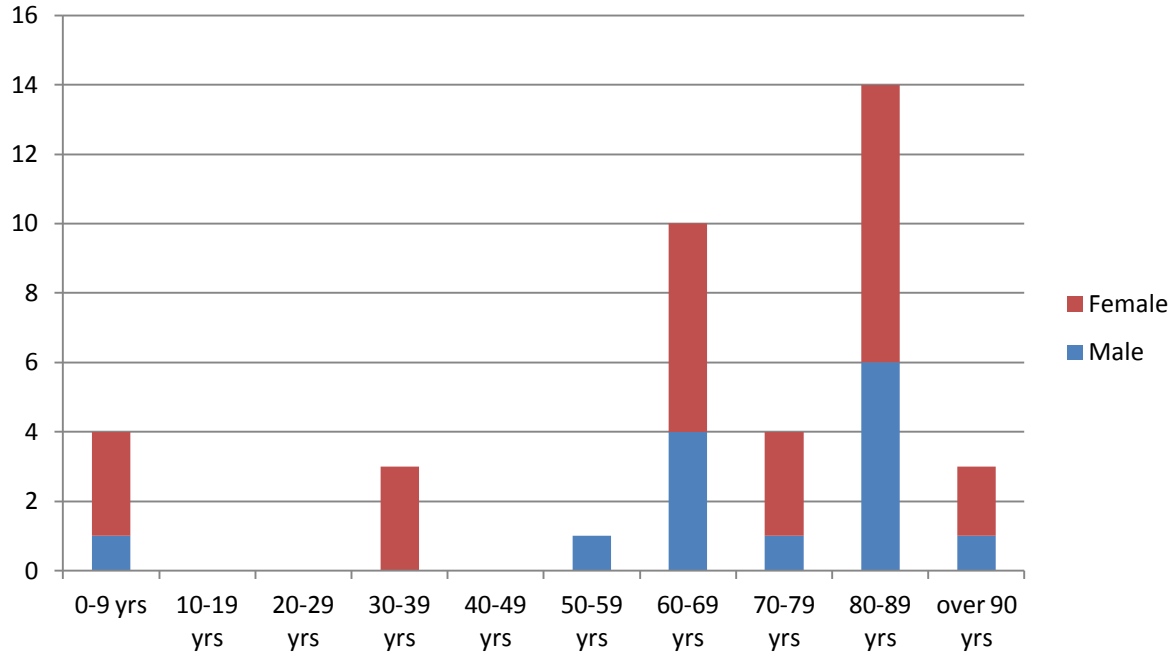
There was an increase in listeriosis cases reported in 2012 with 39 cases compared with 21 in 2011 (Figure 12). Five of these cases were linked to a multi-jurisdictional outbreak associated with soft cheese produced in Victoria. The outbreak started in August 2012 and continued into 2013.

Figure 12. Listeriosis notifications by year, NSW 2007 – 2012



Four cases died (10%) aged 68 (2), 70 & 80 years. The majority of cases were aged over 60 years and had immunosuppressive conditions. There were two perinatal cases where both mother and baby were infected and another two babies who were born to asymptomatic mothers, all 4 babies survived. One pregnant woman had a miscarriage at 19 weeks. 64% of cases were female (Figure 13).

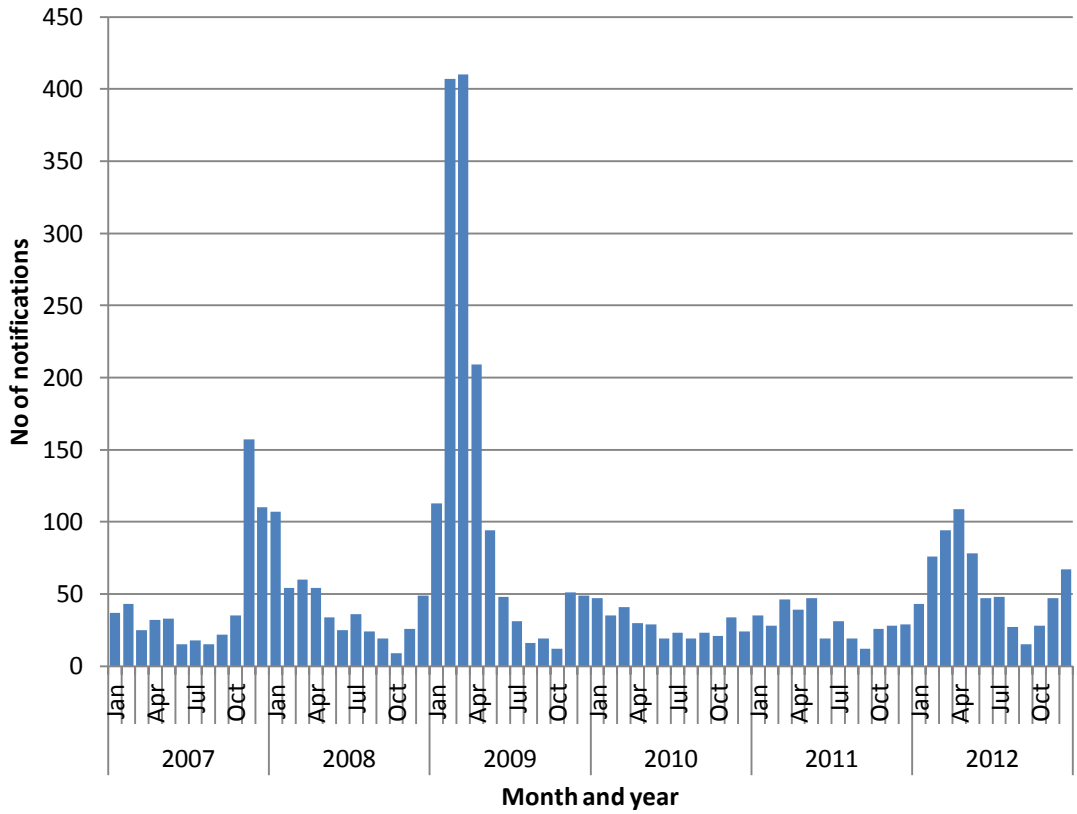
Figure 13. Listeriosis notifications by sex and age group, NSW 2012



5.8 Cryptosporidiosis

There were 682 cases of cryptosporidiosis reported in NSW in 2012, a 6% increase compared to the annual five year average from 2007-2011 (n=640). The median age of cryptosporidiosis cases was 6 years, with ages ranging from 3 months to 95 years. Males represented 46% of cases (n=313). No clusters or outbreaks were identified in 2012. The large number of notifications in 2009 was due to an outbreak associated with swimming pools (Figure 14.)

Figure 14. Cryptosporidiosis notifications by month, NSW 2007 – 2012



5.9 Hepatitis A

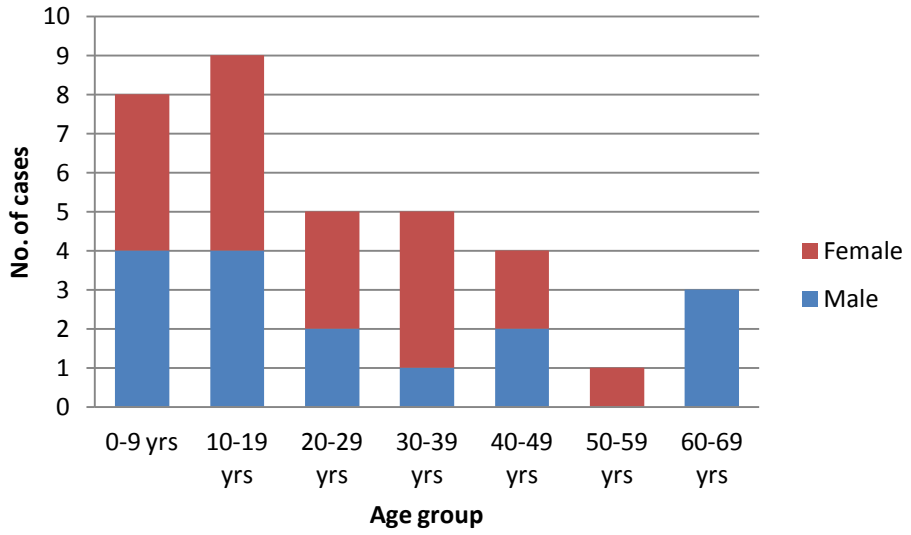
There were 42 cases of hepatitis A infection reported in 2012; a decrease of 43% when compared to the previous 5 year average (2007-2011) and the lowest annual count on record. Hospitalisation was required for 48% (20/42) of cases with a median length of stay of 3.5 days.

In accordance with previous years, the majority of cases (83%) (35/42) were acquired overseas in countries where hepatitis is known to be endemic. Locally acquired cases accounted for 17% (7/42) of cases.

Hepatitis A cases acquired overseas

There were 35 overseas acquired cases reported in 2012. Of these, 46% (16/35) were male and the majority were aged less than 30 years (Figure 15).

Figure 15. Overseas acquired hepatitis A cases by age and sex, 2012

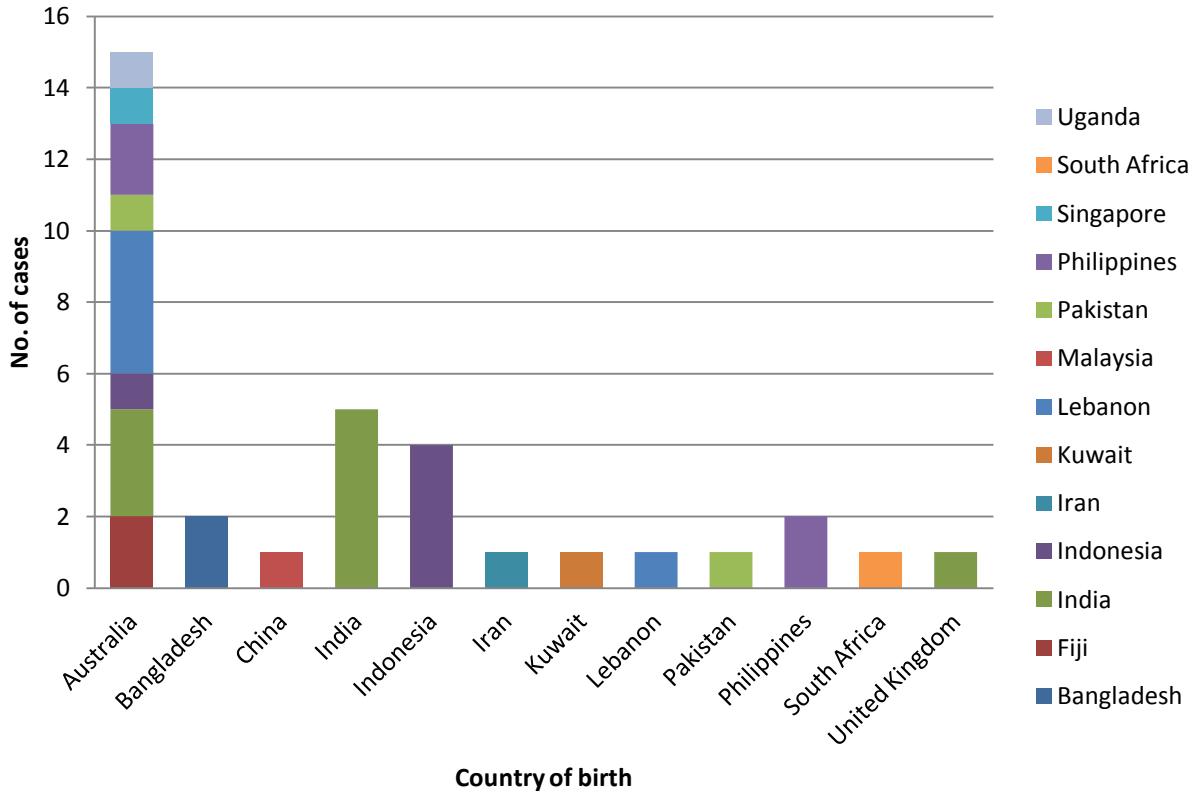


Of the 35 overseas acquired cases, 43% (15/35) cases were Australian born, 57% (20/35) were born outside Australia. Approximately half of the overseas born cases spoke English as a primary language.

The majority of overseas born cases (90%, 18/20) acquired their infection while travelling to their country of birth (Figure 16). The 15 Australian born cases acquired their infection in eight different countries in South East Asia, the Pacific, Middle East and Sub-Saharan Africa. None of these cases were Aboriginal or Torres Strait Islanders. The median length of travel for 16 cases where this is known was 33 days (range 7 to 88 days). Of all overseas acquired cases, two cases reported travelling as part of an organised tour.

The majority of cases were not vaccinated (89%, 31/35). One overseas born cases reportedly vaccinated received the vaccine more than 10 years prior to travel. Two Australian born vaccinated cases both received the vaccine at the same time they were tested due to a household member being diagnosed with hepatitis A.

Figure 16. Hepatitis A cases by country of birth and country of disease acquisition, 2012



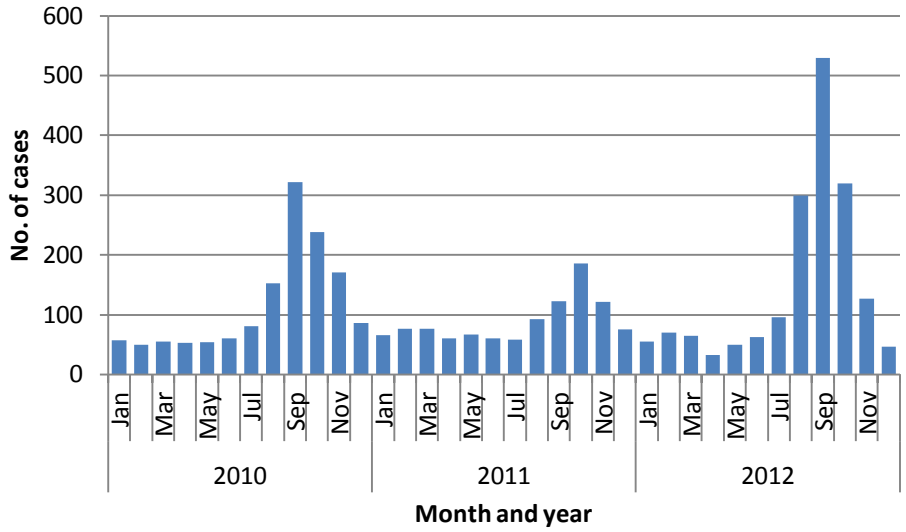
Of the seven locally acquired cases, 57% (4/7) were male and the median age was 29 years (range 6 to 81 years). No cases identified as Aboriginal or Torres Strait Islander. Almost half of the cases (n=3) were Australian born with remaining cases from Korea (n=1), East Timor (n=1), Iran (n=1) and unreported (n=1).

No clusters or source of infection were identified amongst the locally acquired cases. One case had acquired her infection after contact with a confirmed case at school. Two cases reported travel to Melbourne in their exposure period. No risk factors were identified for the remaining four cases.

5.10 Rotavirus

Rotavirus became a notifiable disease in 2010. There were 1754 notification of rotavirus received in 2012, a 30% increase when compared to the average notification for the previous 2 years (2010-2011). This was mainly due to the huge increase in cases from August to October with the peak of 530 cases in September (Figure 17).

Figure 17: Notifications of rotavirus by month and year, NSW 2010-2012



In 2012, the age group most affected were children under 5 years with the peak occurring in children aged 1 year. There was a relative increase in the proportion of children aged 5-9 years notified: 27% of notifications compared with 20% in 2011 and 16% in 2010. This suggests there may be reduced immunity to rotavirus infection in unvaccinated older children due to reduced exposure to circulating virus since the vaccine was introduced in 2007. Males and females were equally affected (Figure 18 and 19).

Figure 18: Rotavirus notification in children aged 0 to 9 years NSW 2012

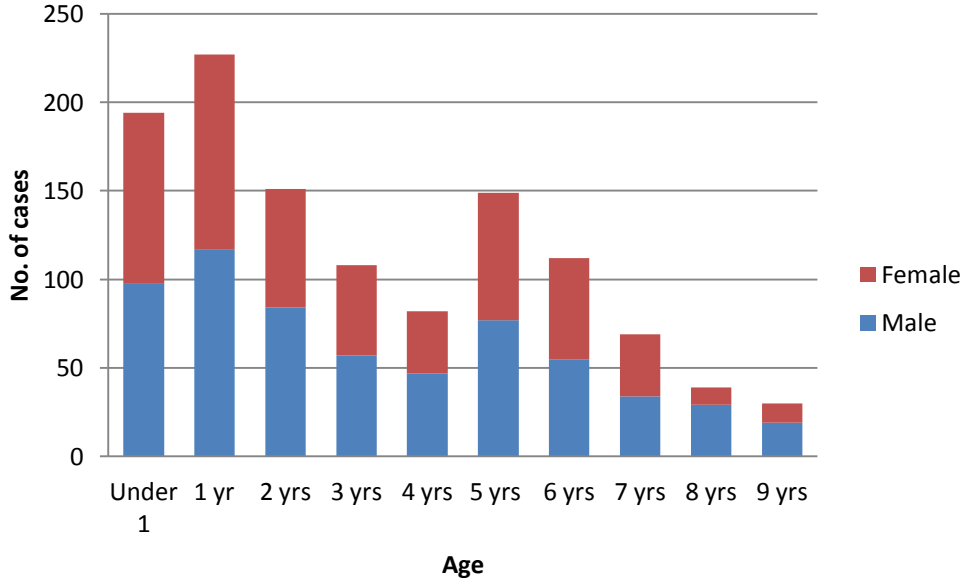
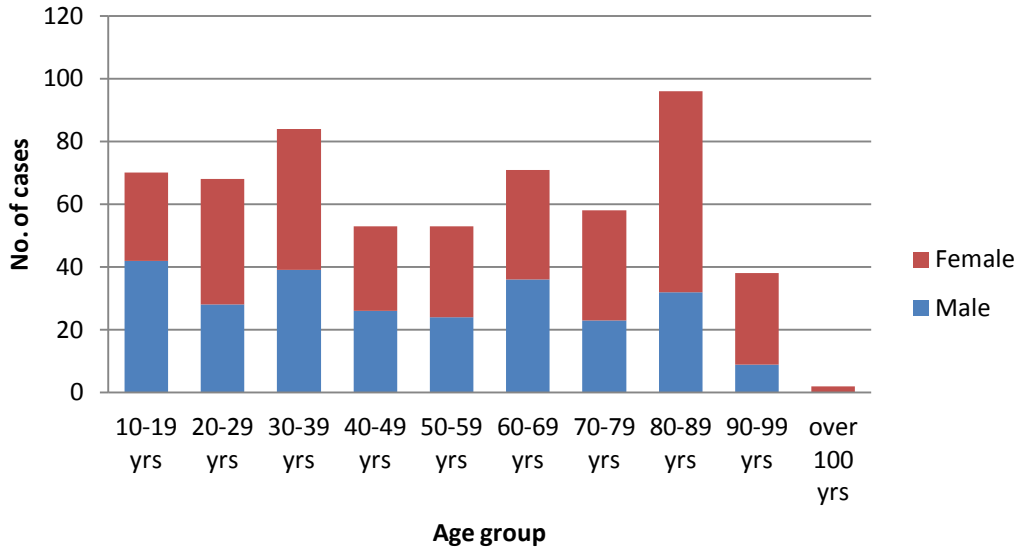
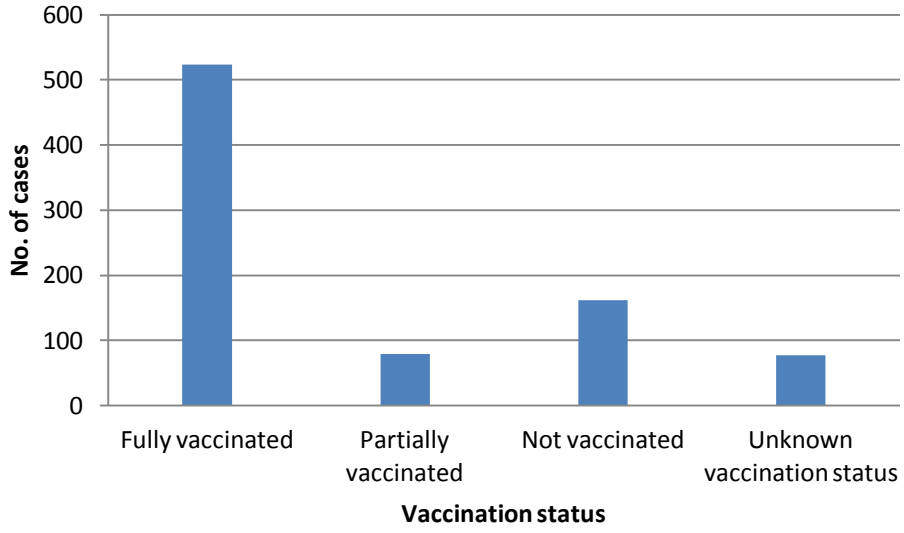


Figure 19: Rotavirus notification in people age 10 years and over, NSW 2012



In NSW, the Rotavirus vaccine was introduced in 2007 and consists of two doses of Rotarix oral vaccine at age 2 and 4 months. There were 842 children with confirmed rotavirus infection born since May 2007 who have had the opportunity to be vaccinated. Of these, 62% (n=524) were fully vaccinated for their age and a further 9% (n=79) were partially vaccinated for their age. 19% (n=162) of these children were not vaccinated and vaccine status was unknown for 9% (n=77) of cases (Figure 20).

Figure 20: Rotavirus vaccination status for children born since May 2007 with rotavirus infection, NSW, 2012



6. Enteric Outbreaks in NSW during 2012

In 2012, there were a total of 864 gastrointestinal outbreaks reported in final summary form to the Communicable Diseases Branch. There were 61 suspected foodborne outbreaks and 803 viral or probable viral gastrointestinal outbreaks in institutions.

6.1 Foodborne and suspected foodborne outbreaks

In 2012, 61 foodborne or suspected foodborne disease outbreaks affecting over 662 people were reported to NSW Health. Of these, 27 people (4.1%) were hospitalised compared with 48 of 797 (6.0%) in 2011. In 2012, no deaths were reported to be associated with a suspected foodborne outbreak.

In 2012 , 37.5% of all cases (248/662) and 70.4% of all hospitalisations (19/27) associated with the 61 reported foodborne and suspected foodborne disease outbreaks, were due to *Salmonella* infections which was the cause of illness in 44% (n=27) of the outbreaks. Of the 27 outbreaks associated with *Salmonella* infection, 23 (85%) were caused by *Salmonella* Typhimurium, one *Salmonella* Wangata, one *Salmonella* Muenchen, one *Salmonella* Give and one *Salmonella* Singapore (Table 6).

Of the 23 outbreaks associated with *Salmonella* Typhimurium (see table 6 and 7 for MLVA types) infection in NSW in 2012, 14 had compelling epidemiological and/or microbiological evidence implicating a food vehicle. For 13 of these outbreaks, the responsible vehicles were items containing raw or undercooked egg, or were contaminated from raw egg products used in production. In the other outbreak, illness was associated with different sandwiches presumed to be cross-contaminated from raw ingredients in a poorly maintained preparation area.

The outbreak of *Salmonella* Muenchen was associated with a Christmas leg ham and the *Salmonella* Wangata outbreak was associated with various meats from a butcher.

In six more outbreaks, *Clostridium perfringens* (via chicken burrito and roast beef as vehicles), *Staphylococcus aureus* (via fried rice as the vehicle), norovirus (via oysters as the vehicle) and Scombroid poisoning (via tuna steaks as the vehicle) were each identified as the agent responsible (Table 6).

For 28 (46%) 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; the very low infective dose of a number of pathogens makes it difficult for the laboratories to detect it in one stool specimen.

For 39 (64%) of the suspected foodborne outbreaks, a (suspected) responsible vehicle could not be found. Possible reasons for this include the delay between consumption of foods and reporting of illness, making it difficult for cases to recall foods and ingredients consumed, and for 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 6: Foodborne disease outbreaks reported in NSW, 2012

PHU ID number	Month of onset	Setting	Pathogen	No. ill	No. hospitalised	Evidence*	Epi. Study**	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								
NSCC29807	Jan	restaurant	*Salmonella* Typhimurium (MLVA 3-9-7-13-523, PT 170)	5	0	D	D	Undercooked eggs
NSCC29883	Jan	restaurant	Unknown	12	0	D	N	Unknown
SESI201201	Jan	restaurant	Unknown	12	0	D	C	Unknown
SSW29733	Jan	restaurant	*Salmonella* Typhimurium (MLVA 3-9-9-12-523, PT 170)	7	3	D	M	Profiteroles filled with cream (contaminated from piping bag)
GW201201	Feb	private residence	*Salmonella* Give	10	0	D	D	Unknown
HUN0453	Feb	private residence	*Salmonella* Muenchen	16	1	D	D	Leg of Ham
NSCC30179	Feb	restaurant	*Salmonella* Typhimurium (MLVA 3-9-8-13-523, PT 170)	9	0	D	D	Fried Ice cream (undercooked egg)
SSW30215	Feb	restaurant	Unknown	4	1	D	N	Unknown
NC30929	Mar	restaurant	*Salmonella* Typhimurium (MLVA 3-10-7-15-523, PT 170)	15	0	D	D	Unknown
NSCC201201	Mar	community	Unknown	52	0	D	N	Unknown

PHU ID number	Month of onset	Setting	Pathogen	No. ill	No. hospitalised	Evidence*	Epi. Study**	Responsible vehicle
NSCC31014	Mar	commercial caterer	*Salmonella* Typhimurium (MLVA 3-15/16-11-10/11-523, PT 135a)	8		D	C	Unknown
SES30680	Mar	restaurant	*Salmonella* Typhimurium (MLVA 3-9-9-12-523, PT 170)	17	1	AM	C	Bombe Alaska (undercooked egg)
SES30797	Mar	restaurant	Unknown	10	0	D	N	Unknown
SESI30918	Mar	restaurant	*Salmonella* Typhimurium (MLVA 3-13-9-11-550, PT 135)	4	2	M	D	Bacon and egg burger
SSW201201	Mar	camp	Unknown	16	0	D	N	Unknown
WS30662	Mar	take-away	*Salmonella* Typhimurium (MLVA 3-10-8-9-523, PT 44)	11	0	AM	D	Vietnamese rolls
HUN0454	Apr	restaurant	Unknown	3	0	D	N	Unknown
HUN0455	Apr	restaurant	*Salmonella* Typhimurium (MLVA 3-9-7-12-523, PT 170)	14	2	D	D	Fried Ice cream (undercooked egg)
HUN0456	Apr	restaurant	*Salmonella* Typhimurium (MLVA 3-9-7-13-523, PT 170)	20	3	M	D	Raw egg mayonnaise
HUN0457	Apr	take-away	*Salmonella* Typhimurium (MLVA 3-9-8-13-523, PT 170)	3	0	D	D	Unknown

PHU ID number	Month of onset	Setting	Pathogen	No. ill	No. hospitalised	Evidence*	Epi. Study**	Responsible vehicle
HUN0458	Apr	community	*Salmonella* Wangata	3	0	D	N	Unknown
HUN0459	Apr	commercial caterer	Unknown	26	0	D	C	Unknown
HUN0461	Apr	commercial caterer	Unknown	16	1	A	C	Lamb salad
NSCC31173	Apr	take-away	*Salmonella* Typhimurium (MLVA 3-10-7-13-523, PT 170)	14	0	D	D	Bakery goods
SES31204	Apr	restaurant	Unknown	3	0	D	N	Unknown
SESI30974	Apr	private residence	Viral Suspected	19	0	A	C	Home-made cakes
GS31108	May	restaurant	*Salmonella* Typhimurium (MLVA 3-9-9-12-523, PT 170)	12	0	M	N	Fried Ice cream (undercooked egg)
SSW201202	May	private residence	Scrombroid	3	0	D	D	Tuna steaks
SSW201203	May	bakery	*Salmonella* Typhimurium (MLVA 3-9-9/8-12-523, PT 170)	27		M	D	Numerous bakery goods (cross contamination from raw eggs)
WS31726	May	commercial caterer	Unknown	5	0	D	D	Unknown
GS31892	Jun	restaurant	*Salmonella* Typhimurium (MLVA 3-9-7-12-523, PT 170)	3	0	D	D	Ice cream containing raw egg
HUN0463	Jun	institution	*Salmonella* Typhimurium (MLVA	3	0	D	N	Unknown

PHU ID number	Month of onset	Setting	Pathogen	No. ill	No. hospitalised	Evidence*	Epi. Study**	Responsible vehicle
			3-14-9-14-523, PT Unknown)					
Ill31823	Jun	national franchised fast food	Unknown	7	0	D	D	Unknown
NS31930	Jun	restaurant	Unknown	35	0	D	C	Unknown
WS31832	Jun	commercial caterer	*Staphylococcus aureus*	22	6	A	C	Fried rice
SES32487	Jul	restaurant	Unknown	9	0	D	D	Unknown
HUN0462	Aug	restaurant	*Salmonella* Typhimurium (MLVA 3-9-9-12-523, PT 170)	5	1	M	D	Fried Ice cream (undercooked egg)
NSCC32873	Aug	commercial caterer	Unknown	17	0	D	C	Unknown
SSW32768	Aug	aged care	*Salmonella* Typhimurium (MLVA 3-9-7-10/13-523, PT 170)	3	2	D	D	Unknown
SSW32901	Aug	restaurant	Unknown	5	0	D	N	Unknown
WS32857	Aug	restaurant	Unknown	3	0	D	D	Unknown
NC32900	Aug	private residence	Unknown	7	0	D	N	Unknown
Ill33065	Sep	take-away	Unknown	5	0	D	N	Unknown
NSCC201202	Sep	private residence	*Salmonella* Typhimurium (MLVA	9		D	D	Unknown

PHU ID number	Month of onset	Setting	Pathogen	No. ill	No. hospitalised	Evidence*	Epi. Study**	Responsible vehicle
			3-27-8-21-496, PT Unknown)					
NSW33143	Sep	commercial caterer	*Salmonella* Typhimurium (MLVA 3-9-8-14-523, PT 170)	14	0	D	D	Raw egg mayonnaise
SSW33083	Sep	restaurant	Unknown	10	0	D	D	Mushroom sauce
NS33608	Oct	restaurant	*Clostridium perfringens*	5	0	M	D	Chicken burrito
Ill33621	Oct	restaurant	Unknown	20	0	D	N	Unknown
HUN0467	Oct	community	Norovirus	8	0	M	D	Oysters
NS33828	Nov	restaurant	*Salmonella* Singapore	7	3	D	D	Unknown
SES34005	Nov	restaurant	Unknown	9	0	D	C	Unknown
WS33689	Nov	restaurant	*Salmonella* Typhimurium (MLVA 3-9-8-13-523, PT 170)	3	1	D	N	Unknown
HUN0464	Nov	restaurant	Unknown	10	0	D	D	Unknown
HUN0465	Nov	restaurant	Unknown	5	0	D	D	Unknown
HUN0466	Nov	restaurant	*Salmonella* Typhimurium (MLVA 3-17-9-12-523, PT 135)	2	0	D	D	Unknown
CC34096	Dec	restaurant	*Salmonella* Typhimurium (MLVA 3-9-8-13-523, PT 170)	4	0	D	D	Unknown
GS201201	Dec	restaurant	Unknown	16	0	D	N	Unknown

PHU ID number	Month of onset	Setting	Pathogen	No. ill	No. hospitalised	Evidence*	Epi. Study**	Responsible vehicle
NS34169	Dec	restaurant	Unknown	12	0	D	D	Unknown
SSW34188	Dec	restaurant	Unknown	8	0	D	N	Unknown
SSW34201	Dec	restaurant	Unknown	7	0	D	N	Unknown
WS34233	Dec	restaurant	*Clostridium perfringens*	13	0	D	D	Roast beef

Table 7: *Salmonella*e by serotype, phage type and MLVA type associated with foodborne outbreaks in NSW, 2012*

***Salmonella* serotype**	**Phage type**	**MLVA type**	**No. of outbreaks (cases)**
Salmonella Typhimurium	170	MLVA 3-9-7-13-523	3 (27)
Salmonella Typhimurium	170	MLVA 3-9-9-12-523	5 (65)
Salmonella Typhimurium	170	MLVA 3-9-8-12-523	1 (3)
Salmonella Typhimurium	170	MLVA 3-10-7-15-523	1 (15)
Salmonella Typhimurium	170	MLVA 3-9-7-12-523	1 (3)
Salmonella Typhimurium	170	MLVA 3-9-8-13-523	4 (19)
Salmonella Typhimurium	170	MLVA 3-10-7-13-523	1 (14)
Salmonella Typhimurium	135a	MLVA 3-10-8-9-523	1 (11)
Salmonella Typhimurium	135a	MLVA 3-15/16-10/11-523	1 (8)
Salmonella Typhimurium	135	MLVA 3-13-9-11-550	1 (4)
Salmonella Typhimurium	135	MLVA 3-17-9-12-523	1 (2)
Salmonella Typhimurium	44	MLVA 3-9-8-14-523	1 (14)
Salmonella Typhimurium	Unknown	MLVA 3-27-8-21-496	1 (9)
Salmonella Typhimurium	Unknown	MLVA 3-14-9-14-523	1 (10)
Salmonella Wangata			2 (19)
Salmonella Give			1 (10)
Salmonella Singapore			1 (7)

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

6.2 Summary of significant foodborne outbreaks during 2012

An extended outbreak of ***Salmonella* Typhimurium** (MLVA 3-9-9-12-523 & 3-9-8-12-523, PT 170) associated with eating products containing, or contaminated from raw eggs was investigated. Six separate outbreak incidents of salmonellosis from a restaurant (4 incidents) and a bakery (2 incidents) were investigated from January to April 2013. The restaurant and bakery had the same egg supplier. A total of 77 cases were reported (29 lab confirmed with *Salmonella* Typhimurium (MLVA 3-9-9-12-523 or 3-9-8-12-523). Illness in people who had eaten at the restaurant was associated with consumption of either fried ice cream or a Bombe Alaska, both desserts contained raw egg and had minimal cook times. Illness in people who had eaten from the bakery was not specific to a single bakery item, but was common to items that had fillings that had been piped with piping bags. Illness from the bakery is thought to be due to consumption of food that had been contaminated from equipment cross-contaminated by raw egg. The NSWFA inspected the restaurant, bakery and egg farm. *Salmonella* Typhimurium (MLVA 3-9-9-12-523 or 3-9-8-12-523) was found on the bakery equipment and the egg farm laying and grading room. The restaurant was asked not to serve minimally cooked egg products, the bakery and farm underwent a thorough cleaning and re-test schedule and the bakery switched to disposable piping bags. (SSW29733, NSCC30179, SES30680, SSW201203, HUN0462, GS31108).

***Salmonella* Typhimurium (MLVA type 3-10-7-15-523, PT170) infection associated with a take away**

A cluster of an uncommon MLVA (3-10-7-15-523) was recognised in the North Coast area of NSW. A total of 34 of these MLVA have been reported with collection dates from 2-23 March 2012. Thirty-one cases that either lived or visited the mid-north coast area of NSW. Twenty-five cases were interviewed and interviews revealed a take-away shop as a common source for 15 of

those with exposure dates from 29/2/2012 to 13/3/2012. Foods consumed were numerous with no single common ingredient. Another 4 cases reported eating at food outlets in the same shopping centre food court. The NSWFA inspected the premises and took numerous food and environmental samples, only the hummus returned a positive *Salmonella* Typhimurium result (MLVA pending). The hummus is made on site with the same stick blender that is used to make the crepe batter which contains raw egg. The shop reported making their own chicken log for kebabs, a procedure that has the potential to cause cross-contamination with the environment if sanitisation is not completely effective. The NSWFA requested the owners cease making their own chicken log. Upon reinspection, all samples taken for testing were negative. It is believed environment or equipment contamination may have resulted in contamination of a food or condiment used over an extended period, whether by the chicken or egg it is unsure. The chicken is from a large national supplier while the egg is a local product, which could explain why this MLVA was localised in time to this area. The traceback to the egg grading facility found only *Salmonella* Singapore on boot swabs of the grading area (NC30929).

***Salmonella* Muenchen infection associated with a butcher shop**

OzFoodNet (HNE) identified an outbreak of *Salmonella* Muenchen in January 2012 associated with a butcher shop. A cluster investigation was initiated after five notifications were received over a two week period. Through case interviews we identified an outbreak of gastroenteritis associated with a Christmas lunch and dinner. Thirteen people (59%) became ill with symptoms consistent with salmonellosis after consuming a variety of home and commercially prepared foods, including sliced meat from a leg of ham. There was one secondary case whom upon hospitalisation had S. Muenchen isolated from a stool specimen. A cohort study was conducted however a causative food could not be identified. It was reported that a leg of ham from a small local butcher was undercooked and deteriorated shortly after Christmas Day. All cases associated with the family function ate the ham. The remaining four S. Muenchen cases were interviewed. Two cases, not known to each other, also purchased and consumed leg ham from the same premises prior to their illness onset. A source of infection for the remaining two cases could not be identified. In total, 16/25 known possible and confirmed cases reported consuming leg ham from the butcher. The NSW Food Authority conducted an environmental investigation and identified a number of food hygiene and food safety issues, including improper sanitising of contact surfaces, cross contamination between raw meat and cooked hams during storage, cross contamination between raw meat and ready to eat ham by staff, an absence of cooking records for hams, and staff not washing hands after handling raw meat. It was also noted that inadequate disinfection also contributed to microbial growth in the product. As a result, the premises failed the audit and an improvement notice issued. (HUN0453)

Staphylococcus aureus infection associated with a sports event

On 2 June 2012, 22 individuals attending sports championships in Sydney became ill with gastrointestinal symptoms 1-5 hours after eating a common meal. Illness lasted 2-13 hours. The 22 were from a group of 40 people who ate the same meal. 35 people were interviewed. All interviewees had eaten an early dinner and 36.1% of the cohort ate lunch at the event dining facility. Attack rates were highest for chicken stir-fry (74.1%) and fried rice (71%). These two food items explained all of the cases. The risk ratios for chicken stir-fry and fried rice were not able to be calculated due to undefined cells i.e. there were no ill people who did not eat either chicken stir-fry or fried rice. No other food had a significant association. It was revealed that this fried rice was from the same batch which had been prepared and allegedly hot-held from the lunch meal. Stool samples were sent interstate for testing. *Staphylococcus aureus* was grown from one stool specimen and *Staphylococcus aureus* toxin was detected in another. The most likely source of food contamination was through food handlers either from a skin infection on uncovered hands or arms, or via coughing or sneezing over food prior to cooking. (WS31832)

Norovirus infection associated with consumption of raw oysters

On 30 October 2012, the NSW Food Authority received a report of 6/30 ill with gastroenteritis associated with a five day bush walking event on the North Coast of NSW, from 22-26 October 2012. Further reports of gastroenteritis affecting a husband and wife couple who were not a part of the bushwalking group were also reported. All eight cases consumed oysters from the local area from 24-25 October. This was the only commonly consumed food in this group. There had been no contact between the two groups or with ill people prior to the onset of illness. The median incubation period was 36 hours with a duration up to 48 hours. The clinical profile was consistent with norovirus. One stool sample was collected which was positive for norovirus genotype II by polymerase chain reaction (PCR). An environmental investigation identified a damaged sewerage pipe that had been leaking into the waterway from where the local oysters were harvested. Oyster samples from this waterway subsequently tested positive by PCR for norovirus genotype II. The oyster farming in the waterway was closed and the broken pipe was repaired. (HUN0467)

***Salmonella* Typhimurium (MLVA 3-17/16-9-12-523) infection cluster investigation associated with fresh chicken**

In July OzFoodNet NSW commenced an investigation into a *Salmonella* Typhimurium cluster with novel MLVA patterns of 3-17-9-12-523 and 3-16-9-12-523 (STm PT 135). A total of 216 cases were notified to NSW Health between 4/6/2012 and 28/12/2012. In the initial investigation, 41 cases were interviewed using a hypothesis generating questionnaire (HGQ). A trawling questionnaire was completed for 35 of these cases. The proportion of males was slightly higher than females (53%). The median age was 14.5, with a range of 0-86. Cases were predominantly Sydney based, with cases also in the Hunter New England, North Coast and Wollongong areas. From the HGQ and trawling questionnaire, foods of greatest interest included fresh pre-cut chicken (88%), fresh beef cuts (60%), carrots (71%), cooked onions (63%), apples (63%) and bananas (57%). Fresh chicken purchased from large supermarket retailers was a feature of this cluster. The NSW Food Authority conducted a trace back investigation based on place of purchase information provided by cases, and identified three predominant chicken suppliers. Of these suppliers, one noted that they had seen the same phage type in samples collected as part of their routine in-house microbiological program during the year and supplied the isolates for MLVA typing. These isolates were found to have the same MLVA pattern as the clinical isolates (STm MLVA 3-17-9-12-523). The supplier subsequently introduced a series of changes in the production process and the number of cases declined.

6.3 Institutional gastrointestinal outbreaks

In 2012, PHUs reported 803 gastroenteritis outbreaks in institutional settings likely to be due to person-to-person transmission of viral gastroenteritis. The outbreaks affected 13,803 people compared with 517 outbreaks affecting 9,359 people in 2011. Of these outbreaks, 385 (47.9%) occurred in aged care facilities (average 21 cases per outbreak), 299 (37.2%) in childcare centres (average 13 cases per outbreak), 101 (12.6%) in hospitals (average 14 cases per outbreak), 8 (1.0%) in residential care facilities (average 12 cases per outbreak), 4 (0.5%) in correctional facilities (average 6 cases per outbreak) and 6 (1.9%) in other settings (median 19 cases per outbreak) (Table 8).

Norovirus and rotavirus were the two most commonly identified pathogens in stool specimens collected during outbreak investigations. Norovirus was identified in one or more stool specimens in 223 (27.8%) outbreak investigations, and rotavirus in 47 (5.9%) outbreak investigations. In 29 outbreak investigations more than one pathogen was identified.

Other pathogens identified in one or more stool specimens collected during outbreak investigations were *Cryptosporidium* (1 specimen in 5 outbreaks), *Clostridium difficile* (range of 1-2 specimens in 17 outbreaks), *Campylobacter* (1 specimen in 5 outbreaks), *Giardia intestinalis* (1 specimen each in 2 outbreaks), adenovirus (1 specimen each in 3 outbreaks), *Blastocystis hominis* (1 specimen in 1 outbreak) and *Salmonella* (1 specimen in 3 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 fact, in 21/29 (72%) of the outbreaks where one of these pathogens was identified, it was identified in tandem with a viral pathogen.

The aetiology was unknown for 542 (67.5%) of the outbreaks. For 350 outbreaks (43.6%) 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 8: Number of (probable) viral gastroenteritis outbreaks and number of cases by institution, NSW 2008 – 2012

	2008		2009		2010		2011		2012	
Institution	**No. outbreaks**	**No. cases**	**No. outbreaks**	**No. cases**	**No. outbreaks**	**No. cases**	**No. outbreaks**	**No. cases**	**No. outbreaks**	**No. cases**
Aged Care	334	7536	317	7681	248	5166	248	5166	385	8105
Hospital	114	1693	116	1632	73	1603	73	1603	101	1447
Childcare	122	1233	143	1981	183	2441	183	2441	299	4002
School	3	7	3	68	3	29	3	29	2	36
Other	10	172	21	317	10	119	10	119	16	213
TOTAL	**586**	**10641**	**600**	**11679**	**517**	**9359**	**517**	**9359**	**803**	**13803**

7. Activity in NSW during 2012

7.1 Improving Surveillance

- Communication: The HNE, NSW and ACT OzFoodNet sites, the NSW Food Authority and the NSW Enteric Reference Laboratory at ICPMR held weekly teleconferences to discuss notifications and suspected clusters and outbreaks, and to communicate progress on recent investigations. Throughout the year, the enteric diseases / OFN team communicated on a regular basis with public health units and the NSW Food Authority regarding clusters and outbreaks of enteric diseases.
- Reporting: Fortnightly, quarterly and annual reports were prepared for OzFoodNet and distributed to public health units. Weekly, quarterly and annual reports were also prepared for publication on the NSW Health website and the NSW Public Health Bulletin.
- Special events: OzFoodNet (HNE) participated in the surveillance for gastroenteritis during the 13th Australian Transplant Games held in Newcastle in October.

7.2 OzFoodNet studies

- Review of MLVA timeliness in NSW completed and submitted to NSW Public Health bulletin
- Ongoing support to the national working group that developed and implemented objectives and processes for coordinated national surveillance of Listeria monocytogenes in humans
- Ongoing participation in the NCIMS outbreak working group reviewing the outbreak functionality of NCIMS. The group identified features required to support outbreak investigation, reviewed existing features and provided recommendations for desirable enhancements.
- Participant in Australian Research Council (ARC) funded Salmonella attribution study

8. References

[1] New South Wales Department of Health. Circular 2004/32: Notification of Infectious Diseases under the Public Health Act 1991. Issued 22 June 2004. Sydney: NSW.

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[5] 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.