

OzFoodNet

Enhancing Foodborne Disease Surveillance Across Australia

NSW FIRST QUARTER REPORT

January – March 2019



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ISSN: 2008-6145



Highlights Quarter 1, 2019

This report describes data for enteric conditions for quarter 1, 2019. The report is divided into four sections: enteric notifiable diseases highlights, *Salmonella* spotlight, foodborne outbreaks and gastroenteritis outbreaks in institutions. Data sources and analytical methods are described at the end of the report. Every endeavour has been made to ensure that the information provided in this document is accurate at the time of writing. However, infectious disease notification data are continuously updated and subject to change.

A total of 5,520 enteric conditions were notified to NSW Public Health Units in quarter 1, 2019. The most notable increase above average levels in this quarter was for **paratyphoid** (251% increase). A moderate increase was also noted in notifications of **typhoid** (53% increase). The increase in both conditions of enteric fever was driven by overseas travel to Central Asia. Of 51 overseas acquired enteric fever cases, 78% were acquired in India (40 cases), with fewer infections acquired in Bangladesh (2 cases), Pakistan (4 cases) and Nepal (1 case).

Notifications of **shigellosis** remained above average (233% increase compared to the five year average for the same period), primarily as a result of a change in the national surveillance case definition (from 1 July 2018), which introduced a new 'probable case' for cases with a detection of *Shigella* on nucleic acid testing only (without isolation of *Shigella* species). Of the 211 shigellosis cases notified in quarter 1, 2019, 74% were probable cases. Fifty-five cases met the confirmed case definition, for cases where *Shigella* is isolated on culture, which is slightly below average (13% decrease compared to the 5 year quarterly average).

There was one case of **Botulism** in an infant reported in a metropolitan Sydney local health district in quarter 1, 2019. The infant had no apparent high risk exposures, such as eating honey. The child was hospitalised and treated with botulinum immunoglobulin (BabyBIG), and is recovering.

Moderate increases in hepatitis E and Shiga toxin-producing *E. Coli* (STEC) were also observed in quarter 1, 2019 compared to the five year average for the same period. Moderate decreases were noted in cryptosporidiosis, listeriosis and Haemolytic Uremic Syndrome (HUS). Long term trends are not available for campylobacteriosis, which became notifiable on 7 April 2017, however notifications received in this quarter (n=2471) are slightly below the same quarter in the previous year (n=2555). No notifications of cholera were received. The long term trends for 13 notifiable enteric conditions in NSW are shown in Figures 1-3.

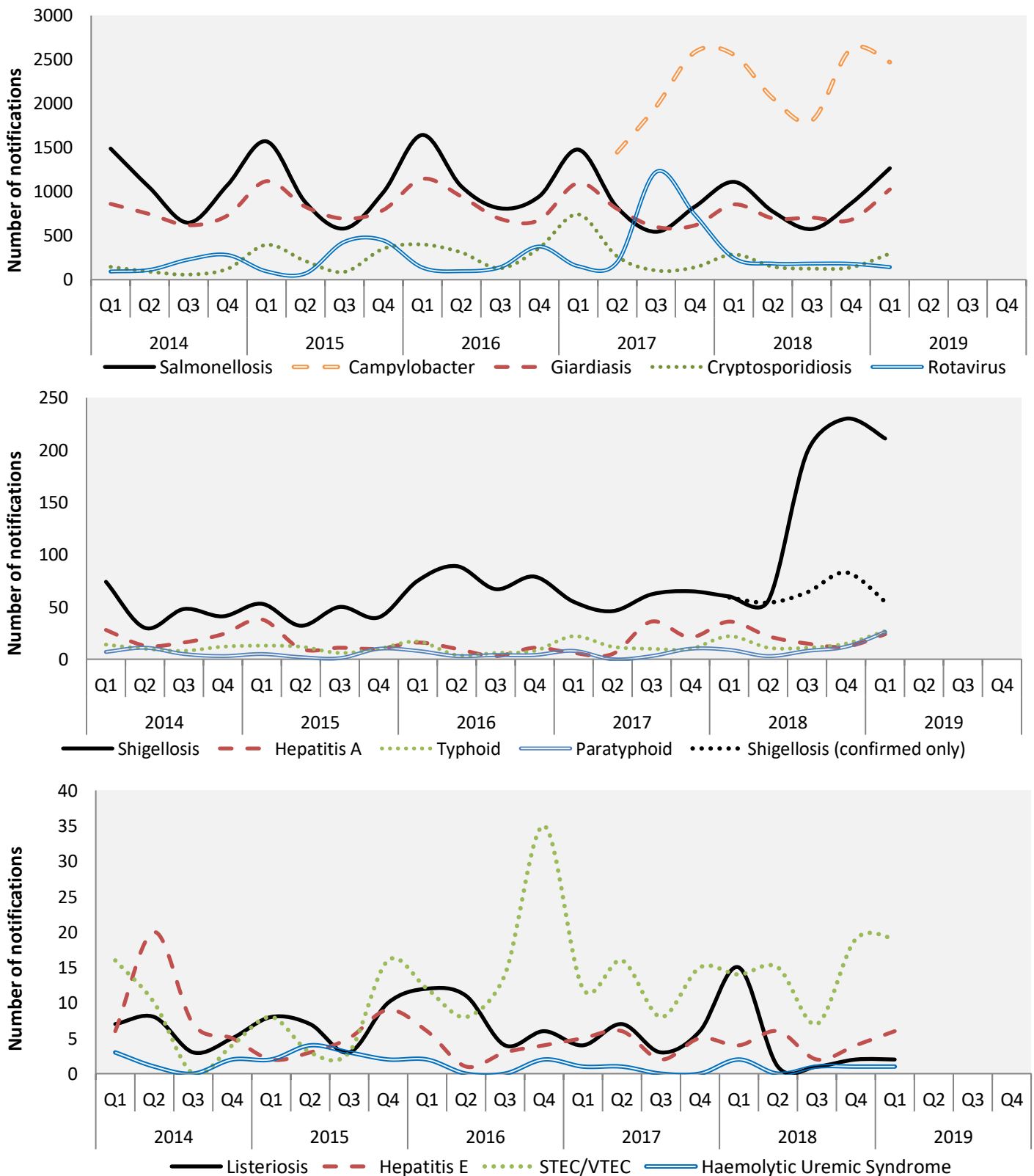
Salmonellosis notifications decreased slightly in quarter 1, 2019 (down 13%) compared to the five-year

quarterly average for the same period. This was due primarily to the continued decline in *Salmonella* Typhimurium cases (n=367, down 44% compared to the 5 year quarterly average of 650 cases). *Salmonella* Enteritidis was the second highest notified *Salmonella* serotype in quarter 1, 2019 (n=133). While overseas acquired cases increased (by 31% above the quarterly average), the greatest increase occurred among locally acquired cases (1338% above average). This increase is attributed to an outbreak in NSW which commenced in May 2018 and has led to the recall of eggs from multiple egg producers. At the end of quarter 1, an additional 100 cases were linked to the outbreak by whole genome sequencing (WGS), for a total of 160 confirmed and four probable outbreak cases, including 150 cases in residents of NSW. Further information is provided on page 11.

Seventeen **foodborne or suspected foodborne outbreaks** were reported affecting 152 residents of NSW (Table 1), of whom 18 were hospitalised (Table 4). A causative agent was linked to a food source in 12 outbreaks: scombroid poisoning linked to consumption of tuna steaks in two outbreaks, *Campylobacter* linked to chicken liver pate in one outbreak, *Salmonella* Typhimurium linked to eggs in five outbreaks (which were linked to the outbreak of *Salmonella* Typhimurium MLVA 5-17-9-13-490 reported in quarter 4 2018), and *Salmonella* Enteritidis linked to eggs in four outbreaks (which were linked to the outbreak of *Salmonella* Enteritidis in Sydney reported in quarters 3 and 4 2018). *Salmonella* Saintpaul was identified as the pathogen in one outbreak but the vehicle of transmission was unknown. A cluster of a toxin-like illness was linked to ham sandwiches in one outbreak, but the pathogen could not be confirmed. The three remaining outbreaks were of unknown aetiology and cause.

Highlights continued

Figures 1-3. Number of notifications by year, quarter and disease, Jan 2014 to Mar 2019^{1,2}



¹ Campylobacteriosis became notifiable on 7 April 2017. Data is likely to be incomplete for this quarterly report due to the methods of notification from laboratories.

² The shigellosis case definition changed on 1 July 2018 to include probable cases (PCR positive only). The trend number of confirmed cases only, which is more comparable to previous counts of shigellosis prior to the case definition change, is provided by the black dotted line.

Table 1. Notifiable enteric conditions, quarter 1 2019, by local health district

Notifiable Disease		CC	FW	HNE	IS	M	MNC	NBM	NNSW	NS	SES	SNSW	SWS	SYD	WNSW	WS	NSW ¹
Botulism	Notified, Q1 2019	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	5 y Q1 mean, 2014-2018	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Campylobacteriosis ^{2,3}	Notified, Q1 2019	97	5	246	188	132	70	109	136	395	317	62	140	181	105	288	2471
	5 y Q1 mean, 2014-2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cholera	Notified, Q1 2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5 y Q1 mean, 2014-2018	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cryptosporidiosis	Notified, Q1 2019	5	1	45	17	3	7	16	11	66	25	1	39	17	9	35	297
	5 y Q1 mean, 2014-2018	14.8	0.2	49.4	20.8	11.0	10.2	19.4	26.8	53.4	52.0	6.6	34.2	30.4	22.6	42.4	394.2
Giardiasis ³	Notified, Q1 2019	46	7	106	55	25	34	66	85	168	112	14	77	62	45	124	1026
	5 y Q1 mean, 2014-2018	42.4	1.0	134.0	57.0	33.6	25.0	41.0	39.0	175.6	174.0	13.8	65.6	94.4	37.8	81.4	1015.6
Hepatitis A	Notified, Q1 2019	0	0	2	3	1	0	2	0	3	0	0	6	3	1	3	24
	5 y Q1 mean, 2014-2018	0.6	0.4	0.0	0.8	0.4	0.0	0.8	0.2	2.4	3.8	0.0	4.6	2.6	0.6	7.6	24.8
Hepatitis E	Notified, Q1 2019	0	0	0	0	0	0	1	0	1	0	0	2	1	0	1	6
	5 y Q1 mean, 2014-2018	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	1.4	0.8	0.0	0.0	0.4	0.0	1.6	4.6
Listeriosis	Notified, Q1 2019	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
	5 y Q1 mean, 2014-2018	0.0	0.0	0.6	1.0	0.0	0.0	0.2	0.4	1.8	1.8	1.0	1.2	0.8	0.0	0.4	9.2
Paratyphoid	Notified, Q1 2019	1	0	0	1	0	0	2	0	0	4	0	4	2	0	12	26
	5 y Q1 mean, 2014-2018	0.0	0.0	0.8	0.0	0.0	0.0	0.4	0.2	1.2	0.8	0.0	0.2	2.0	0.0	1.8	7.4
Rotavirus	Notified, Q1 2019	7	0	7	7	2	1	5	0	21	13	3	27	21	0	29	143
	5 y Q1 mean, 2014-2018	1.8	0.2	9.2	2.2	3.2	1.0	7.6	9.2	23.6	27.0	1.0	17.4	15.0	4.0	22.4	144.8
Salmonellosis	Notified, Q1 2019	38	5	152	43	43	43	40	101	191	158	31	131	102	29	157	1266
	5 y Q1 mean, 2014-2018	75.6	6.8	153.4	71.6	55.6	60.0	55.2	107.2	197.0	201.8	31.4	140.6	118.4	37.2	146.4	1458.6
Shigellosis ⁴	Notified, Q1 2019	5	1	12	4	1	5	9	9	35	39	0	15	39	3	34	211
	5 y Q1 mean, 2014-2018	3.0	0.2	1.8	0.8	1.0	0.4	2.0	2.4	5.0	20.4	0.8	3.0	15.2	0.6	6.8	63.4
STEC	Notified, Q1 2019	0	0	2	0	2	0	0	2	2	0	5	0	0	2	3	19
	5 y Q1 mean, 2014-2018	0.2	0.0	2.2	1.2	1.6	0.0	0.6	0.2	0.2	1.4	1.6	0.2	0.6	0.4	1.8	12.4
HUS	Notified, Q1 2019	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
	5 y Q1 mean, 2014-2018	0.0	0.0	0.8	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.4	2.0
Typhoid	Notified, Q1 2019	1	0	1	0	0	0	0	0	3	2	0	6	1	0	13	27
	5 y Q1 mean, 2014-2018	0.2	0.0	0.4	0.0	0.0	0.0	0.8	0.2	1.6	1.6	0.2	2.2	2.0	0.0	8.4	17.6
Foodborne ⁵ Outbreaks	Notified, Q1 2019	1	0	4	1	0	1	1	0	2	5	0	3	1	0	3	17
	People affected	2	0	10	13	0	3	4	0	25	56	0	9	6	0	24	152
<i>Salmonella</i> Cluster	Notified, Q1 2019	1	1	7	2	2	2	6	1	6	7	0	6	6	1	4	12
	People affected	2	1	23	2	2	5	11	2	45	52	0	18	35	1	33	232

Legend: Blue shading refers to a 100% or greater increase in the number of notifications compared to the five year quarterly average. Notes: ¹ Total NSW numbers may differ to the sum of cases by LHD due to some cases not being attributed to an LHD and/or single outbreaks with cases across multiple LHDs; ² Campylobacteriosis became notifiable on 7 April 2017, 5 year quarterly average data not available (NA); ³ Data is likely to be incomplete for this quarterly report due to changes in the methods of notification from laboratories; ⁴ Case definition changed on 1 July 2018 to include 'probable' cases; ⁵ Foodborne or potentially foodborne outbreaks.

Table 2. Notifiable enteric conditions, quarter 1 2019, by overseas or local acquisition

Notifiable Disease	Place infection acquired	NSW, Q1 2019	5 yr Q1 mean 2014-2018	2019 % change
<i>Salmonella</i> Enteritidis	Locally acquired	92	6.4	1338%
	Overseas acquired	39	29.8	31%
	Unknown	2	3.0	-33%
Hepatitis A	Locally acquired	5	7.2	-31%
	Overseas acquired	19	17.4	9%
	Unknown	0	0.2	-100%
Hepatitis E	Locally acquired	1	0.6	67%
	Overseas acquired	5	3.8	32%
	Unknown	0	0.2	-100%
Paratyphoid	Locally acquired	1	0.0	0%
	Overseas acquired	25	7.2	247%
	Unknown	0	0.2	0%
STEC	Locally acquired	16	8.0	100%
	Overseas acquired	3	0.6	400%
	Unknown	0	3.8	-100%
Shigellosis ^a	Locally acquired	44	32.8	34%
	Overseas acquired	142	21.2	570%
	Unknown	25	9.4	166%
Typhoid	Locally acquired	1	0.8	25%
	Overseas acquired	26	16.8	55%
	Unknown	0	0.0	-

Legend: Blue shading refers to a 100% or greater increase in the number of notifications compared to the five year quarterly average.

^a The Shigellosis case definition changed on 1 July 2018 to include probable cases (PCR positive only). As per the [NSW Shigellosis Control Guidelines for Public Health Units](#), place of infection is only investigated for probable shigellosis cases if (a) they meet criteria for "considered to be at greater risk of ongoing transmission", or (b) they subsequently become a confirmed case.

Salmonella Spotlight

In quarter 1 2019, 23% of notified enteric infections were salmonellosis. The number of salmonellosis notifications was 13% lower in this quarter, compared to the 5 year quarterly average. Of the 1,266 *Salmonella* notifications, 29% were *S. Typhimurium* (367 cases). This is a 44% reduction in *S. Typhimurium* notifications compared to the five year average for this quarter (650 cases). Since 2011, there has been an overall decline in the number of *S. Typhimurium* notifications (Figure 5). This can in part be attributed to the NSW Food Safety Strategy 2015-2021, which aims to reduce *Salmonella* notifications by 30% through improved food safety practices, verification programs, and training across the retail sector.

S. Enteritidis notifications accounted for 11% of all *Salmonella* notifications in quarter 1, 2019. An increase above the quarterly average occurred among locally acquired cases (1338% above the quarterly average). This increase can be attributed to the ongoing outbreak of locally acquired *S. Enteritidis* that was identified in Q3, 2018 with cases continuing into Q1, 2019. The investigation of this outbreak is further described on page 11.

S. Wangata, ser 4,5,12:I and Paratyphi B bv Java were the highest notified serovars following *S. Typhimurium* and *S. Enteritidis* in quarter 1, 2019 (Figure 4). Ser 4,5,12:I is a monophasic variant of *S. Typhimurium*, which has been recognised as an cause of infection worldwide in recent years.

Figure 4. Proportion of *Salmonella* serovars, quarter 1, 2019 (N=1266)

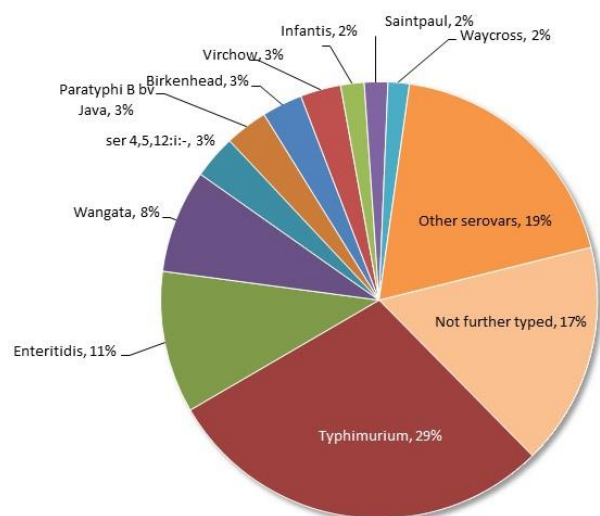
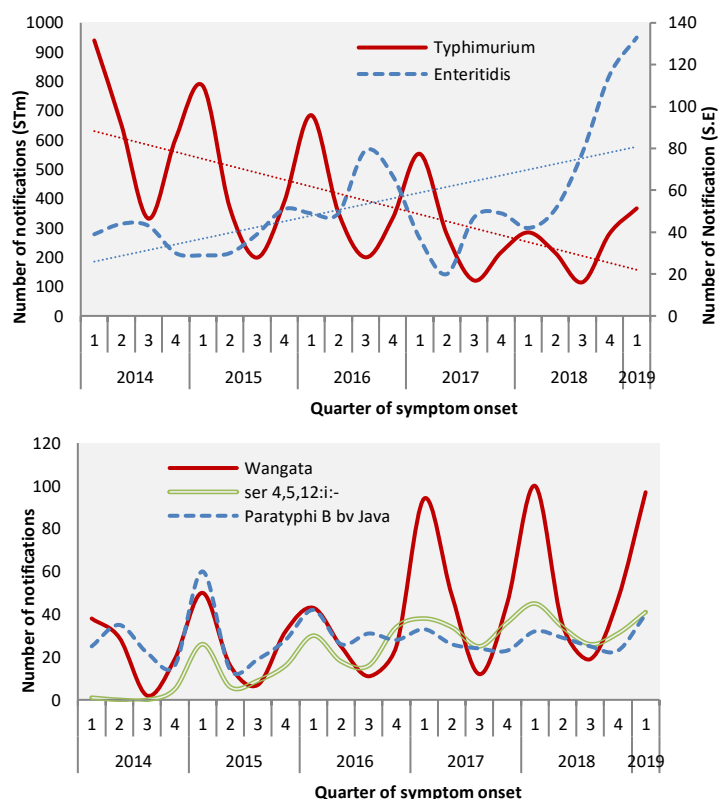


Figure 5. Trends, by quarters, for key *Salmonella* serovars in NSW from 2014-2019



The majority (97%) of *S. Typhimurium* isolates were typed using MLVA. In quarter 1, the most common MLVA profile (5-17-9-13-490) made up 27% of all the *S. Typhimurium* typed (Table 3) and was linked to an egg producer in the Hunter New England region. The investigation of this outbreak is further described on page 11.

Table 3. Top 12 *Salmonella* Typhimurium MLVA patterns, quarter 1, 2019 (N=356)

MLVA	Notifications	% of <i>S. Tm</i> typed
5-17-9-13-490	95	27%
3-13-12-9-523	10	3%
3-9-7-14-523	10	3%
3-14-10-8-523	8	2%
3-17-9-11-523	8	2%
6-14-15-12-490	8	2%
3-12-13-9-523	7	2%
3-12-12-14-523	6	2%
3-13-10-8-523	6	2%
4-16-11-0-517	5	1%
3-14-9-8-523	5	1%
3-17-8-12-523	4	1%
Top 12 total	172	48%

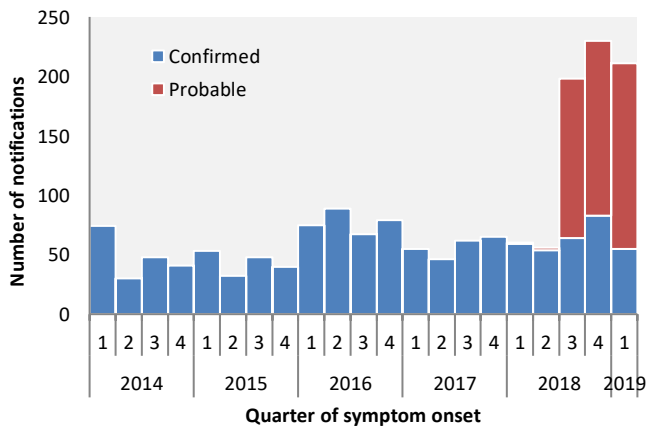
Shigella Spotlight

The national shigellosis case definition changed on 1 July 2018 to include 'probable cases.' Probable cases include those with a detection of *Shigella* on nucleic acid testing only (PCR). The ipaH gene used as the target for all current nucleic acid tests for *Shigella* is common to both *Shigella* species and enteroinvasive *Escherichia coli* (EIEC). Thus, we are unable to differentiate between shigellosis cases and EIEC cases in probable *Shigella* notifications.

This section describes shigellosis notifications in NSW by classification (confirmed, probable) to allow comparison with previous years. The number of shigellosis notifications, by classification, is shown for each quarter in Figure 6. Risk factors for probable cases will be incomplete as cases are not interviewed unless their treating doctor advises that the patient meets the criteria considered to be at greater risk of ongoing transmission.

In quarter 1, 2019, 55 confirmed cases of shigellosis were notified in NSW. This is a 13% decrease compared to the five year average of confirmed shigellosis notifications for this quarter (63 cases). In quarter 1, 2019, 156 probable cases of shigellosis were notified in NSW.

Figure 6. Number of shigellosis notifications by year, quarter and classification, Jan 2014 to Mar 2019



The proportion of infections acquired overseas was high among both confirmed and probable shigellosis cases in quarter 1, 2019 (55% and 72% respectively) (Table 4). However, the primary country of acquisition varied between confirmed cases (Indonesia, 27%) and probable cases (India, 38%) (Table 5).

Table 4. Overseas travel as a risk factor for infection reported by shigellosis cases notified in quarter 1, 2019, by classification

Classification	No	%
Confirmed cases	30	55%
Probable cases	112	72%

Table 5. Top 5 countries of acquisition, Shigellosis cases notified in quarter 1, 2019, by classification

Confirmed cases		
Country	No	% overseas acquired
Indonesia	8	27%
Philippines	4	13%
India	4	13%
Pakistan	3	10%
Peru	2	7%

Probable Cases		
Country	No	% overseas acquired
India	42	38%
Indonesia	15	13%
Fiji	8	7%
Philippines	6	5%
Pakistan	5	5%

Foodborne and suspected foodborne outbreaks

NSW Health investigates all potential foodborne disease outbreaks. Gastroenteritis and foodborne outbreaks are identified via a range of mechanisms, including reports from the public, general practitioners, institutions such as residential care facilities and child care centres, emergency departments, analysis of surveillance data, and reports to the NSW Food Authority's (NSWFA) Consumer Complaints Line. The most notable outbreaks are described on pages 10-12.

Table 4. Foodborne and potentially foodborne disease outbreaks investigated in NSW, quarter 1 2019

PHU ID	Month ¹	Setting	Agent responsible	No. ill	Lab confirmed	No. Hospitalised	Evidence	Responsible vehicles	Contributing factors
SWS201901	January	Restaurant	Scombroid	2	0	2	D	Tuna steak	Toxic substance or part of tissue
NS201901	January	Restaurant	<i>Salmonella</i> Enteritidis	14	10	4	D, M	Eggs	Cross contamination from raw ingredients, inadequate cleaning of equipment
WS201901	January	Private residence	<i>Salmonella</i> Enteritidis	6	1	1	D	Eggs	Unknown
SES62035	January	Restaurant	<i>Salmonella</i> Enteritidis	21	12	8	A, D, M	Fried ice cream (eggs)	Ingestion of contaminated raw products
HNE0527	January	Restaurant	<i>Salmonella</i> Typhimurium (MLVA 5-17-9-13-490)	3	3	2	D	Eggs	Unknown
HNE0526	January	Restaurant	<i>Salmonella</i> Typhimurium (MLVA 5-17-9-13-490)	2	2	1	D	Eggs	Unknown
MNC201901	February	Commercial caterer	<i>Salmonella</i> Typhimurium (MLVA 5-17-9-13-490)	3	3	2	D	Eggs	Unknown
SWS62124	February	Restaurant	<i>Campylobacter</i>	5	2	1	A, D	Chicken liver pate	Ingestion of contaminated raw products
HNE0528	February	Restaurant	<i>Salmonella</i> Typhimurium (MLVA 5-17-9-13-490)	3	2	0	D	Eggs	Unknown
NSW201901	February	Bakery	<i>Salmonella</i> Typhimurium (MLVA 5-17-9-13-490)	43	24	6	D	Eggs	Inadequate cleaning of equipment
SES62248	February	Restaurant	<i>Salmonella</i> Saintpaul	11	6	0	D	Unknown	Inadequate cleaning of equipment
HNE0529	February	Restaurant	Unknown (toxin suspected)	2	0	0	D	Ham sandwiches	Unknown
SES62299	February	Restaurant	Unknown	9	0	0	D	Unknown	Unknown
SES201902	February	Restaurant	Unknown	5	0	0	D	Unknown	Unknown

PHU ID	Month ¹	Setting	Agent responsible	No. ill	Lab confirmed	No. Hospitalised	Evidence	Responsible vehicles	Contributing factors
WS62374	February	Take-away	<i>Salmonella</i> Enteritidis	8	7	5	D	Eggs, Vietnamese rolls	Contaminated eggs onsite despite consumer advisory, inadequate cleaning of equipment
CC201902	March	Private residence	Scombroid	2	0	0	D	Tuna steak	Toxic substance or part of tissue
IS62436	March	Take-away	Unknown	13	0	1	D	Unknown	Unknown

¹ Month of outbreak is the month of onset of first case or month of notification/investigation of the outbreak.

Evidence category:

- A** Analytical epidemiological association between illness and 1 or more foods.
- D** Descriptive evidence implicating the suspected vehicle or suggesting foodborne transmission.
- M** Microbiological confirmation of agent in the suspected vehicle and cases.

Notable Foodborne Outbreaks

Key points

- Eggs are a healthy and nutritious food, however eggs need careful handling to keep them safe.
- To reduce the risk of *Salmonella* infection from eggs at home, people are advised to follow the NSW Food Authority's egg safety recommendations. Restaurants, cafes, bakeries, caterers and manufacturers that use raw (unpasteurised) egg to make dressings, desserts and sauces are required to follow *Food Safety Guidelines for the Preparation of Raw Egg Products* or use alternatives to raw eggs in ready to eat foods. Safer alternatives include commercially produced dressings and sauces, or pasteurised egg products.
- Whole Genome Sequencing (WGS) can identify further cases associated with outbreak investigations, and help to inform a national approach to outbreak investigation and control.
- Commercial dishwashers must be heated to at least 60°C to provide an additional sanitisation step which can kill bacteria, such as *Salmonella*.

NSW *Salmonella* Enteritidis outbreak linked to local eggs – MJOI201901

The initial investigation and subsequent recall of eggs relating to an increase in locally acquired *S. Enteritidis* cases in the metropolitan Sydney area was described in the quarter 3 and 4 2018 reports. Following the egg recall in September 2018, locally acquired *S. Enteritidis* cases with the outbreak strain continued to be detected during quarter 1 2019 and the increase remained under active investigation.

Four point source clusters were linked to the outbreak during quarter 1 2019, with two occurring in restaurants, one in a take-away venue and one at a private residence.

In the first point source cluster, at least 14 people from five unrelated dining groups became unwell after dining at an Asian restaurant in metropolitan Sydney (NS201901). Ten of these were tested and found to have a *S. Enteritidis* infection. Symptoms appeared between 30 December 2018 and 23 January 2019. Food history information varied, and no common food items were identified

between the unwell diners. The NSW Food Authority inspected the venue with the local council and identified hygiene and cross-contamination issues at the restaurant. The business was found to not be using adequate sanitiser and voluntarily agreed to close the premises to improve cleaning practices. Four food samples collected during the initial inspection returned positive for *S. Enteritidis*, including raw meat, cooked prawn, canned meat and ham. Findings indicated that poor sanitising and food handling is likely to have contributed to the spread of *S. Enteritidis*. A prohibition order was issued and the business closed until the contamination risk had been addressed.

Trace-back of ingredients supplied to the restaurant led to a NSW Food Authority inspection of the supplying egg farm. This egg producer had two properties which were both subsequently found to be contaminated with *S. Enteritidis* linked by WGS, to the original outbreak. A consumer advisory was issued on 1 February 2019. This egg producer was later found to have links to the first contaminated farm identified in September 2018. This was the first indication that the organism responsible for the outbreak could easily be spread from farm to farm.

Shortly after the first outbreak the NSW Salmonella SMS project (which sends an SMS to patients with a recent *Salmonella* diagnosis asking about their food exposures), identified a second point source outbreak, at a different restaurant, linked to this same egg farm. At least 21 people from six unrelated dining groups became unwell following dining at a restaurant in metropolitan Sydney (SES62035), of which 12 were confirmed to be *S. Enteritidis*. Symptom onsets occurred between 1 January 2019 and 29 January 2019. A survey was sent to 15 cases to establish any common food exposures. Of the 11 responses received, nine people reported consumption of fried ice cream (82%) and BBQ chicken (82%). The NSW Food Authority inspected the venue and found the restaurant was using raw eggs to make fried ice cream. NSW Food Authority samples of the fried ice cream were positive for *S. Enteritidis*. A prohibition order was served on the business and the venue was closed for two weeks. In the third point source cluster, eight people from seven unrelated dining groups became unwell after consuming take-away at a venue in metropolitan Sydney (WS62374). Of these, six were confirmed to be *S. Enteritidis*, one *Salmonella* PCR positive only, and one did not submit specimens for testing. Symptom onsets occurred between

15 February 2019 and 21 February 2019. All seven *Salmonella* cases reported consuming Vietnamese rolls, of which five ate pork rolls, one ate a chicken roll, and one ate a roll with unspecified meat. NSW Food Authority conducted an inspection of the venue and found the take-away used eggs supplied by the producer identified in the above outbreaks. The eggs should not have been onsite. The take-away was issued a prohibition order.

In parallel to the above investigations, NSW Department of Primary Industries (DPI) and NSW Local Land Services (LLS) worked with egg farmers to address the risk of *S. Enteritidis* on farm. This included issuing biosecurity directions that limited access to and movement on affected farms as well as depopulation. Monitoring led to identification of a third egg farm that, in early February 2019, was confirmed to have *S. Enteritidis* detections and was depopulated. Through ongoing sampling, a feeder farm related to this farm was also confirmed to have *S. Enteritidis* detection. All of the five properties found to be affected since the start of the outbreak (since September 2018) were found to have links to each other through transfer of materials or people.

To the end of quarter 1 2018, there were a total of 160 confirmed cases of this outbreak strain of *S. Enteritidis* and four probable outbreak cases, including 150 cases notified in residents of NSW.

Towards the end of the quarter, seven cases in residents of states outside of NSW were found to be genetically related to the NSW outbreak by WGS. A multi-jurisdictional outbreak investigation commenced on 19 March 2019. The infections were traced back to an interstate egg farm with trading links to a contaminated NSW egg farm, before the introduction of biosecurity orders on the NSW property.

Investigation into the source of introduction and the spread of the infection continued into the second quarter of 2019, leading to the subsequent [recall](#) of eggs of other brands. Further information will be provided in the next quarterly report. Active surveillance for and investigation of locally-acquired *S. Enteritidis* infections is ongoing.

***Salmonella* Typhimurium outbreak with MLVA profile 5-17-9-13-490 linked to an egg farm**

The initial investigation into an outbreak of *Salmonella* Typhimurium with novel MLVA profile 5-17-9-13-490 was described in the quarter 4 2018 report. The outbreak strain continued to be detected during quarter 1 2019 and remained under active investigation.

Five point source clusters linked to the outbreak were identified during quarter 1 2019, with three occurring in restaurants, one in a bakery, and one in a commercial catering business serving older people. Four of these point sources were small in size, with only two or three people able to be identified. Regardless, each cluster was investigated by either NSW Food Authority or local council. While no environmental samples were positive for *Salmonella* at any of these food venues, traceback of ingredients did find that eggs in use at the time of these illnesses were supplied by the same egg grading facility.

The fifth point source outbreak in this investigation was significantly larger. At least 43 people from 17 unrelated dining groups became unwell with gastroenteritis symptoms after consuming, amongst other things, cake items purchased at ten retail outlets of the same bakery chain across metropolitan Sydney (NSW201901). Twenty-four people were confirmed to have a *Salmonella* infection, of which 23 were confirmed with *Salmonella* Typhimurium MLVA profile 5-17-9-13-490. One infection was confirmed by PCR and could not be typed. The remaining people reported to be unwell were not tested. Six of these cases were linked by WGS to the broader outbreak. Half of the confirmed *Salmonella* cases were male, and were aged between two to 85 years. Onset of symptoms occurred between 3 February and 21 February 2019, with a median incubation period of one day. Eleven people presented to a hospital, and the median illness duration was seven days. A variety of cake items were reported to have been consumed, with many reported to feature a cream element. The NSW Food Authority investigated the outbreak with the assistance of local councils. The central kitchen of the cake supplier was found to be using large industrial size mixers to mix cake mix (including raw egg ingredients) and/or ready to eat fillings. One potential issue identified on inspection was ineffective sanitation, including dishwashers not reaching adequate temperatures (60°C). This was identified as a potential source of contamination. However, swabs and samples collected from the central kitchen did not confirm a link to the outbreak as *Salmonella* Typhimurium was not detected.

At the end of quarter 1 2019, there were a total of 134 NSW residents affected by this outbreak of *S. Typhimurium* with MLVA pattern 5-17-9-13-490 and related MLVA patterns, and an additional 13 people in neighbouring jurisdictions outside of NSW.

A single common egg farm was identified during the NSWFA investigation of point source clusters, and nine

environmental samples from the farm tested positive for *S. Typhimurium* MLVA 5-17-9-13-490 during quarter 1 2019. The NSW Food Authority worked with the farm to enhance sanitisation and cleaning of technical equipment to reduce *Salmonella* transmission risks.

***Campylobacter* linked to chicken liver pate - SWS62124**

A small cluster of *Campylobacter* in a metropolitan Sydney local health district was investigated by the local public health unit in February 2019. Five people from a group of 16 became unwell after attending a birthday lunch celebration at a restaurant on 26 January 2019. Two of the unwell people tested positive for *Campylobacter*, and one person was hospitalised. Those positive for *Campylobacter* were aged between 60 to 90 years of age.

All five unwell people reported consuming chicken liver pate, along with one person who remained well. Univariate analysis of food histories indicated that the people who consumed a meal containing chicken liver pate were 4.8 times more likely to be ill, than those who did not eat, however this was not statistically significant.

One week after this event, a worker at the restaurant was hospitalised with *Campylobacter* infection. However the investigation by the public health unit and NSW Food Authority found that despite the epi-link, the worker did not have any involvement in the kitchen during the incubation period. It is thought that the worker was most likely exposed to the same food source. Efforts were made to obtain isolates from at least two samples for WGS and phylogenetic analysis. Since only one culture positive isolate was available, the phylogenetic analysis was not able to be completed.

The local council inspected the venue and found that the chicken liver pate was undercooked, and this item was subsequently removed from the menu.

***Salmonella* Saintpaul linked to a restaurant - SES62248**

A cluster of *Salmonella* Saintpaul in a metropolitan Sydney local health district was investigated by the local public

health unit in February 2019. The cluster was identified with the assistance of responses to the NSW *Salmonella* SMS project. Eleven people from five unrelated dining groups became unwell with gastroenteritis symptoms after dining at a restaurant between 2 and 5 February 2019. Six of the unwell people had a confirmed infection with *Salmonella*, with five cases serotyped as *Salmonella* Saintpaul and one case positive by PCR only. The median age of people diagnosed with salmonellosis was 21 years (range: three to 49 years of age), and 66% were female. The unwell people reported onset of symptoms between 4 February and 12 February 2019.

People in three of the five dining groups reported ordering and sharing salmon dishes, which was the only common food type established during the investigation. Two of the five dining groups reported ordering dishes with a "soft" egg on top.

The NSW Food Authority inspected the venue, and found the business was not cooking eggs sufficiently. A dishwasher on the premises was also found to not be reaching adequate temperatures (60°C). This potentially played a role in the infections as high-temperature commercial dishwashers are designed to heat water to high enough temperatures to sanitise dishes, removing visible impurities and bacteria such as *Salmonella*. All swabs and samples collected at the venue during the inspection were negative for *Salmonella*. A prohibition order was issued regarding the service of raw and under-processed eggs, and undercooked eggs were removed from the menu.

In all of the above cases compliance and enforcement action was taken against food business where they did not meet regulatory requirements. That action was taken in accordance with the [NSW Food Authority compliance and enforcement policies](#).

Institutional gastrointestinal outbreaks

From 1 January to 31 March 2019, a total of 261 outbreaks of suspected viral gastrointestinal illness in institutions were reported in NSW affecting at least 3520 people (Table 6). This represents an increase of 75% compared to the average number of outbreaks reported during the same quarter from 2014 to 2018 (n=148), and an increase of 80% compared to the mean number of people affected as a result of the gastroenteritis outbreaks during the same quarter from 2014 to 2018 (n=1953).

Of the 261 outbreaks, 207 (79%) occurred in child care centres, 39 (15%) in aged care facilities, nine (4%) in hospitals and six (2%) in other facilities (Table 6). The number of outbreaks during quarter 1 was higher than the five year quarterly average across all institution types: outbreaks in child care centres were 102% above average, outbreaks in hospitals were 114% above average, and outbreaks in aged care facilities were 1% above average. (Figure 8). The number of outbreaks in child care centres reported during quarter 1 has increased each year since

2014. At least part of the increase is thought to be owing to better reporting.

Overall, 15% of staff members and 18% of non-staff became sick during gastroenteritis outbreaks in quarter 1 (Table 6). The highest attack rate for gastrointestinal disease for staff was in child care centres (17%) and for non-staff was in hospitals (42%). Outbreaks lasted nine days on average (Table 6).

One or more stool samples were collected in 63 (24%) of the outbreaks. Norovirus was identified in 30 (48%) of these outbreaks. Cryptosporidiosis was investigated as the cause of one small outbreak in a child care centre, and a site inspection by the local public health unit led to a number of recommendations for improvements to the facilities at the centre. The majority of results of the other samples were negative, or not reported (Table 6).

Public health units monitor gastroenteritis outbreaks in institutions and provide advice on control measures.

Figure 8. Number of reported outbreaks of gastrointestinal illness in institutions, quarter 1 2019 compared to the 5 year quarterly average, by month and facility type

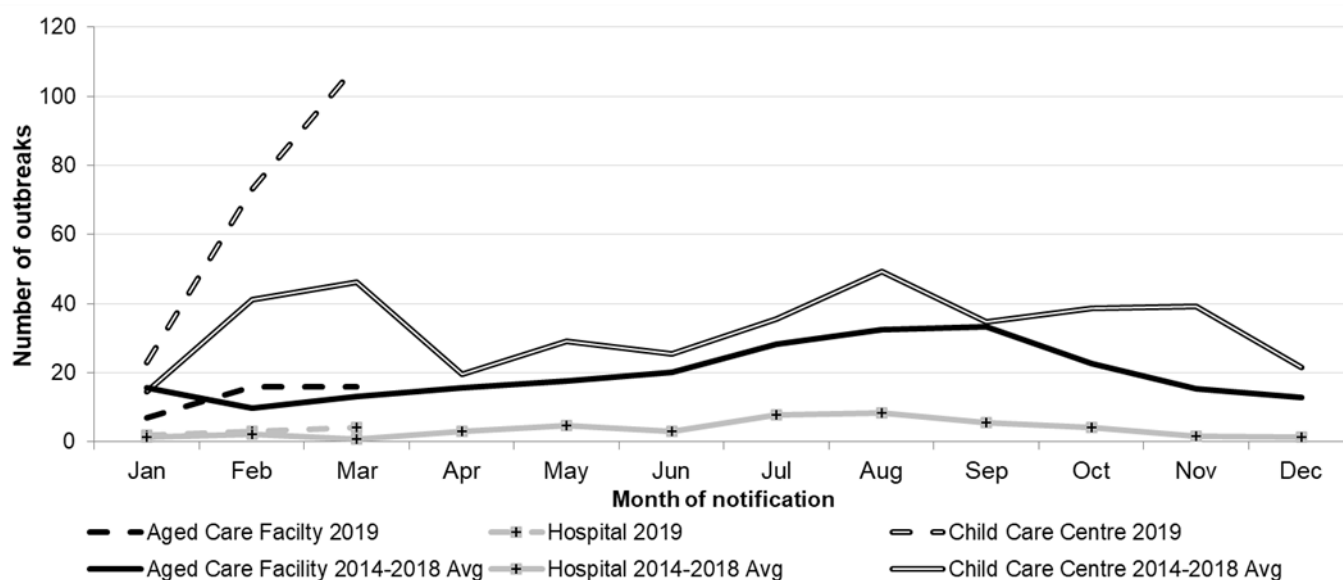


Table 5. Outbreaks of gastroenteritis in institutions reported in NSW, quarter 1 2019, by local health district²

Facility type	Q1 2019	FW	HNE	IS	M	MNC	NBM	NS	SES	SNSW	SWS	SYD	WNSW	WS	NSW
ACF	No. of outbreaks	0	7	4	2	2	2	4	10	0	2	3	1	2	39
	Staff affected	0	30	5	7	5	34	21	32	0	0	9	2	4	149
	Non-staff affectede	0	55	40	35	30	33	75	146	0	7	35	3	20	479
CCC	No. of outbreaks	0	34	28	14	0	19	27	19	6	2	22	2	34	207
	Staff affected	0	141	85	42	0	45	51	36	19	4	46	9	60	538
	Non-staff affectede	0	377	356	177	0	149	300	186	50	12	223	45	281	2156
Hospital	No. of outbreaks	1	0	0	0	0	1	1	4	0	0	0	0	2	9
	Staff affected	1	0	0	0	0	5	0	10	0	0	0	0	9	25
	Non-staff affecte	5	0	0	0	0	0	7	39	0	0	0	0	43	94
Other ¹	No. of outbreaks	0	1	0	0	0	1	3	0	0	0	1	0	0	6
	Staff affected	0	3	0	0	0	0	7	0	0	0	5	0	0	15
	Non-staff affecte	0	5	0	0	0	15	43	0	0	0	2	0	0	65

¹ Other= camp, school, disability service, sports centre

² CC and NNSW did not report any outbreaks of gastroenteritis in institutions in this period

Table 6. Outbreaks of gastroenteritis in institutions reported in NSW, quarter 1 2019, by facility type

Setting	No of Outbreaks (n)	Staff Affected (n: attack rate)	Non-staff affected (n: attack rate)	Average duration of outbreak (days)	Outbreaks with stool collected (n: %)	Outbreaks with pathogen found (n: pathogen found)
ACF	39	149: 7%	479: 17%	6	27: 69%	16: norovirus
CCC	207	538: 17%	2156: 18%	10	25: 12%	9: norovirus & 1: cryptosporidiosis
Hospital	9	25: 10%	94: 42%	6	9: 100%	5: norovirus
Other ¹	6	15: 14%	65: 20%	8	2: 33%	-
Total	261	727: 15%	2794: 18%	9	63: 24%	30: norovirus & 1: cryptosporidiosis

¹ Other= camp, school, disability service, sports centre

METHODS

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).

Notifiable enteric diseases in NSW

Under the Public Health Act 2010 (NSW), the following enteric diseases and conditions are notifiable in NSW: botulism, campylobacteriosis, 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. Individual cases of other enteric diseases such as 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).

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.

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.

Methods

Data for all notifiable enteric diseases and conditions was extracted from NCIMS using Secure Analytics for Population Health Research and Intelligence (SAPHaRI)ⁱ using the calculated date of onset of disease. This is a composite field of the true date of onset provided by the notifying doctor or obtained during case follow-up, the date of specimen collection for laboratory notified cases, the date of notification by the doctor or laboratory, or the date of receipt of notification, whichever is earliest.

The counts of each notifiable enteric disease for Quarter 1 2019 were compared with the average annual count for the same quarter for the years 2014 to 2018 using SAS Enterprise Guide and MS Excel at Health Protection NSW.

Individual factors such as possible risk exposures are reported for cases where that information has been collected by the public health unit. "Unknown" place of acquisition usually indicates that the person was in more than one place during their exposure period, so that the place of acquisition cannot be definitively assigned. Possible risk factors are those reported by the case on questioning, and cannot be attributed as the source unless further investigation is undertaken.

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

GLOSSARY

ACF	Aged-care facility	NBM	Nepean Blue Mountains LHD
CC	Central Coast LHD	NNSW	Northern NSW LHD
CCC	Childcare centre	NS	Northern Sydney LHD
FW	Far West LHD	NSW	New South Wales
HNE	Hunter New England LHD	NSWFA	NSW Food Authority
HUS	haemolytic uraemic syndrome	Q	Quarter
ICPMR	Institute of Clinical Pathology and Medical Research	SES	South Eastern Sydney LHD
IS	Illawarra Shoalhaven LHD	SNP	single nucleotide polymorphisms
LHD	Local Health Districts	SNSW	Southern NSW LHD
M	Murrumbidgee LHD	STEC	Shiga toxin-producing <i>Escherichia Coli</i>
MLVA	Multi-locus variable number tandem repeat analysis	SWS	South Western Sydney LHD
MLST	Multi-locus sequence typing	SYD	Sydney LHD
MNC	Mid North Coast LHD	WNSW	Western NSW LHD
N	Number	WS	Western Sydney LHD
NA	Not available	Yr	Year