OzFoodNet

Enhancing Foodborne Disease Surveillance Across Australia

NSW ANNUAL REPORT 2020

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GLOSSARY

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

SUMMARY – ENTERIC INFECTIONS IN NSW

This report summarises NSW enteric disease surveillance data for viral, bacterial and parasitic pathogens for 2020, changes in notifications over time, and other activities in 2020. NSW Health undertakes surveillance of enteric diseases to monitor trends and identify outbreaks, with the aim of implementing control measures to prevent further illness within the community. Disease notification represents only a portion of cases in the community, as it usually relies on people seeing a doctor, and the doctor ordering a test that detects the infection, to generate a notification.

Note: During the COVID-19 response in 2020 the control guidelines for public health unit management of some enteric conditions were temporarily amended. Therefore some information will not be available during this reporting period.

Cases of infection and incidence 2020

Notifications of enteric conditions: 15,355

Reported hospitalisations: 435

Reported deaths: 6

Notification rate per 100,000 population: 186.3

Notified incidence and reported hospitalisation due to enteric pathogens in NSW, 2020

	5Yr annual mean	N 2020	% change	Notified Rate	Reported Hospitalisation[a]
Campylobacteriosis[b]	N/A	9063	N/A	110.0	11
Salmonellosis	3785.0	2915	-23%	35.4	183
Giardiasis	3243.8	1767	-46%	21.4	0
Cryptosporidiosis	973.2	544	-44%	6.6	39
Shigellosis	421.6	465	10%	5.6	77
Rotavirus	1339.2	393	-71%	4.8	7
STEC/VTEC	56.4	116	106%	1.4	48
Typhoid	50.4	32	-37%	0.4	25
Listeriosis	23.4	18	-23%	0.2	16
Hepatitis A	63.6	17	-73%	0.2	11
Paratyphoid	25.4	13	-49%	0.2	10
Hepatitis E	18.6	9	-52%	0.1	6
Haemolytic Uremic Syndrome	5.0	2	-60%	0.02	2
Botulism	1.0	1	0%	0.01	0
Cholera	1.0	0	-100%	0	0
TOTAL	N/A	15355	NA	186.3	435

[a] Hospitalisations may be underestimated as counts are limited to those infections investigated by a public health unit

[b] Campylobacteriosis became a notifiable condition in April 2017. Data from previous years is not available, thus a 5yr mean cannot be calculated.

Notable changes in 2020 (compared to 5 year annual average, 2015-2019)

- Campylobacteriosis was the highest enteric infection notified in 2020. Since its introduction as a notifiable condition in NSW in April 2017, Campylobacteriosis notifications have exceeded all other enteric infections (page 6).
- STEC notifications increased by 106% compared to the five year annual average. This increase can be partly attributed to introductions of a more sensitive test across laboratories in NSW (pages 14).

Reported enteric disease outbreaks

- 33 foodborne or potentially foodborne disease outbreaks were reported affecting at least 470 people; a 43% decrease in the number of reported foodborne or probable foodborne disease outbreaks compared to 2019 (n=58)
- 841 viral or probable viral gastroenteritis outbreaks in institutions were reported, affecting at least 11651 people; a 31% decrease in the number of reported gastroenteritis outbreaks in institutions compared to 2019 (n=1225)

CAMPYLOBACTERIOSIS

Campylobacteriosis is a disease caused by *Campylobacter* bacteria, usually through contaminated food, untreated water and contact with unwell animals. It usually causes diarrhoea, abdominal pain, fever, malaise, nausea, and sometimes vomiting. Notified cases are usually only investigated if they are part of, or suspected to be part of, an outbreak.

Summary 2020

- Case count: 9063[a]
- Reported hospitalisations: 11[b]
- Reported deaths: 1
- Notification rate per 100,000: 110.0

a. Case numbers are correct at the time of writing. It is noted that some notifications are outstanding from smaller laboratories and numbers may increase.
b. Hospitalisations may be underestimated as most cases are not interviewed by public health officers

Overall trend

There was a 15% decrease when compared to the previous year (n=10689). Campylobacteriosis became a notifiable condition on 7 April 2017.

Groups with highest notification rate in 2020

Age: <5 years (10.8% of cases – 181.0 per 100,000)

Sex: Male (56% of cases – 123.5 per 100,000)

LHD: Murrumbidgee (6% of cases – 224.0 per 100,000)

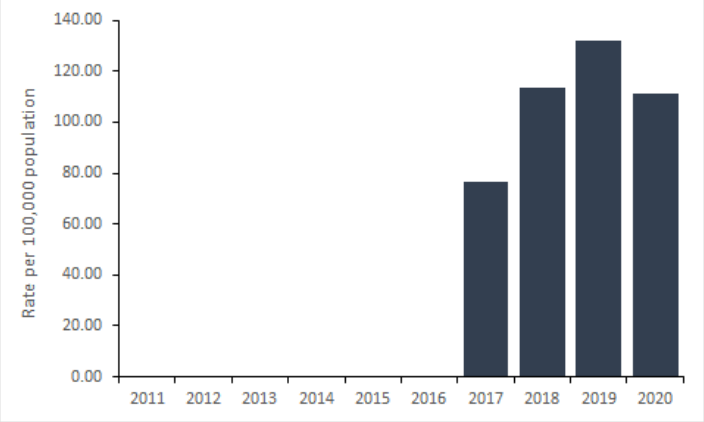
Seasonality

Campylobacteriosis notifications were highest in the warmer months, particularly in November (n=1031) and January 2020 (n=983)

Outbreaks

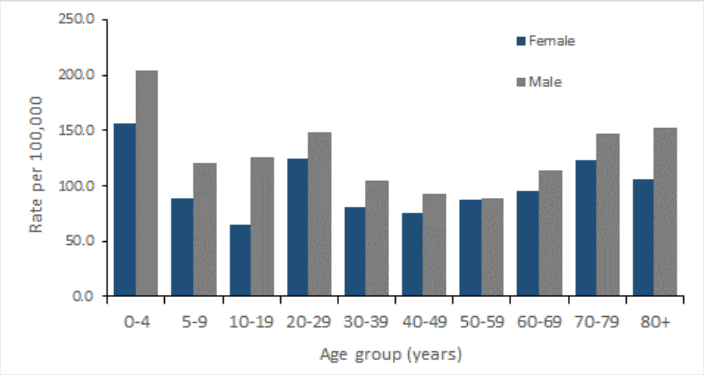
Three outbreaks were detected in NSW in 2020 affecting 7 people. (pages 20-27)

Notification rate per 100,000 population by year, 2018 – 2020 , NSW



* Campylobacteriosis became a notifiable condition on 7 April 2017, therefore 2017 notifications only represent 9 months of data.

Notification rate per 100,000 population by age category and sex, 2020, NSW



Number of cases and rates (per 100,000) by Local Health District, 2020, NSW

	Count		Rate	
LHD	**5Yr mean**	**2020**	**5yr mean**	**2020**
CC	n/a	363	n/a	102.0
FW	n/a	33	n/a	109.0
HNE	n/a	824	n/a	86.1
IS	n/a	525	n/a	125.0
MNC	n/a	263	n/a	116.0
MURR	n/a	548	n/a	224.0
NBM	n/a	480	n/a	122.0
NNSW	n/a	433	n/a	139.0
NS	n/a	1293	n/a	135.0
SES	n/a	1131	n/a	117.0
SWS	n/a	563	n/a	53.7
SNSW	n/a	380	n/a	174.0
SYD	n/a	492	n/a	70.1
WNSW	n/a	571	n/a	200.0
WS	n/a	1164	n/a	109.0
NSW	**n/a**	**9063**	**n/a**	**110.7**

* Became notifiable on 7 April 2017; no 5yr average can be reported

SALMONELLOSIS

Salmonellosis is caused by infection with *Salmonella* bacteria. In Australia, most *Salmonella* infections occur after eating contaminated food, and sometimes after close contact with another person or animals with salmonellosis. Notified cases are usually only investigated if they are part of, or suspected to be part of, an outbreak.

Summary 2020

- Case count: 2915
- Reported hospitalisations: 183*
- Reported deaths: 1
- Notification rate per 100,000: 35.46

*Hospitalisations may be underestimated as most cases are not interviewed by public health officers

Overall trend

23% decrease in the 2020 notification rate compared to the 5 year annual mean (48.2 per 100,000)

Groups with most notifications in 2020

- Age: <5 years (23.7% of cases – 127.7 per 100,000)
- Sex: Female (52% of cases – 36.6 per 100,000)
- LHD: Northern NSW (9.8% of cases – 92.3 per 100,000)

Seasonality

Consistent peaks in summer months (Dec-Feb)

Top serotypes in 2020 (% of all types *Salmonella*) - % change compared to 2019

1. Typhimurium (38%) - ↑24%
2. Wangata (9%) - ↑ 17%
3. Saintpaul (4%) - ↑79%
4. Enteritidis- (4%) - ↓69%
5. Virchow - (4%) - ↓12%

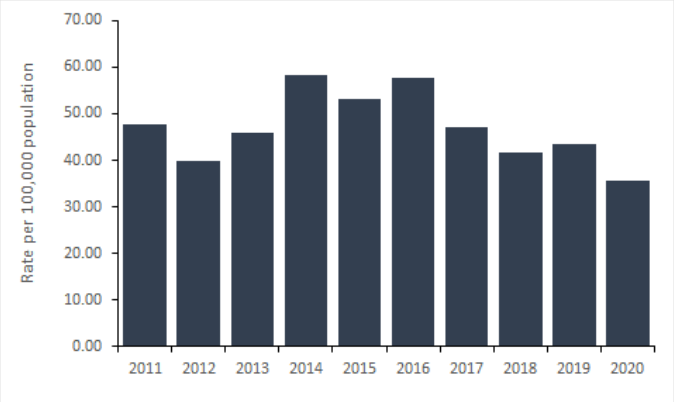
Outbreaks

10 foodborne outbreaks caused by *Salmonella* were detected in NSW in 2020, affecting 305 people (10.5% of all *Salmonella*) (pages 20-27)

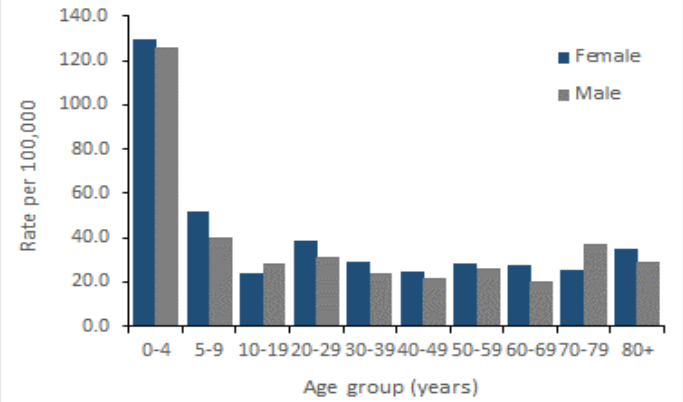
Deaths

One death related to salmonellosis infection was recorded in 2020 in an adult. This person had other medical issues that were the cause of the death, and the salmonellosis was noted as a potential exacerbating factor.

Notification rate per 100,000 population by year, 2011 – 2020, NSW



Notification rate per 100,000 population by age category and sex, 2020, NSW



Number of cases and rates (per 100,000) by Local Health District, 2020, NSW

	Count		Rate	
LHD	**5Yr mean**	**2020**	**5yr mean**	**2020**
CC	167	128	48.9	36.1
FW	17	10	55.4	33.1
HNE	412	391	44.4	40.8
IS	177	132	43.0	31.3
MNC	147	119	66.9	52.5
MURR	148	122	61.1	49.9
NBM	156	144	41.5	36.6
NNSW	277	288	91.7	92.3
NS	530	307	57.0	31.9
SES	470	280	50.5	29.0
SWS	389	341	39.2	32.5
SNSW	91	65	43.2	29.7
SYD	294	175	43.8	24.9
WNSW	105	116	37.2	40.6
WS	406	297	41.1	27.8
NSW	**3786**	**2915**	**48.2**	**35.6**

Salmonellosis continued

Salmonella serotypes

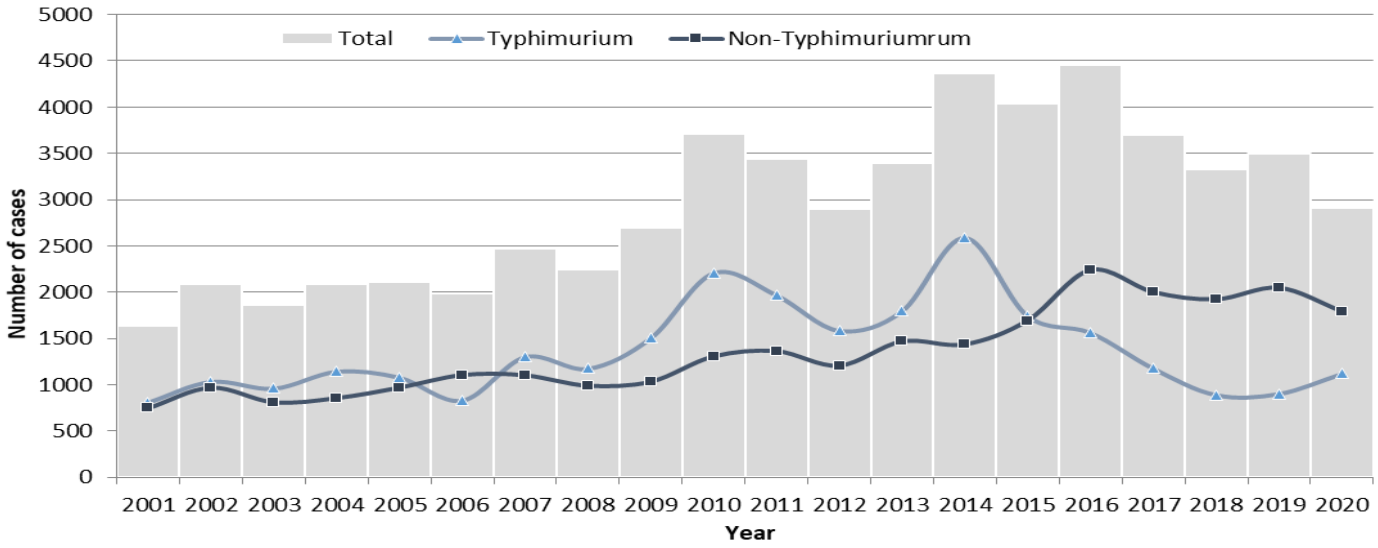
Top 5 *Salmonella* serotypes in NSW, 2016-2020 (number of notifications)

	2016	2017	2018	2019	2020
1	Typhimurium (1565)	Typhimurium (1179)	Typhimurium (893)	Typhimurium (901)	Typhimurium (1120)
2	Enteritidis (243)	Wangata (201)	Enteritidis (280)	Enteritidis (363)	Wangata (261)
3	Virchow (167)	Birkenhead (160)	Wangata (201)	Wangata (223)	Saintpaul (152)
4	Saintpaul (142)	Enteritidis (156)	Ser 4,5,12:i:- (137)	Paratyphi B bv Java (120)	Enteritidis (114)
5	Paratyphi B bv Java (125)	Ser 4,5,12:I (134)	Birkenhead (121)	Virchow (119)	Virchow (105)

Salmonella Typhimurium trends

In 2020, *Salmonella* Typhimurium notifications increased by 24% when compared to 2019, primarily due to one large outbreak (page 25).

Number of *Salmonella* Typhimurium infections compared to other *Salmonella* serotypes in NSW, 2001-20.



SALMONELLA ENTERITIDIS INFECTION

While *Salmonella* Enteritidis is endemic in commercial poultry farms in most countries, it was not thought to be endemic in Australia until 2018 when an outbreak occurred originating from NSW egg farms. All notified cases of *Salmonella* Enteritidis are investigated in NSW to determine likely place of acquisition (local vs overseas); locally acquired cases are further investigated in conjunction with the NSW Food Authority.

Summary 2020

- Case count: 113
- Reported hospitalisations: 25
- Reported deaths: 0
- Notification rate per 100,000: 1.4

Overall trend

53% decrease in the 2020 notification rate compared to the 5 year annual mean (3.0 per 100,000)

Groups with highest notification rate in 2020

Age: <5 years (18% of cases – 3.7 per 100,000)

Sex: Female (50% of cases – 1.35 per 100,000)

LHD: South West Sydney (27% of cases – 2.9 per 100,000)

Seasonality

Typically peaks in October, however in 2020 peak occurred in February.

Place of acquisition in 2020

In NSW: 66%

In Australia & outside NSW: 1%

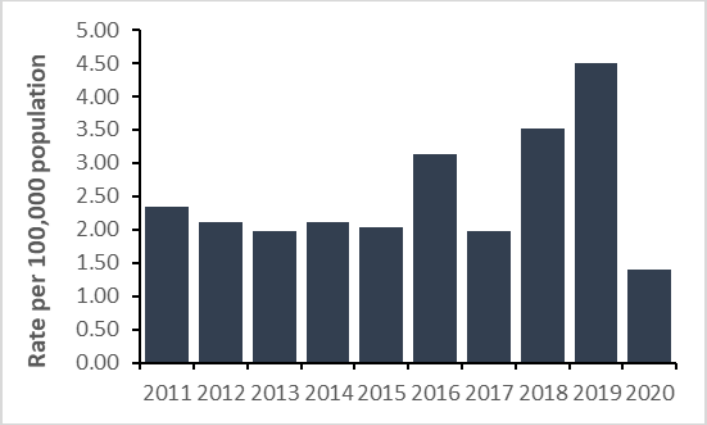
Overseas: 27%

Unknown: 6%

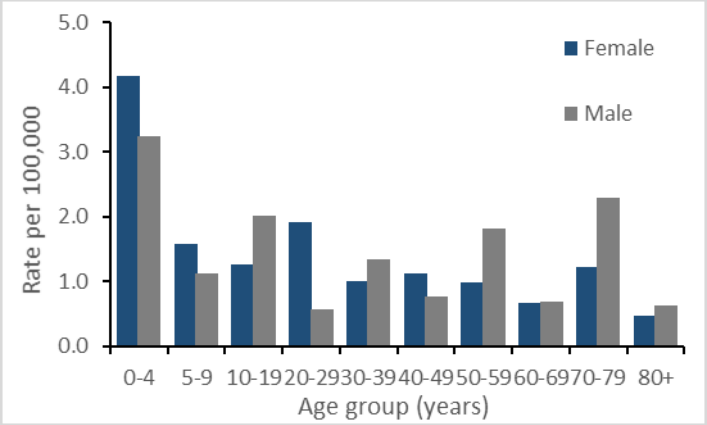
Outbreaks

No *Salmonella* Enteritidis outbreaks were detected in 2020.

Notification rate per 100,000 population by year, 2011 – 2020, NSW



Notification rate per 100,000 population by age category and sex, 2020, NSW



Number of cases and rates (per 100,000) by Local Health District, 2020, NSW

	Count		Rate	
LHD	**5Yr mean**	**2020**	**5yr mean**	**2020**
CC	8.8	4	2.6	1.1
FW	0.4	0	1.3	0.0
HNE	20.4	4	2.2	0.4
IS	13.0	3	3.2	0.7
MNC	7.8	2	3.5	0.9
MURR	5.2	0	2.1	0.0
NBM	11.0	8	2.9	2.0
NNSW	43.0	7	14.3	2.2
NS	0.0	15	0.0	1.6
SES	37.2	12	4.0	1.2
SWS	22.6	30	2.3	2.9
SNSW	5.0	1	2.4	0.5
SYD	21.4	8	3.2	1.1
WNSW	4.0	0	1.4	0.0
WS	28.8	18	2.9	1.7
NSW	**228.6**	**112**	**2.9**	**1.4**

*grey shading – >50% increase compared to 5yr mean

TYPHOID & PARATYPHOID FEVER

Typhoid & paratyphoid fever are caused by infections with *Salmonella* Typhi and *Salmonella* Paratyphi bacteria, respectively. Together, they are called Enteric Fever. In Australia, most diagnosed infections are acquired overseas by individuals ingesting contaminated food or water while visiting countries where typhoid or paratyphoid is endemic. All notified cases of typhoid and paratyphoid are investigated in NSW.

Summary 2020

- Case count: 45
- Reported hospitalisations: 35
- Reported deaths: 0
- Notification rate per 100,000: 0.5

Overall trend

55% decrease in the 2020 notification rate compared to the 5 year annual mean (1.2 per 100,000)

Groups with highest notification rate in 2020

Age: 5 - 9 years (22% of cases – 1.9 per 100,000)

Sex: Male (58% of cases – 0.6 per 100,000)

LHD: Western Sydney (56% of cases – 1.7 per 100,000)

Seasonality

Peaks typically in summer months (Jan-Feb)

Place of acquisition in 2020

In NSW: 17.8%

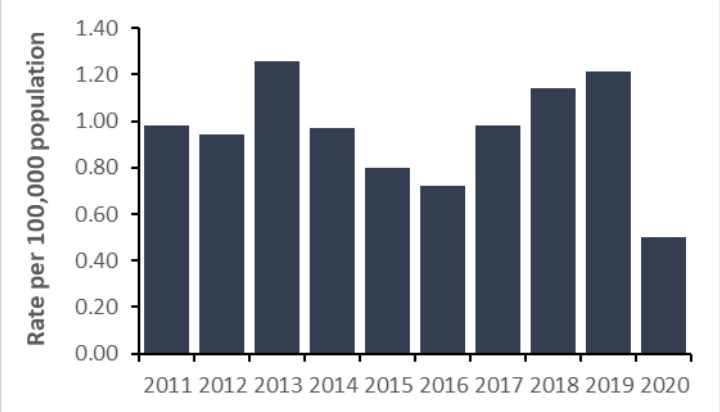
Overseas: 82.2%

(based on responses from 100% of cases)

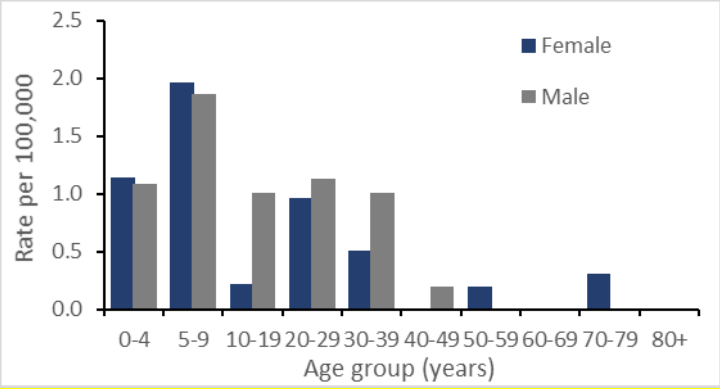
Outbreaks

There have been no known local typhoid outbreaks in Australia since 1977

Notification rate per 100,000 population by year, 2011 – 2020, NSW



Typhoid and paratyphoid notification rate per 100,000 population by age category and sex, 2020, NSW



Number of cases and rates (per 100,000) by Local Health District, 2020, NSW

	Count		Rate	
LHD	**5Yr mean**	**2020**	**5yr mean**	**2020**
CC	1.2	0	0.4	0.0
FW	0	0	0.0	0.0
HNE	3	0	0.3	0.0
IS	1	3	0.2	0.7
M	0.2	0	0.1	0.0
MNC	0.4	0	0.2	0.0
NBM	2.4	0	0.6	0.0
NNSW	0.8	0	0.3	0.0
NS	7.2	3	0.8	0.3
SES	8.8	3	0.9	0.3
SWS	10.4	5	1.0	0.5
SNSW	0.6	1	0.3	0.5
SYD	8.6	5	1.3	0.7
WNSW	0.8	0	0.3	0.0
WS	30.4	25	3.1	2.3
NSW	**75.8**	**45**	**1.0**	**0.5**

* grey shading – >50% increase compared to 5yr mean

SHIGELLOSIS

Shigellosis is a disease caused by infection with *Shigella* bacteria. It causes diarrhoea and is easily spread among people. All cases of shigellosis are investigated in NSW to determine if the infection was acquired overseas or from local sources. *Shigella* can be spread person-to-person or via contaminated food.

Summary 2020

- Case count: 465
- Confirmed cases: 223, Probable cases: 242
- Reported hospitalisations: 77*
- Notification rate per 100,000: 5.7

*Hospitalisations may be underestimated as usually only confirmed cases are interviewed by public health officers

Overall trend

6% increase in the 2020 notification rate compared to the 5 year annual mean (5.4 per 100,000).

The change in the national case definition on 1 July 2019, to include probable cases (detection by PCR test) accounts for some of the increase in notifications (page 16).

Groups with highest notification rate in 2020

Age: 20-29 years (23.2% of cases – 10.3 per 100,000)

Sex: Male (71.4% of cases – 8.1 per 100,000)

LHD: SES (28.2% of cases – 13.6 per 100,000)

Seasonality

No significant trend (highest in January and February)

Place of acquisition in 2020

In NSW: 48%

In Australia & outside NSW: 1%

Overseas: 33%

Unknown: 18%

Risk exposures reported (locally acquired only)*

Men who have sex with men (MSM): 57%

Contact with a confirmed/possible case: 3%

Unknown: 40%

Typing of confirmed cases

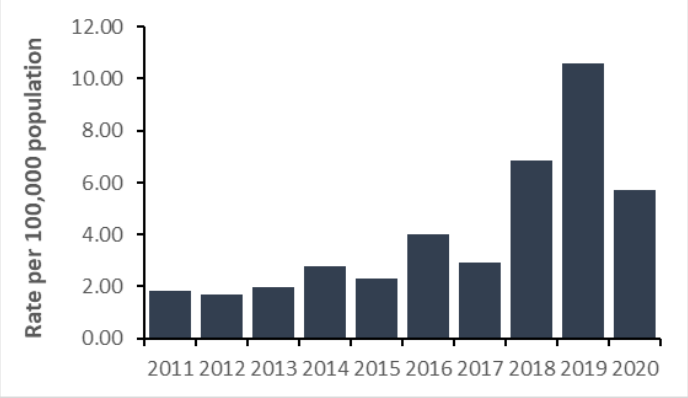
Sonnei: 78%

Flexneri: 17%

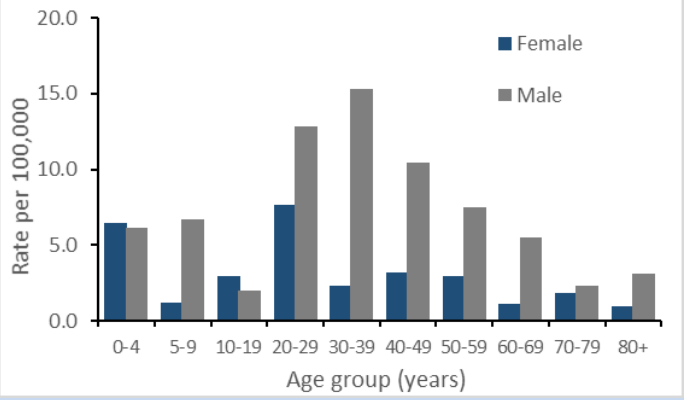
Dysenteriae: <1%

Untyped: 4%

Notification rate per 100,000 population by year, 2011 – 2020, NSW



Notification rate per 100,000 population by age category and sex, 2020 NSW



Number of cases and rates (per 100,000) by Local Health District, 2020, NSW

	Count		Rate	
LHD	5Yr mean	2020	5yr mean	2020
CC	15	4	4.5	1.1
FW	1	0	3.3	0.0
HNE	22	23	2.4	2.4
IS	11	11	2.7	2.6
MNC	5	2	2.3	0.9
MURR	6	4	2.6	1.6
NBM	11	17	2.9	4.3
NNSW	20	14	6.6	4.5
NS	60	67	6.4	7.0
SES	101	131	10.9	13.6
SWS	30	38	3.0	3.6
SNSW	6	4	2.9	1.8
SYD	83	78	12.3	11.1
WNSW	5	7	1.7	2.5
WS	46	65	4.6	6.1
NSW	**422**	**465**	**5.4**	**5.7**

* grey shading – >50% increase compared to 5yr mean

LISTERIOSIS

Listeriosis is an illness usually acquired after eating foods contaminated with the bacterium *Listeria monocytogenes*. Listeriosis is a serious disease in pregnant women and their foetuses, the elderly and people with weakened immune systems. All notified cases of listeriosis are investigated in NSW.

Summary 2020

- Case count: 18
- Reported hospitalisations: 16
- Reported deaths: 3
- Notification rate per 100,000: 0.2

Overall trend

26% decrease in the 2020 notification rate compared to the 5 year annual mean (0.3 per 100,000)

Groups with highest notification rate in 2020

Age: 80+ years (35.7% of cases – 1.33 per 100,000)
Sex: Male (64.3% of cases - 0.2 per 100,000)
LHD: Illawarra Shoalhaven (16.6% of cases – 0.7 per 100,000)

Deaths

Three deaths occurred in people aged 77-93 years, from Sydney, Northern Sydney and South Eastern Sydney regions.

Place of acquisition in 2020

In NSW: 50%
In Australia & outside NSW: 0%
Overseas: 0%
Unknown: 50%
(based on responses from 77.7% of cases)

Seasonality

Notifications were highest in Nov and Dec (33.3%)

Outbreaks

There were no listeriosis outbreaks detected in 2020.

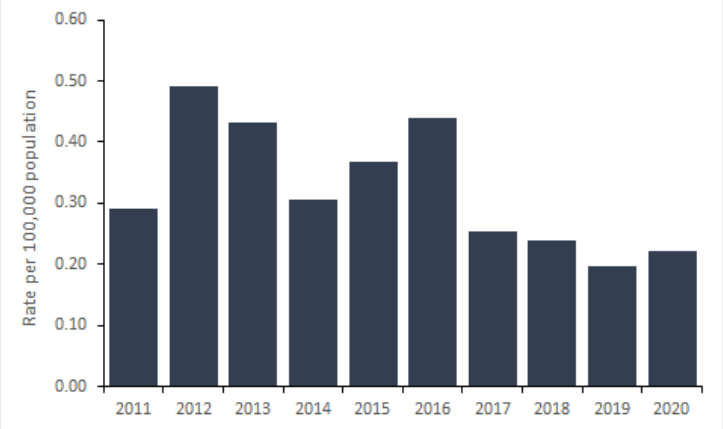
Most common comorbidities reported

Heart disease: 5
Cancer: 5

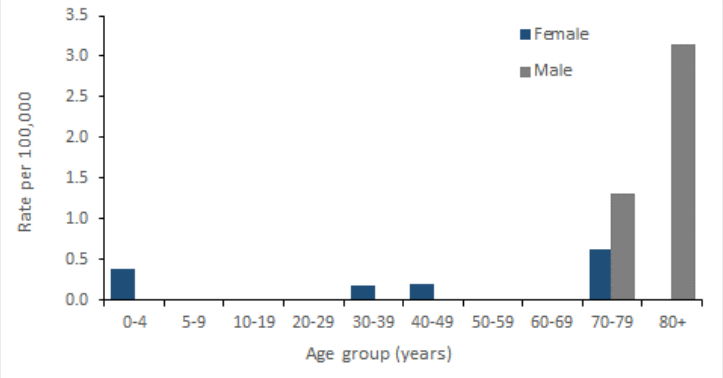
Perinatal

Two perinatal cases were reported in 2020, both of which resulted in miscarriages.

Notification rate per 100,000 population by year, 2010 – 2020, NSW



Notification rate per 100,000 population by age category and sex, 2020, NSW



Number of cases and rates (per 100,000) by Local Health District, 2020, NSW

	Count		Rate	
LHD	**5Yr mean**	**2020**	**5yr mean**	**2020**
CC	1	0	0.3	0.0
FW	0	0	0.0	0.0
HNE	1.6	1	0.2	0.1
IS	1.2	3	0.3	0.7
MNC	0.6	0	0.3	0.0
MURR	0.6	0	0.2	0.0
NBM	0.6	0	0.2	0.0
NNSW	0.6	0	0.2	0.0
NS	3.8	2	0.4	0.2
SES	3.4	3	0.4	0.3
SWS	3.4	3	0.3	0.3
SNSW	1.6	0	0.8	0.0
SYD	2.8	3	0.4	0.4
WNSW	0.8	0	0.3	0.0
WS	1.4	3	0.1	0.3
NSW	**23.4**	**18**	**0.3**	**0.2**

* grey shading – >50% increase compared to 5yr mean

SHIGA TOXIN PRODUCING *E.* COLI INFECTION (STEC)

STEC is a bacterial infection that can cause serious disease, including bloody diarrhoea, and sometimes haemolytic uraemic syndrome (HUS). Infection usually results from consuming contaminated food or water, or from contact with infected animals or people. All notifications of STEC infection are investigated in NSW.

Summary 2020

- Case count: 116
- Reported hospitalisations: 48
- Reported deaths: 0
- Notification rate per 100,000: 1.4

Overall trend

In 2020 there was a 98.7% increase in notification rate compared to 5 year annual mean (0.7 per 100,000).

The introduction of a more sensitive laboratory method (PCR) in some laboratories in 2020 may have attributed to the increase in notification rate.

Groups with highest notification rate in 2020

- Age: 70-79 years (18.95 of cases – 3.5 per 100,000)
- Sex: Females (54.3% of cases – 1.5 per 100,000)
- LHD: Murrumbidgee (7.0 per 100,000, 14.7% of notifications)

Seasonality

The highest number of notifications occurred in November and December.

Place of acquisition in 2020

- In NSW: 78.1%
- Unknown: 21.9%

(based on responses from 98.3% of cases)

Risk exposures reported (locally acquired only)

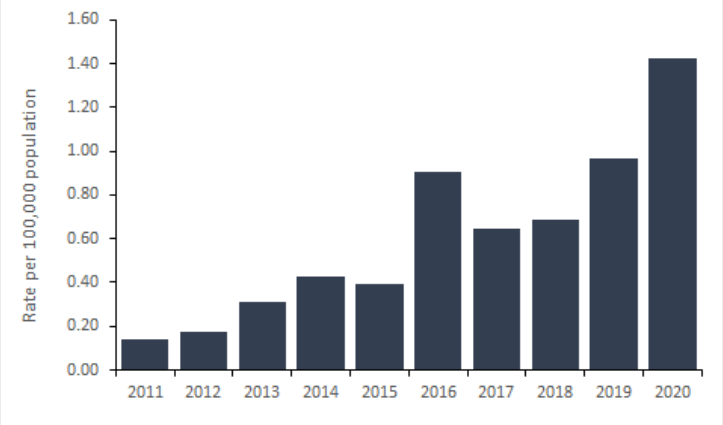
- Ate beef during incubation:47%
- Any restaurant during incubation: 36%
- Animal contact: 29%
- Farm exposure: 23%

Note: Cases may report more than one risk factor

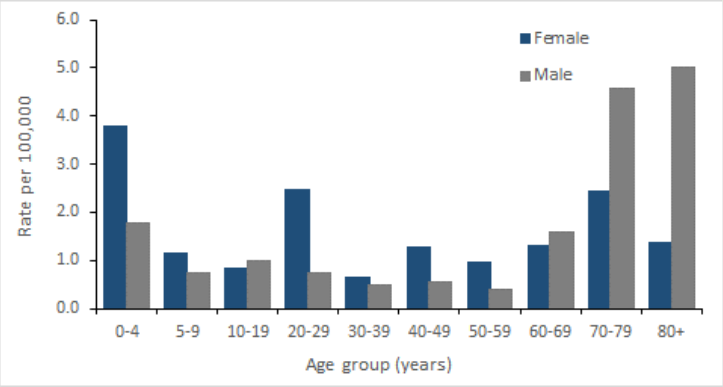
Deaths

No deaths relating to STEC were reported in 2020

Notification rate per 100,000 population by year, 2010 – 2020, NSW



Notification rate per 100,000 population by age category and sex, 2020, NSW



Number of cases and rates (per 100,000) by Local Health District, 2020, NSW

	Count		Rate	
LHD	**5Yr mean**	**2020**	**5yr mean**	**2020**
CC	1.2	1	0.4	0.3
FW	0.4	1	1.3	3.3
HNE	6.2	20	0.7	2.1
IS	1	1	0.2	0.2
MNC	0.4	2	0.2	0.9
MURR	9.4	17	3.9	7.0
NBM	0.8	12	0.2	3.0
NNSW	1.2	2	0.4	0.6
NS	1	4	0.1	0.4
SES	3.4	6	0.4	0.6
SWS	1.4	4	0.1	0.4
SNSW	8.4	11	4.0	5.0
SYD	0.8	0	0.1	0.0
WNSW	8.4	17	3.0	6.0
WS	12	18	1.2	1.7
NSW	**56**	**116**	**0.7**	**1.4**

* grey shading – >50% increase compared to 5yr mean

HAEMOLYTIC URAEMIC SYNDROME (HUS)

HUS is a clinical syndrome characterized by progressive renal failure that is associated with haemolytic anaemia and thrombocytopenia. In patients with HUS associated with diarrhoea, STEC is the primary cause. All notified cases of HUS are investigated in NSW.

Summary 2020

- Case count: 2
- Reported hospitalisations: 2
- Reported deaths: 0
- Notification rate per 100,000: 0.02

Overall trend

In 2020, there was a significant decrease in the notification rate when compared to the 5 year annual mean (0.1 per 100,000)

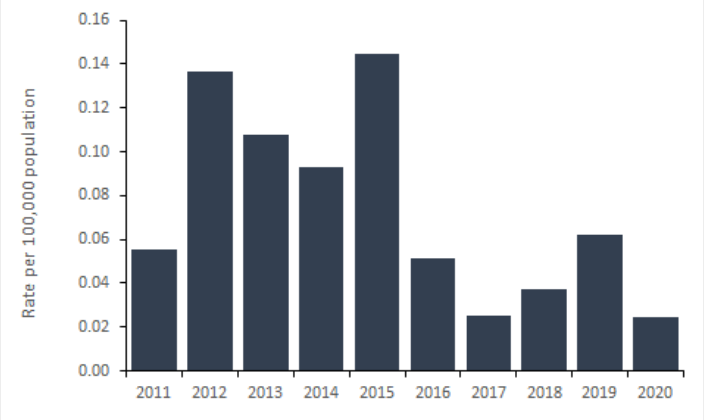
Groups with highest notification rate in 2020

- Sex: Both females and males were equally represented (notification rate 0.02 per 100,000 population0
- Age: 0-4 years (100 % of cases – 0.4 per 100,000)
- LHD: Mid North Coast LHD (notification rate 0.4 per 100,000 population, representing 50% of cases)

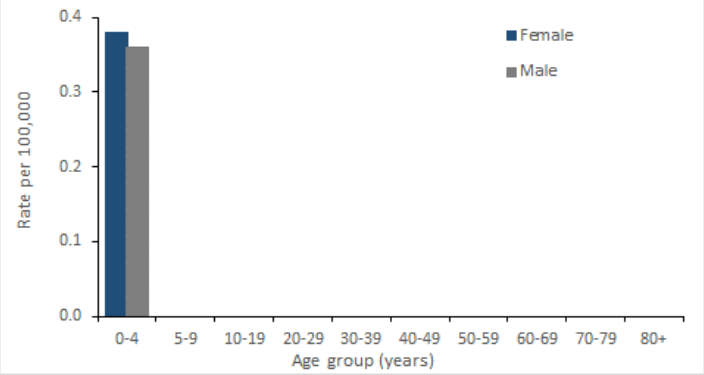
Bacterial infection

- STEC infections were identified in both notified HUS cases in 2020 (1=O111; 1=serogroup unknown)

Notification rate per 100,000 population by year, 2011 – 2020, NSW



Notification rate per 100,000 population by age category and sex, 2020, NSW



Number of cases and rates (per 100,000) by Local Health District, 2020, NSW

	Count		Rate	
LHD	**5Yr mean**	**2020**	**5yr mean**	**2020**
CC	0.2	0	0.1	0.0
FW	0.2	0	0.7	0.0
HNE	0.8	0	0.1	0.0
IS	0.6	0	0.1	0.0
MNC	0	1	0.0	0.4
MURR	0	0	0.0	0.0
NBM	0	0	0.0	0.0
NNSW	0	1	0.0	0.3
NS	0.8	0	0.1	0.0
SES	0.2	0	0.0	0.0
SWS	0.6	0	0.1	0.0
SNSW	0.2	0	0.1	0.0
SYD	0.2	0	0.0	0.0
WNSW	0.4	0	0.1	0.0
WS	0.8	0	0.1	0.0
NSW	**5**	**2**	**0.1**	**0.02**

* grey shading – >50% increase compared to 5yr mean

CRYPTOSPORIDIOSIS

Cryptosporidiosis is a disease caused by swallowing the *Cryptosporidium* parasite, most commonly in contaminated water. It mainly causes diarrhoea and abdominal cramps. All cases of cryptosporidiosis are investigated in NSW. When an investigation finds multiple cases have attended the same recreational water facility, further investigation and controls may be initiated.

Summary 2020

- Case count: 544
- Reported hospitalisations: 39
- Reported deaths: 1
- Notification rate per 100,000: 6.66

Overall trend

- 46.4% decrease in the 2020 notification rate compared to 5 year annual mean (12.4 per 100,000)

Groups with highest notification rate in 2020

- Age: <5 years (20.8% of cases – 20.9 per 100,000)
- Sex: Female (54.0% of cases – 7.1 per 100,000)
- LHD: Illawarra Shoalhaven (18.7 per 100,00 – 14.5% of total notifications)

Seasonality

- Peaks in summer to autumn months (Dec-Apr)

Place of acquisition in 2020

- In NSW: 79%
- In Australia & outside NSW: 3%
- Overseas: 10%
- Unknown: 8%

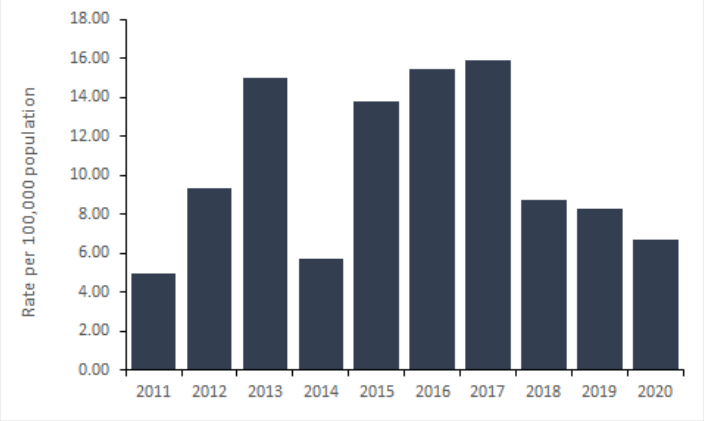
(based on responses from 55% of cases)

Risk exposures reported (locally acquired only)

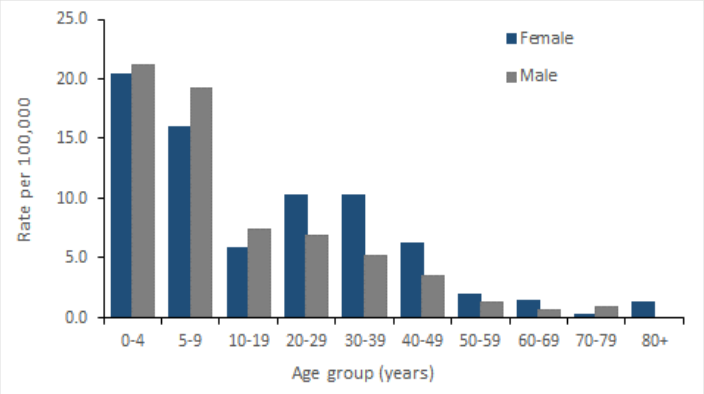
- Public swimming pool: 28%
- Farm/farm animal exposure: 16%

Note: Some cases may report more than one risk factor

Notification rate per 100,000 population by year, 2011 – 2020, NSW



Notification rate per 100,000 population by age category and sex, 2020, NSW



Number of cases and rates (per 100,000) by Local Health District, 2020, NSW

	Count		Rate	
LHD	**5Yr mean**	**2020**	**5yr mean**	**2020**
CC	38	24	11.2	6.8
FW	2	1	5.0	3.3
HNE	138	53	14.9	5.5
IS	61	79	14.8	18.7
MNC	29	25	13.3	11.0
MURR	41	21	16.9	8.6
NBM	44	32	11.6	8.1
NNSW	58	39	19.3	12.5
NS	142	59	15.2	6.1
SES	123	61	13.2	6.3
SWS	72	44	7.3	4.2
SNSW	18	16	8.4	7.3
SYD	67	20	10.0	2.9
WNSW	56	35	20.0	12.3
WS	84	35	8.5	3.3
NSW	**973**	**544**	**12.4**	**6.6**

* grey shading – >50% increase compared to 5yr mean

GIARDIASIS

Giardiasis is an infection mainly of the small intestine caused by the parasite *Giardia lamblia*. Giardiasis has been reported in humans and in a variety of animals. Notified cases of giardiasis are not routinely followed up in NSW.

Summary 2020

- Case count: 1767
- Reported hospitalisations: 0*
- Reported deaths: 0
- Notification rate per 100,000: 21.6

*Hospitalisations may be underestimated as most cases are not interviewed by public health officers

Overall trend

- 47.7% decrease in 2020 notification rate compared to 5 year average (41.3 per 100,000)

Groups with highest notification rate in 2020

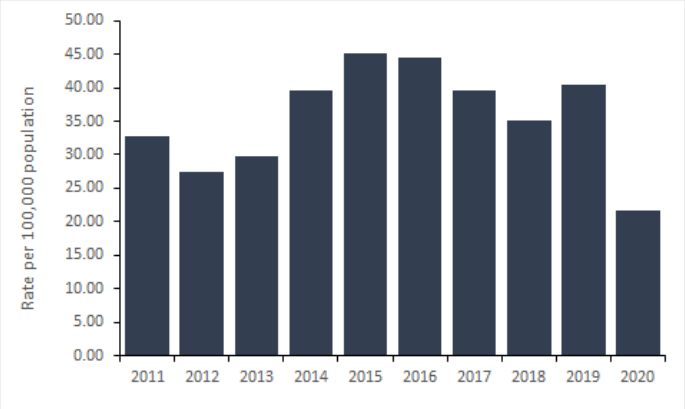
- Age: <5 years (17.8% of cases – 120.0 per 100,000)
- Sex: Male (54.0% of cases – 23.3 per 100,000)
- LHD: Northern NSW (8.8% of cases – 49.7 per 100,000)

Seasonality

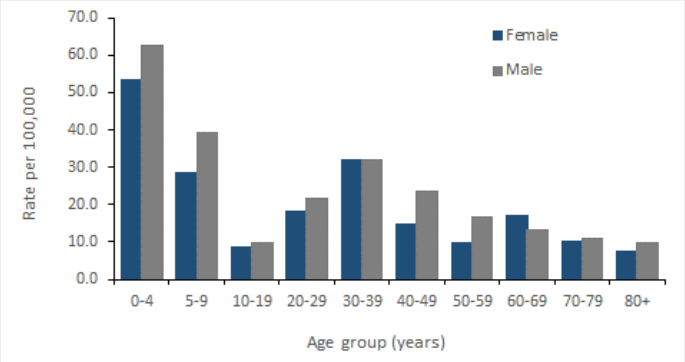
- Peaks in summer to autumn months (Jan-Mar)

Note: Risk factor information is not available as cases are not routinely followed up

Notification rate per 100,000 population by year, 2011 – 2020, NSW



Notification rate per 100,000 population by age category and sex, 2020, NSW



Number of cases and rates (per 100,000) by Local Health District, 2020, NSW

	Count		Rate	
LHD	**5Yr mean**	**2020**	**5yr mean**	**2020**
CC	139	81	40.7	22.8
FW	7	4	22.0	13.3
HNE	389	200	41.9	20.9
IS	182	92	44.4	21.8
MNC	89	49	40.3	21.6
MURR	130	57	53.9	23.3
NBM	138	96	36.7	24.4
NNSW	168	155	55.7	49.7
NS	507	267	54.5	27.8
SES	550	208	59.1	21.6
SWS	227	158	22.9	15.1
SNSW	45	28	21.3	12.8
SYD	285	118	42.5	16.8
WNSW	121	78	43.0	27.3
WS	267	176	27.0	16.5
NSW	**3244**	**1767**	**41.3**	**21.6**

* grey shading – >50% increase compared to 5yr mean

HEPATITIS A

Hepatitis A is caused by a viral infection of the liver. The virus is mainly spread by the faecal-oral route, usually by consuming contaminated food or water or by direct contact with an infected person. All notified cases of hepatitis A are investigated in NSW.

Summary 2020

- Case count: 17
- Reported hospitalisations: 11
- Reported deaths: 0
- Notification rate per 100,000: 0.2

Overall trend

- 74.4% decrease in the 2020 notification rate compared to 5 year average (0.8 per 100,000)

Groups with highest notification rate in 2020

- Age: 20-29 years (29.4% of cases – 0.48 per 100,000)
- Sex: Male (58.8% of cases – 0.2 per 100,000)
- LHD: Western Sydney (0.8 per 100,000, 47.1% of cases)

Seasonality

- No seasonality

Place of acquisition in 2020

- In NSW: 12%
- In Australia & outside NSW: 0%
- Overseas: 88%
- Unknown: 0%

(note: data available on 100% of cases)

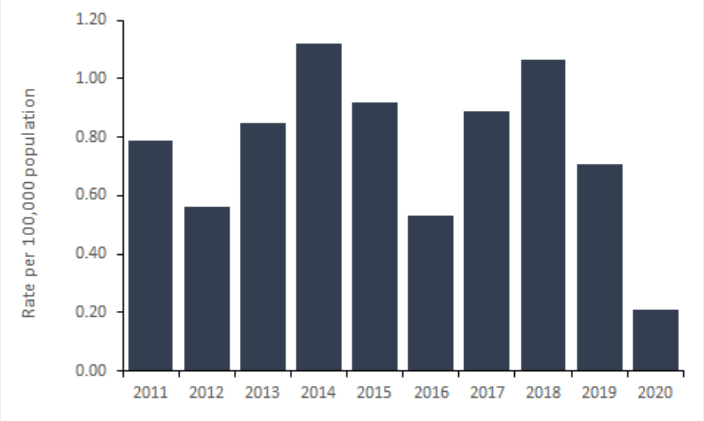
Risk exposures reported (locally acquired)

- Imported (commercial) frozen fruit consumption: 50%
- Own food from overseas (non-commercial) consumption: 50%

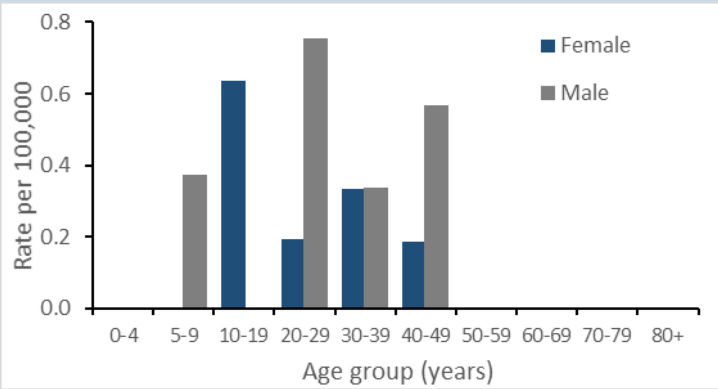
Outbreaks

There were no hepatitis A outbreaks detected in 2020.

Notification rate per 100,000 population by year, 2011 – 2020, NSW



Notification rate per 100,000 population by age category and sex, 2020, NSW



Number of cases and rates (per 100,000) by Local Health District, 2020, NSW

	Count		Rate	
LHD	5Yr mean	2020	5yr mean	2020
CC	1.4	0	0.4	0.0
FW	0.4	0	1.3	0.0
HNE	3.2	1	0.3	0.1
IS	2.6	0	0.6	0
MNC	0.2	1	0.1	0.4
MURR	1	0	0.4	0
NBM	2.2	2	0.6	0.5
NNSW	0.4	0	0.1	0
NS	6.2	1	0.7	0.1
SES	8.6	1	0.9	0.1
SWS	10.2	2	1.0	0.2
SNSW	0	0	0.0	0.0
SYD	9	1	1.3	0.1
WNSW	1.8	0	0.6	0.0
WS	16.4	8	1.7	0.8
NSW	**63.6**	**17**	**0.8**	**0.2**

* grey shading – >50% increase compared to 5yr mean

HEPATITIS E

Hepatitis E is caused by a viral infection of the liver. The virus is mainly spread by the faecal-oral route, usually by consuming contaminated food or water or by direct contact with an infected person. All cases of hepatitis E are investigated in NSW.

Summary 2020

- Case count: 9
- Reported hospitalisations: 6
- Reported deaths: 0
- Notification rate per 100,000: 0.11

Overall trend

- 53.6% decrease in 2020 notification rate compared to 5 year average (0.24 per 100,000)

Groups with highest notification rate in 2020

- Age: 20-29 years (44.4% of cases - 0.38 per 100,000)
- Sex: Male (55.5% of cases – 0.12 per 100,000)
- LHD: Western Sydney (66.7% of cases - 0.6 per 100,000 respectively)

Place of acquisition in 2020

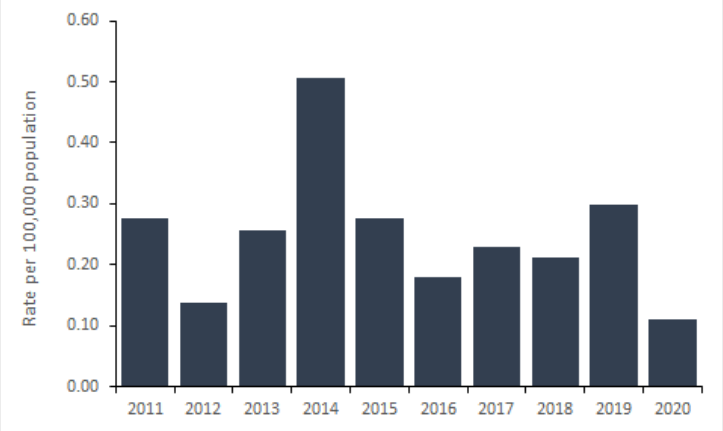
- In NSW: 11%
- In Australia & outside NSW: 0%
- Overseas: 89%
- Unknown: 0%

(note: data available on 100% of cases)

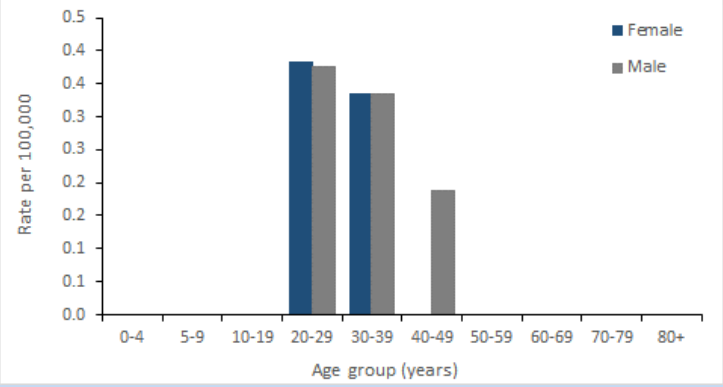
Risk exposures reported (locally acquired)

- Pork consumption: 100%
- Shellfish consumption: 100%

Notification rate per 100,000 population by year, 2011 – 2020, NSW



Notification rate per 100,000 population by age category and sex, 2020, NSW



Number of cases and rates (per 100,000) by Local Health District, 2020, NSW

	Count		Rate	
LHD	**5Yr mean**	**2020**	**5yr mean**	**2020**
CC	0.4	0	0.1	0
FW	0	0	0.0	0
HNE	0.4	0	0.0	0
IS	0.2	1	0.0	0.2
MNC	0.2	0	0.1	0
MURR	0.2	0	0.1	0
NBM	0.8	1	0.2	0.3
NNSW	0.2	0	0.1	0
NS	2.8	0	0.3	0
SES	1.4	0	0.2	0
SWS	3	1	0.3	0.1
SNSW	0	0	0.0	0
SYD	2.6	0	0.4	0
WNSW	0	0	0.0	0
WS	6.4	6	0.6	0.6
NSW	**18.6**	**9**	**0.24**	**0.1**

* grey shading – >50% increase compared to 5yr mean

ROTAVIRUS INFECTION

Rotavirus is a viral infection that causes gastroenteritis. Globally, rotavirus is the most common cause of severe gastroenteritis in early childhood. A vaccine is available and is provided free for children less than 6 months of age in NSW. Single notified cases of rotavirus are not routinely followed up in NSW.

Summary 2020

- Case count: 393
- Reported hospitalisations: 7*
- Reported deaths: 1
- Notification rate per 100,000: 4.81

*Hospitalisations may be underestimated as not all cases are interviewed by public health officers

Overall trend

- 71% decrease in the 2020 notification rate compared to 5 year average (17.1 per 100,000)

Seasonality

- Usually peaks in spring to summer, in 2020 it peaked in January coming off a large outbreak in 2019

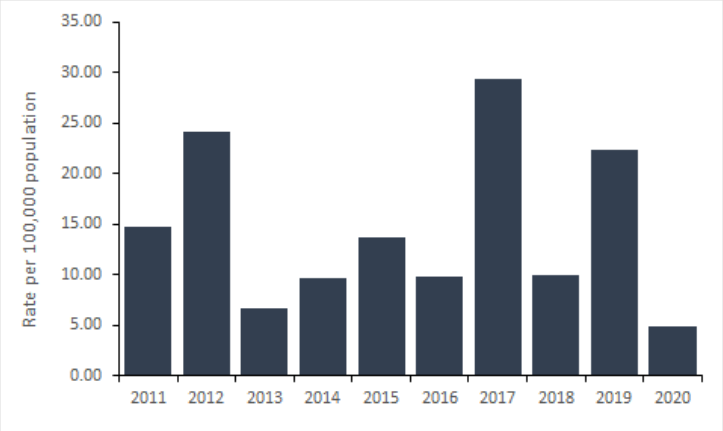
Groups with highest notification rate in 2020

- Age: <5 years (42.7% of cases – 31.1 per 100,000)
- Sex: Male (51.3% of cases – 4.9 per 100,000)
- LHD: Murrumbidgee (10.6 per 100,000 - 6.1% of cases)

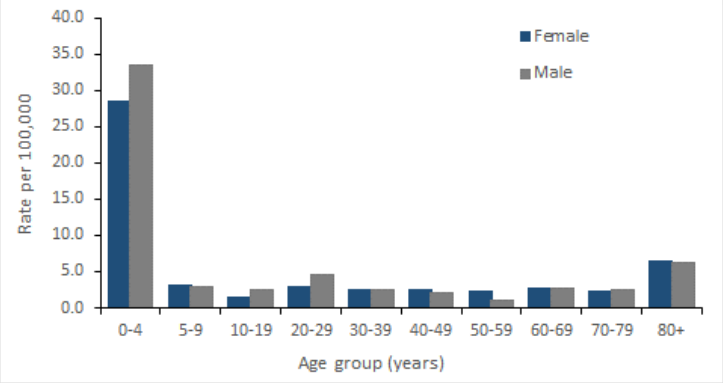
Outbreaks

- Cases found to be associated with an institutional outbreak: 21 cases (5.3%) associated with 9 institutional outbreaks

Notification rate per 100,000 population by year, 2011 – 2020, NSW



Notification rate per 100,000 population by age category and sex, 2020, NSW



Number of cases and rates (per 100,000) by Local Health District, 2020, NSW

	Count		Rate	
LHD	**5Yr mean**	**2020**	**5yr mean**	**2020**
CC	39	13	11.3	3.7
FW	5	0	16.0	0.0
HNE	103	22	11.1	2.3
IS	36	11	8.7	2.6
MNC	7	3	3.4	1.3
MURR	37	26	15.4	10.6
NBM	63	37	16.6	9.4
NNSW	65	13	21.7	4.2
NS	202	57	21.7	5.9
SES	194	55	20.8	5.7
SWS	193	71	19.4	6.8
SNSW	15	9	7.2	4.1
SYD	131	30	19.5	4.3
WNSW	48	6	16.9	2.1
WS	203	40	20.5	3.8
NSW	**1341**	**393**	**17.1**	**4.8**

* grey shading – >50% increase compared to 5yr mean

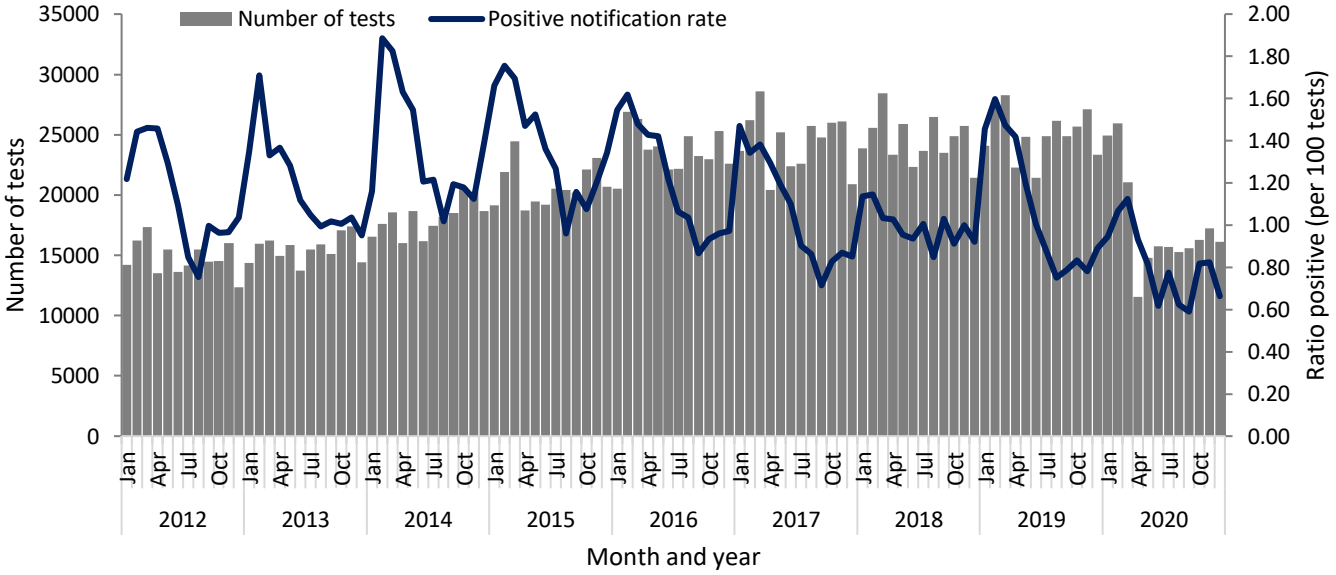
DENOMINATOR DATA

Laboratory testing data from 14 public and private laboratories was collected for *Cryptosporidium*, *Giardia*, *Salmonella* and *Shigella* from 2012. In January 2014, an additional private laboratory was added. The positive notification ratio is the ratio of positive results to total laboratory tests performed from participating laboratories.

Summary for 2020:

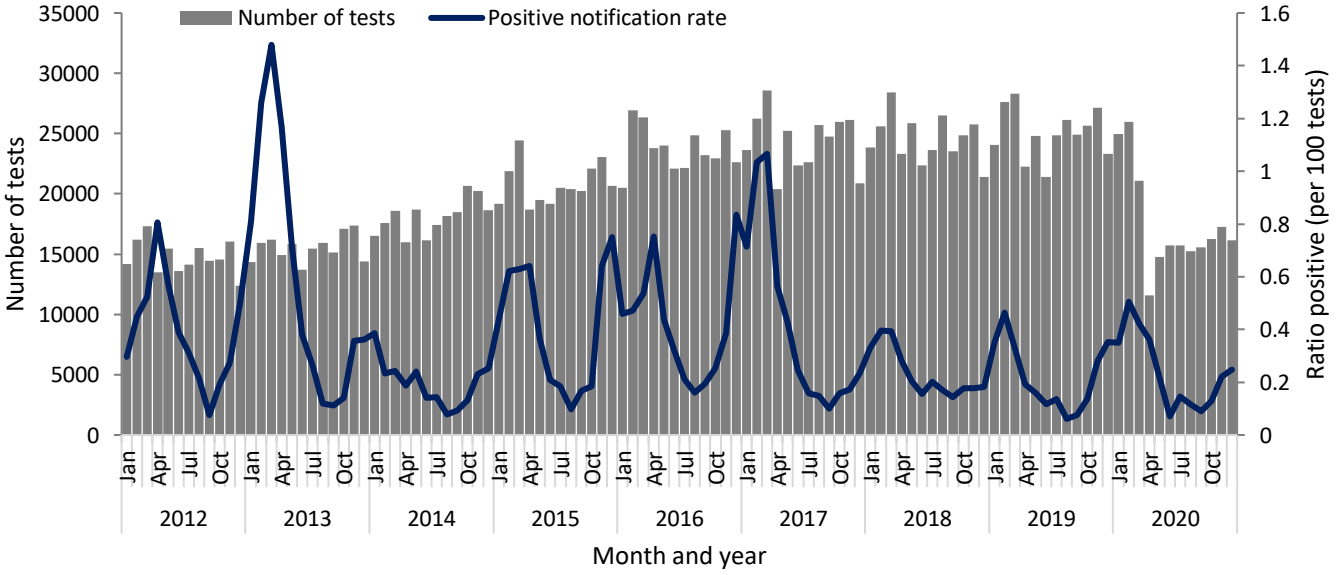
- *Giardia* positive notification rates peaked during February-March at 1.12 (per 100 tests performed)
- *Cryptosporidium* positive notification rates peaked during late-summer at 0.50 (per 100 tests performed)
- *Salmonella* positive notification rates followed the seasonal pattern, peaking in February at 2.29 (per 100 tests performed)
- *Shigella* positive notification rate was highest in January at 0.58 (per 100 tests performed)

Number of *Giardia* tests performed by 15 laboratories and rate positive by month and year, NSW, 2012–2020*



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

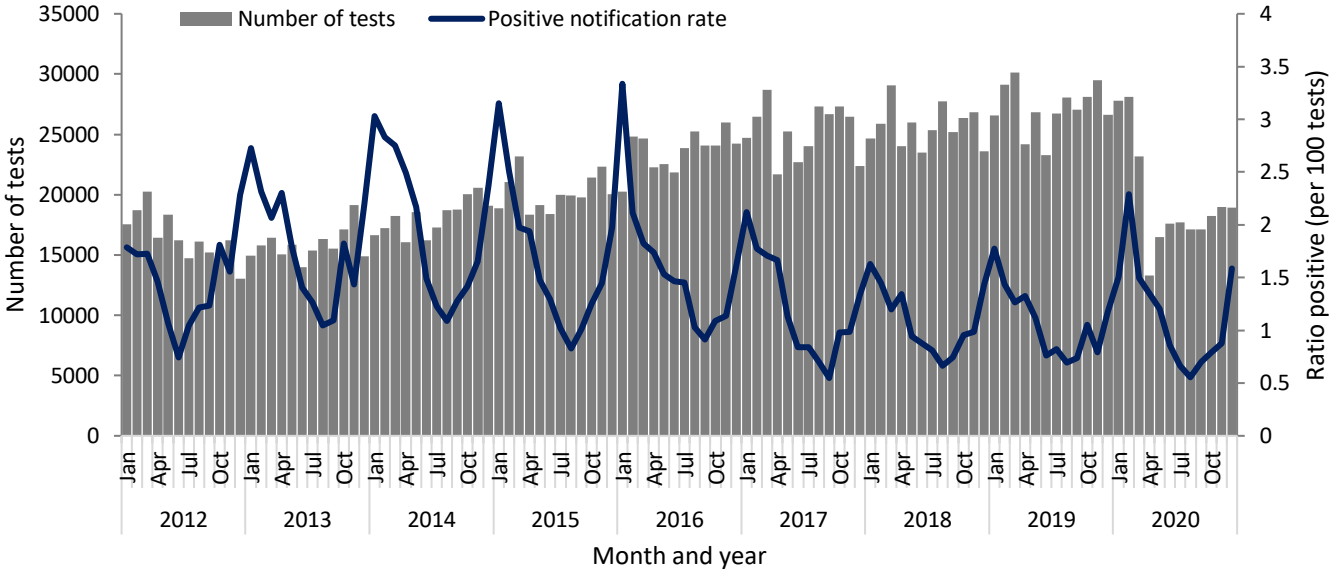
Number of *Cryptosporidium* tests performed by 15 laboratories and rate positive by month, NSW, 2012–2020*



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

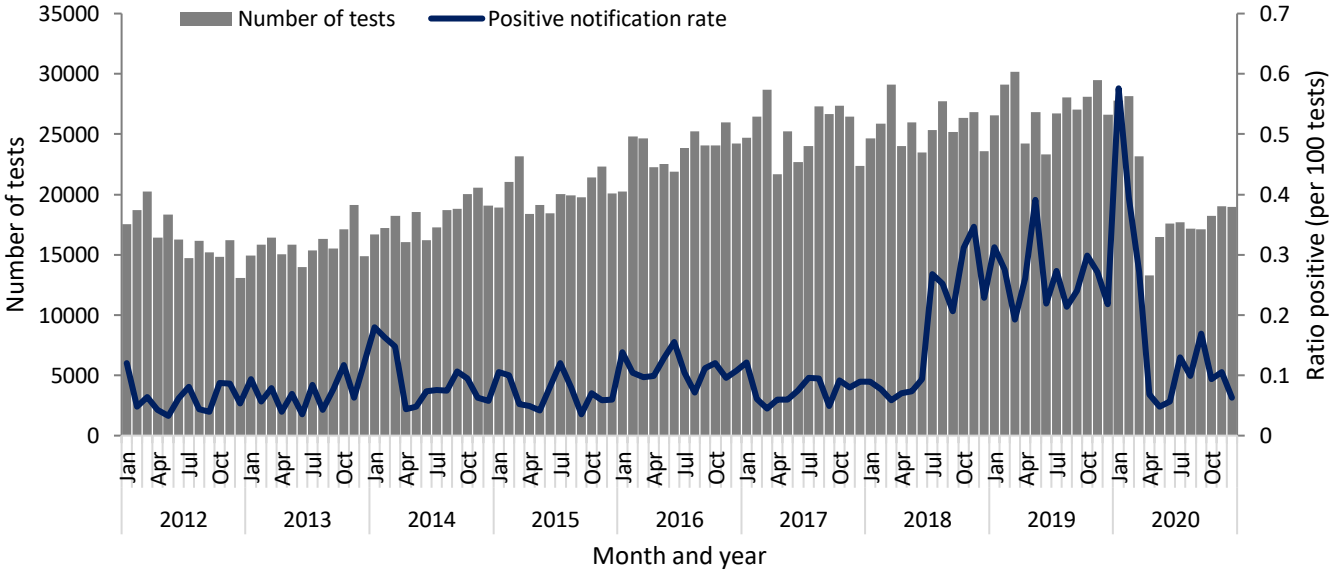
Denominator data continued

Number of *Salmonella* tests performed by 15 laboratories and rate positive by month, NSW, 2012–2020*



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

Number of *Shigella* tests^ performed by 15 laboratories and rate positive by month, NSW, 2012–2020*



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

^ 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 (PCR).

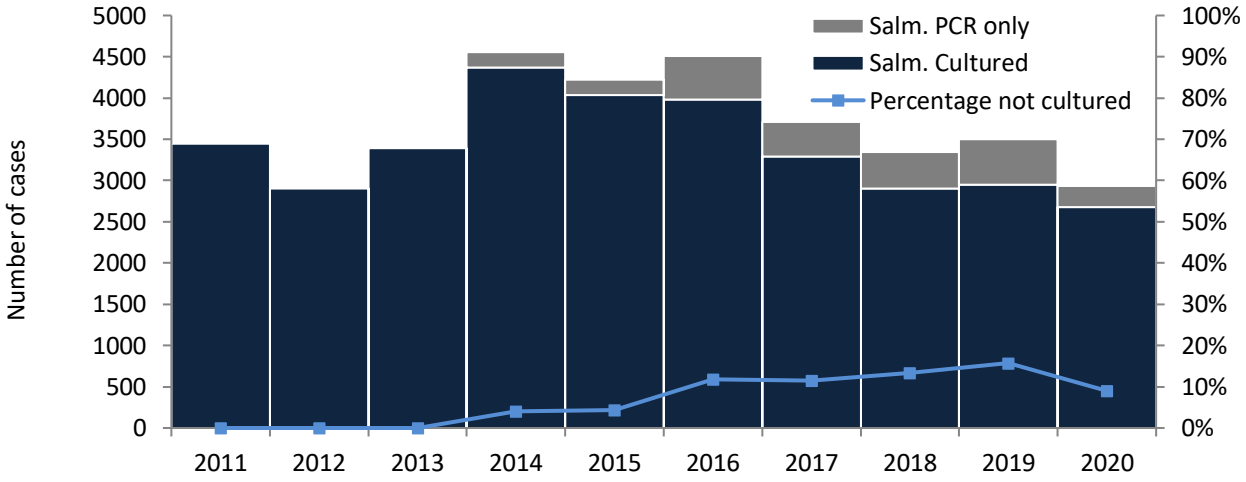
CULTURE INDEPENDENT TESTING

Culture independent testing (CIDT) does not require isolation and identification of living micro-organisms but works by detecting the presence of specific antigens using polymerase chain reaction (PCR). CIDT was introduced by NSW laboratories in 2014. These tests can be conducted more rapidly and yield results sooner than can be reached through traditional culturing methods. Culture is needed, however, to further characterise the organisms that cause infections.

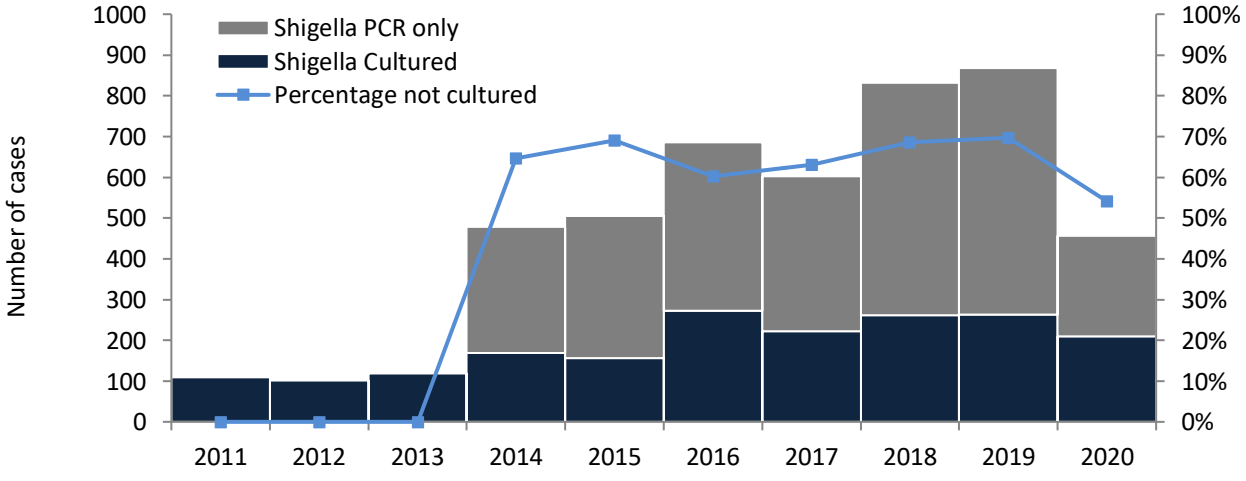
Summary for 2020:

- Due to the requirements for the extensive urgent PCR testing for COVID-19 in NSW in 2020, which uses some of the same reagents for enteric PCR testing, laboratories in NSW performed a greater proportion of enteric testing by culture methods than they would have otherwise.
- 9% of *Salmonella* notifications in 2019 were based on diagnosis by PCR methods only.
    - Some laboratories in NSW do not culture *Salmonella* unless it has been requested by the treating doctor.
- 54% of *Shigella* notifications in 2019 could not be cultured or were not cultured.
    - 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).
    - PCR positive *Shigella* samples should be routinely cultured because the antigen target for *Shigella* is also found in enteroinvasive *E. coli*. As such *Shigella* PCR reports that are not culture confirmed are not counted as confirmed cases in NSW.
    - Culture for *Shigella* has a high false negative rate due to the fastidious nature of the organism.

The number of *Salmonella* notifications, by test type, and the percentage PCR only, in NSW, 2011 – 2020



The number of *Shigella* notifications, by test type, and the percentage with only PCR positive result in NSW, 2011 – 2020



SURVEILLANCE OF FOODBORNE OUTBREAKS

A food-borne disease outbreak may be defined as a situation where two or more people, who are linked in time or place, report acute onset of enteric or other symptoms caused by ingestion of infectious agents or toxins that may have been acquired by consuming contaminated food or drink. These investigations follow the identification of disease clusters or reports of illness in two or more people who consumed the same food. Investigations are commenced when complaints are received by the NSW Food Authority, or when reported directly to public health units.

Summary 2020

- Foodborne outbreaks investigated: 32
- Outbreak related cases: 463

Overall trend

- 42% decrease in the number of outbreaks compared to 5 year annual mean (55 outbreaks)
- 39% decrease in the number of outbreak-related cases compared to 5 year annual mean (756 people ill)

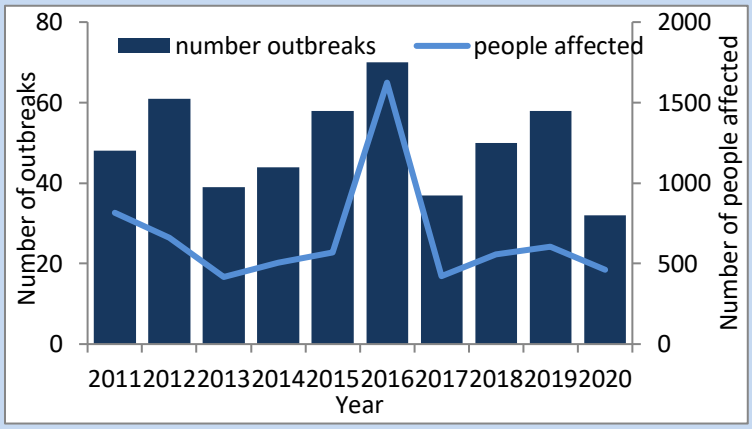
Top 5 Causative agent in 2020

- Unknown: 42%
- *Salmonella*: 30%
- Fish poisoning: 9%
- *Campylobacter*: 9%
- *Norovirus:* 3%

Contributing factors in 2020

- Cross contamination raw ingredients: 29%
- Toxic substance or part of tissue: 23%
- Other source of contamination: 16%
- Ingestion contaminated raw products: 16%
- Inadequate cleaning of equipment: 13%

Number of foodborne or suspected foodborne outbreaks and number people affected by year, 2011-2020, NSW



Foodborne outbreak by causative agent and year, 2015-2020, NSW

Causative agent	2015	2016	2017	2018	2019	2020
Unknown	25	34	21	27	13	13
Salmonella (all serotypes)	23	20	5	11	24	10
Salmonella Typhimurium	19	14	4	6	12	6
Norovirus	2	6	3	1	3	1
Campylobacter	2	2	3	1	1	3
Clostridium perfringens	1	0	0	1	0	0
Fish poisoning	4	4	1	7	7	3
Listeria	0	1	0	1	2	0
Hepatitis E	0	0	0	0	1	0
STEC	0	0	0	0	0	0
Hepatitis A	1	0	0	1	1	0
Shigella	0	2	0	0	0	0
Bacillus cereus toxin	0	0	0	0	0	1
Other	0	0	0	0	1	1
Total outbreaks	58	69	37	50	53	32

Number of foodborne outbreaks and number of people affected by local health district, 2020, NSW

LHD	2020	No. ill
CC	0	0
HNE	0	0
IS	2	12
M	2	13
MNC	1	15
NBM	0	0
NS	3	30
SES	7	37
SNSW	0	0
SWS	2	5
Syd	4	66
WNSW	1	4
WS	7	24
NSW*	3	257

*Outbreaks affecting more than one LHD counted in NSW resident cases only **

Foodborne outbreaks continued

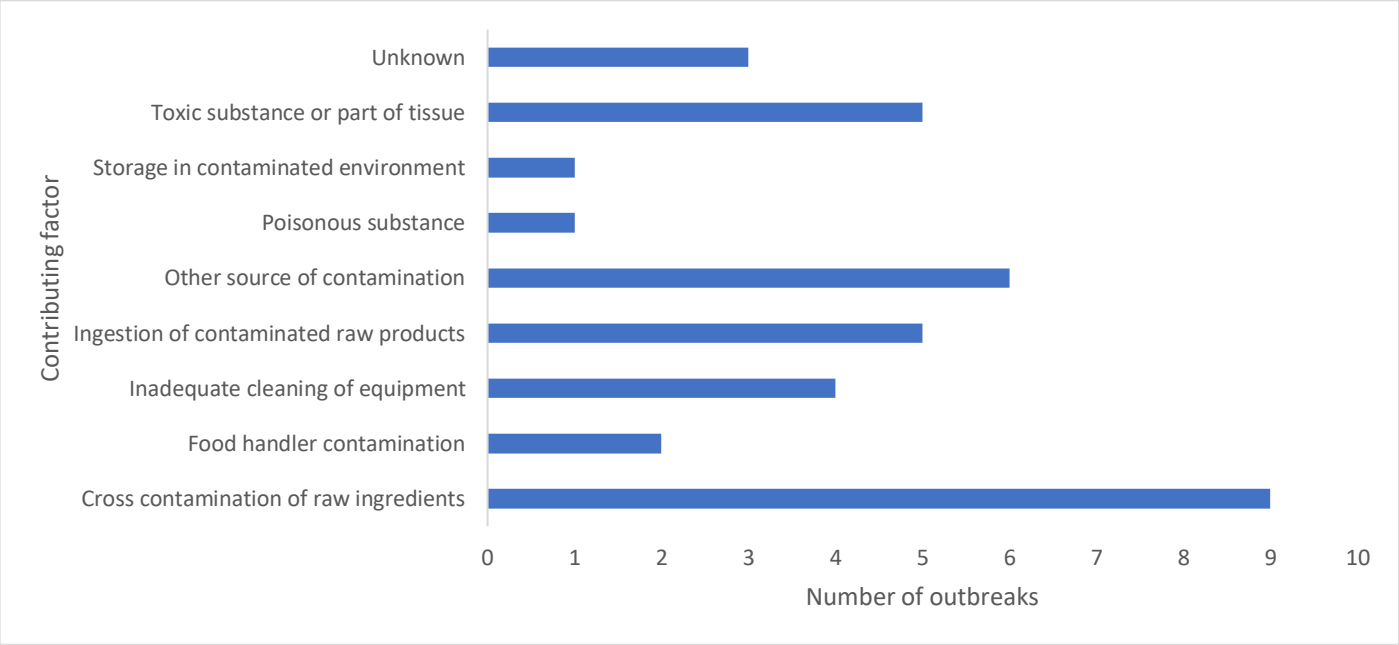
Description of outbreaks by causative agent

Number of outbreaks, number ill and number hospitalised by causative agent, 2020, NSW

Causative agent	Number of outbreaks	Number ill	Ratio ill per outbreak	Number hospitalised	Ratio hospitalised per outbreak
Salmonella Typhimurium	6	269	44.8	37	6.2
Unknown	13	92	7.1	2	0.1
Other *Salmonella*	4	36	9	0	0
Fish Poisoning	3	8	2.7	1	0.3
Norovirus	1	43	43	0	0
Campylobacter	3	7	2.3	2	0.7
Lead	1	5	5	1	1
Bacillus cereus toxin	1	3	3	1	1
Total	**32**	**463**	**14.3**	**44**	**1.4**

Summary foodborne outbreaks by contributing factors

Foodborne outbreaks by contributing factors*, 2020, NSW



* Contributing factors are not mutually exclusive per outbreak

OUTBREAK SUMMARY 2020

Foodborne and potentially foodborne disease outbreaks investigated in NSW, 2020

PHU ID	Month[1]	Setting	Agent responsible	No. ill	Lab confirmed	No. Hospitalised	Evidence*	Responsible vehicles	Contributing factors
MJOI2020-01	January	Community	*Salmonella* Typhimurium	230	230	32	D, M	Unknown	Ingestion of contaminated raw products
MLHD202002	January	Private residence	*Salmonella* Typhimurium	11	1	0	D, A	Eggs	Ingestion of contaminated raw products
SES202001	January	Take-away	Scombroid	3	0	0	D	Kingfish steak	Toxic substance or part of tissue
MLHD202001	January	School	*Salmonella* Typhimurium	2	2	Unknown	D, A	Either: cocktail franks, sausage rolls, party pies, a mixed fruit platter and cupcakes	Other source of contamination
SYD202001	January	Restaurant	*Salmonella* Typhimurium	19	4	0	D, A, M	Chicken wrap	Cross contamination from raw ingredients, inadequate cleaning of equipment
SES202002	January	Childcare	Unknown	8	0	0	D	Unknown	Other source of contamination
IS65571	February	Take-away	Unknown	9	0	Unknown	D	Vietnamese pork and chicken rolls	Cross contamination from raw ingredients, inadequate cleaning of equipment
SES65631	February	Restaurant	Unknown	3	0	0	D	Calamari	Toxic substance or part of tissue
WS65637	February	Restaurant	Unknown	4	0	0	D	Unknown	Cross contamination from raw ingredients
NSW46-9	February	Take-away	*Salmonella* Bareilly	21	21	UNK	D	Sushi	Unknown
SES65694	February	Restaurant	Unknown	6	0	1	D	Unknown	Cross contamination from raw ingredients

PHU ID	Month[1]	Setting	Agent responsible	No. ill	Lab confirmed	No. Hospitalised	Evidence*	Responsible vehicles	Contributing factors
SYD65730	February	Commercial caterer	Norovirus	43	1	0	D & A	Unknown	Food handler contamination
WS202001	April	Private residence	*Bacillus cereus* toxin	3	0	1	D & A	Rice	Toxic substance or part of tissue, other source of contamination
WS202003	May	Private residence	*Salmonella* Typhimurium	4	2	2	D	Eggs	Ingestion of contaminated raw products
WS202004	June	Restaurant	Unknown	2	0	0	D	Stew with offal	Other source of contamination
WS202002	June	Private residence	Lead	5	5	1	D	Saffron substitute	Poisonous substance
NSW202001	June	Takeaway	*Salmonella* Bareilly	6	6	Unknown	D	Sushi	Unknown
SWS67257	July	Takeaway	Unknown	2	0	0	D	Slow-cooked beef burrito	Other source of contamination
SWS202001	July	Private residence	Scombroid	3	0	1	D	Tuna steak	Toxic substance or part of tissue
MNC67831	August	Take-away	Unknown	15	0	0	D	Unknown	Cross contamination from raw ingredients
WS202005	August	Restaurant	*Salmonella* Typhimurium WGS cluster 19-0014	3	3	3	D	Portuguese chicken burger	Other source of contamination
SYD202002	September	Restaurant	Unknown	2	0	0	D	Either seafood and vegetable tempura or Sashimi (unknown fish type)	Ingestion of contaminated raw products
NS68079	September	Restaurant	Unknown	20	0	1	D	Unknown	Storage in contaminated environment, inadequate cleaning of equipment
NS202003	September	Takeaway	Unknown	8	0	0	D	Sushi	Food handler contamination
IS68141	September	Restaurant	*Campylobacter jejuni*	3	1	1	D, A	Indian food – unspecified vegetarian dish	Cross contamination from raw ingredients

PHU ID	Month[1]	Setting	Agent responsible	No. ill	Lab confirmed	No. Hospitalised	Evidence*	Responsible vehicles	Contributing factors
WS68260	September	Takeaway	Unknown	3	0	0	D	Beef burrito and beef nachos	Ingestion of contaminated raw products
SES68299	September	Takeaway	Unknown	10	0	0	D	BBQ chicken	Cross contamination from raw ingredients
SES202004	October	Takeaway	*Salmonella* Senftenberg	5	4	0	AM	Cooked chicken kebab	Inadequate cleaning of equipment
SYD202003	October	Restaurant	*Campylobacter*	2	1	Unknown	D, M, A	Unknown	Cross contamination from raw ingredients
SES68561	October	Restaurant	*Campylobacter*	2	1	1	D, A	Unknown	Cross contamination from raw ingredients
NS68756	November	Restaurant	Scombroid	2	0	0	D	Kingfish	Toxic substance or part of tissue
WNSW202001	December	Aged Care	*Salmonella* (NFS)	4	1	0	D, M	Unknown	Unknown

*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.

SIGNIFICANT ENTERIC OUTBREAKS 2020

Salmonella Typhimurium multijurisdictional outbreak investigation of unknown cause (MJOI2020-01)

In January, NSW began investigating a *Salmonella* Typhimurium cluster as part of a multijurisdictional investigation in all Australian jurisdictions.

Nationally 1,065 cases were notified to state and territory health departments with a unique outbreak sequence, STM-20-0026, of which 230 (21.6%) cases were identified in NSW. Cases were interviewed with a national standardized questionnaire and information was analyzed to identify the possible source of infection. Interviews indicated a fresh produce item was the likely source however no individual item could be implicated.

Food safety agencies in numerous states and territories undertook extensive sampling of items identified in interviews at retail sale but the outbreak strain of *Salmonella* was not detected in any samples.

Cases peaked between 22 January and 12 March 2020, after which cases trailed off to background levels. The source was unable to be determined during this period. The investigation concluded that either the source of the contamination on was transient or the product was no longer available.

Salmonella Typhimurium linked to a school staff gathering at restaurant venue (SYD202001)

An outbreak of *Salmonella* Typhimurium affecting at least 19 of 106 staff who attended a two-day staff development event was investigated by a metropolitan Sydney public health unit in January. Four of the 19 cases were culture positive with the serotype identified as *Salmonella* Typhimurium. Several household contacts of the staff members also reported illness and it was established that these household members had consumed leftovers of the same foods the staff had eaten at the development day.

The public health unit distributed a survey to all attendees. A total of 73 responses (response rate 69%) were received. Among those who responded, twenty-four (33%) reported developing gastroenteritis symptoms after the event. The onset of symptoms occurred between 4pm 21 January and 8am 31 January. The median time of onset was approximately 4pm on 23 January and median duration of symptoms was 72 hours. Symptoms included headache, diarrhoea, abdominal cramps, nausea, fever, joint pain, vomiting, and lethargy. Ten people reported visiting a doctor for their illness, and five reported attending a hospital Emergency Department (ED). Six cases had tests done to investigate their illness.

Analysis of foods consumed demonstrated that sick people were six times more likely to have consumed the chicken wrap on the first day of the staff development day (95% CI, 1.77-20.31, p=0.0039), which is the only food that had a statistically significant result.

The Food Authority was notified and conducted a site inspection at the catering venue, collecting environmental swabs and food samples. Five of the environmental isolates were positive for *Salmonella* Typhimurium, and following genomic sequencing, clustered closely with the four human specimens from culture positive cases. The supplier improved its cleaning and sanitising practices. Enforcement action was also taken. Penalty notices were issued for breaches of the Food Act 2003 (NSW).

Bacillus cereus poisoning linked to rice consumption (MLHD202002)

In April, a woman in her 40s from metropolitan Sydney was notified to the local public health unit for suspected *Bacillus cereus* toxin-mediated poisoning. The woman had no underlying health conditions. She was admitted to the Intensive Care Unit (ICU) where she developed multi-organ failure and unfortunately died from her condition.

Upon investigation, it was found that the woman had developed serious symptoms within hours of consuming a dish prepared with rice that had been cooked one week earlier. The rice was reportedly cooked, left on the bench for several hours to cool, then placed in the fridge.

Her initial symptoms included vomiting, but notably, she had nil diarrhoea. While other family members had also consumed the dish, they experienced milder symptoms and did not require admission to hospital.

The case's husband also found a sample of the leftover rice in the fridge and submitted it to the laboratory for analysis. Heavy growth of bacillus cereus was cultured from the leftover rice, which then returned a toxin positive result. A patient sample was unable to be collected for comparison.

Lead poisoning associated with a saffron substitute sold in Western Sydney (WS202002)

A cluster of lead poisoning in Western Sydney was investigated by the local public health unit in April. The index case was an elderly woman of Sri Lankan background, who was initially notified to public health with an elevated blood lead level of 69.2ug/dL (ref range <5 µg/dL). She was admitted to hospital with investigation of abdominal pain and further clinical investigations showed that she had stippling of basophils on her blood film; a sign strongly suggestive of lead poisoning.

An environmental investigation was initiated, and all family members within the household were advised to be tested for elevated blood lead levels. These five family members were all shown to have elevated blood lead levels, and these levels were proportional to the amount of time spent at the index case's house.

This finding prompted environmental health officers to conduct two site visits to the family home. At the second home visit, seven samples of commonly used spices and food colourings which were used frequently for cooking were collected and submitted to the National Measurement Institute (NMI) for analysis.

A saffron substitute product, which was kept by the index case in an unlabelled jar and used frequently in her cooking, was found to contain 65% lead. The original bottle was obtained by the officers and was resubmitted for further sampling. The second analysis test showed 79% lead, which indicated that the mixing of the lead contaminate in the bottle was not uniform.

Based on the information that was provided by the index case, the saffron substitute may have been purchased from a continental grocer in Western Sydney. An authorised officer from NSW Health attended several continental grocer shops to determine if they were retailing products of interest. Products were identified on shelves in five local stores and eight samples were purchased and submitted to the NMI. All samples returned lead concentration levels of <1mg/kg.

The potential of post-purchase contamination was also investigated but was ruled out as a possible source of lead poisoning. The public health unit actively sought reports of similar lead poisoning cases with possible links to the same product, however none were identified.

Salmonella Bareilly linked to a sushi chain (NSW202001)

Two spatio-temporal clusters of *Salmonella* Bareilly were noted in 2020; the first was in February with 21 cases and the second was in June with 6 cases. Investigations initially commenced in March with interviews attempted for all cases using the *Salmonella* Hypothesis Generating Questionnaire (SHGQ). Of the sixteen interviewed, seven cases had reported eating at different venues of the same sushi chain throughout NSW.

The NSW Food Authority initiated an environmental investigation. The central kitchen for the sushi franchise was inspected and samples collected. No significant issues that could have resulted in the outbreak were identified and *Salmonella* was not detected in any swab or sample. The supplier of raw seafood products traced back to Tasmania and details were provided to the Tasmanian food safety regulator for further investigation. No clear source was found, and cases soon returned to expected background rates.

The investigation was re-opened in June when *S.* Bareilly notifications increased again. In the second cluster, half of the cases were from metropolitan Sydney and half were from regional NSW. Median age 52 years old (age range 11 – 75 years old), 33% male. Interviews were completed for five cases; of which, two had also eaten from the same sushi chain implicated in the first cluster. At the same time that this epidemiological investigation

was conducted, several samples from a NSW egg farm were positive for *S.* Bareilly.

Whole genome sequencing was conducted on all human isolates from the February and June clusters, and from environmental isolates originating from the egg farm. Sequencing results tied the two spatio-temporal clusters together through a genetic relationship (SBAR-20-0001), with 15/21 cases in the February cluster and 5/6 cases in June cluster found to be closely related to each other. Of these 20 clustered cases, 8 cases had reported eating at the previously investigated sushi outlet across the two time periods.

The 19 environmental isolates sequenced from the egg farm clustered into two separate strains but did not match any of the human infections (6 x SBAR-20-0002, 12 x SBAR-20-0003, 1 x not clustering). The source of infection linked to the sushi venue remains unknown.

Gastro illness associated with a Malaysian restaurant (NS68079)

In September, an outbreak involving twenty cases of gastroenteritis from three separate dining groups was investigated by the local public health unit. All cases had consumed food from a Malaysian restaurant in metropolitan Sydney, on two consecutive nights of service.

Reported symptoms included nausea, vomiting, bloody diarrhoea, abdominal cramps, and myalgia. The incubation period ranged from 6-12 hours. Foods reported to be consumed by cases were varied and included a crispy chicken dish, eggplant, spinach, boiled rice, coconut rice, a beef rendang dish, mi goreng and char kway teow.

One case presented to hospital and required a four-day admission. They had a stool sample collected however this was negative for all pathogens tested. None of the other cases presented to a medical practitioner or had a sample collected.

The NSW Food Authority inspected the restaurant and collected environmental swabs and food samples, however all returned negative results. Despite this, significant issues regarding cleanliness and hygiene were identified during the inspection, and the NSW Food Authority issued a prohibition order to the restaurant. The restaurant was able to reopen once the issues were rectified.

Salmonella Typhimurium associated with Portuguese chicken burger consumption (WS202005)

Three cases of gastrointestinal illness occurred following consumption of a Portuguese chicken burger from a takeaway venue in Western Sydney. The three cases were from the same dining group but lived across two households and shared no other common exposures.

All cases reported diarrhoea and presented to the Emergency Department, with none requiring admission. Each case had a stool sample collected, which had *Salmonella* Typhimurium isolated. Sequencing on these specimens genomically linked them together and identified them as *S.* Typhimurium cluster WGS type STM-19-0014.

The NSW Food Authority conducted a site inspection of the venue and collected environmental swabs and samples. *Salmonella* was not detected in any of these samples. The burger's ingredients, which included tomato, iceberg lettuce, 'special sauce', chicken breast, Portuguese chilli and cheese, were also investigated and traced back to source where possible. The 'special sauce' contained commercially-produced whole egg mayonnaise, cottonseed oil, BBQ sauce, American mustard, chilli flakes, and sweet Hungarian paprika. There were no raw eggs used in the special sauce.

The inspection revealed that the venue had no sanitiser available on site which may have contributed to the spread of bacteria. The business was issued with penalty notice for failing to comply with the Food Standards Code.

Salmonella Senftenberg linked to a kebab takeaway venue (SES202004)

An investigation into an increase in *Salmonella* Senftenberg notifications commenced in August 2020. Fourteen cases were notified between 1 July to 6 October 2020, compared to 2 notifications of this serotype for the same period in 2019. The cases lived in metropolitan Sydney. The median age was 48 years old (range 1 years old – 83 years old), 42% were male.

Eight (57%) cases were able to be contacted for interview. Of these, four reported consuming a takeaway kebab from the implicated kebab venue; located in a shopping centre food court. Two cases reported possibly eating a kebab during the exposure period, however could not recall where they may have purchased from. The remaining two cases did not recall eating at the venue, nor any kebabs specifically, however reported routinely shopping at this same centre.

There was also one probable case linked to this cluster in a relative of a case who also reported eating a kebab from the same venue, and subsequently developed gastroenteritis symptoms, but did not get tested.

The NSW Food Authority conducted an inspection of the venue which revealed minor issues with sanitisation and hygiene. Food samples and environmental swabs were collected for testing, in which multiple samples were positive for *Salmonella* Senftenberg, including a sample of cooked chicken, the wash sink, cool room floor, front service area floor and back kitchen floor. The facility was prohibited from operating until they improved the cleanliness of the venue.

INSTITUTIONAL GASTROINTESTINAL OUTBREAKS

Viral gastroenteritis is highly infectious and outbreaks are very common and can be difficult to control. Outbreaks often occur in institutional settings, such as residential care facilities, educational institutions, or health care facilities. Gastroenteritis among two or more people of any age from an institution and linked in time should be notified to the local PHU. This is to ensure that the institution implements appropriate control and prevention strategies.

Summary 2020

- Number of outbreaks: 841
- Number of people affected: 11651
- Number of outbreaks with at least one stool sample collected: 162 (19%)

Overall trend (compared to 5 year average)

- 6% increase in the number of outbreaks
- 7% increase in the number of people affected

Seasonality

- Childcare centres: Peaked in November and December
- Aged care facilities and hospitals: Peaked in January and December

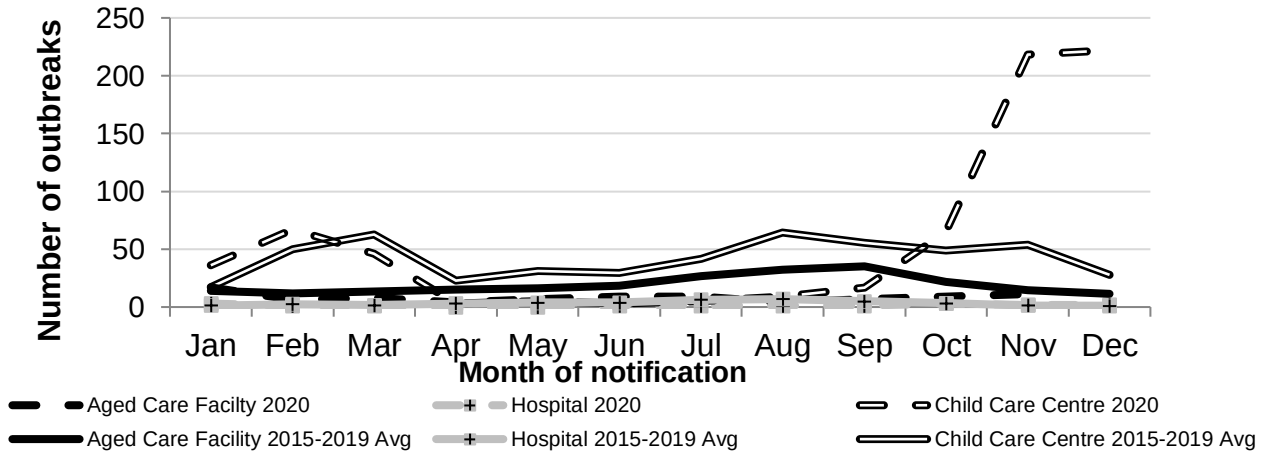
Groups with highest frequency in 2020

- Facility type: childcare centres, 696 (83%) of outbreaks
- Attack rate in staff: child care at 17%
- Attack rate in non-staff: hospital patients at 18%
- Average duration of outbreaks: Childcare centres at 10 days

Causative agent

- Norovirus (laboratory confirmed): 6% of outbreaks (32% of outbreaks with a stool sample collected)

Figure: Number of reported outbreaks of gastrointestinal illness in institutions in 2020 and average of the previous 5 years by month and facility type



Characteristics of outbreaks of gastrointestinal illness in institutions reported to NSW in 2020

Setting	No of Outbreaks (n)	Staff Affected (n: attack rate)	Non-staff affected (n: attack rate)	Avg duration of outbreak (days)	Outbreaks with stool collected (n: %)	Outbreaks with cause found (n: pathogen)
Aged Care	112	240: 2%	871: 10%	7	81: 72%	18: norovirus 2: rotavirus
Child care	696	2136: 17%	8039: 12%	10	63: 9%	25: norovirus 1: rotavirus
Hospital	16	53: 7%	78: 18%	7	15: 94%	9: norovirus
Other*	17	42: 8%	192: 8%	7	3: 18%	1: norovirus
TOTAL	**841**	**2471: 10%**	**9180: 11%**	**10**	**162: 19%**	**52: norovirus 3: rotavirus**

*Camps, & other educational or residential care facilities

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).

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 developing enteric disease policy. 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.

Notifiable enteric diseases in NSW

Under the Public Health Act 2010 (NSW), the following enteric diseases and conditions are notifiable in NSW: botulism, *Campylobacter*, 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. In 2015 paratyphoid was separated from *Salmonella* into a separate disease. 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.

Methods

We analysed data for the following notifiable enteric pathogens; *Salmonella*[i], *Salmonella* Paratyphi *Salmonella* Typhi, *Listeria monocytogenes*, *Shigella*, HUS and STEC, *Cryptosporidium*, *Giardia*, *Campylobacter*, rotavirus and hepatitis A & E viruses. There were no cases of botulism or cholera in 2019.

On 20 April 2021, 2020 data was extracted from NCIMS using Secure Analytics for Population Health Research and Intelligence (SAPHaRI)[ii] using the

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

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

Methods continued

date of onset of disease. The counts of each notifiable enteric disease[iii] for 2020 were compared with the average annual count for the years 2015 to 2019. The NSW estimated resident population for 30 June of each year from 2015-2020 was used to calculate crude incidence rates for each disease.[iv]

Individual factors such as place of acquisition, possible risk exposures, and hospitalisation 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.

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

Notification data for *Campylobacter*, *Cryptosporidium*, *Giardia, Salmonella* and *Shigella* were analysed for the period between 1 January 2013 and 31 December 2019, based on the specimen date. The ratio of positive notifications was calculated by dividing the overall positive results notified to NSW Health by all laboratories, by the total number of tests performed as reported from the participating laboratories. The overall positive results included in the analysis are for individual people notified with each condition reported from all laboratories. However, the testing data are for individual tests reported from participating laboratories and may include multiple specimens per individual. As such, the ratio of positive notifications per test may be an underestimate of the per cent of people tested that are positive for the condition.

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

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

[iv] Australian Bureau of Statistics. Estimated resident populations based on 2011 Census counts and mid-series experimental population projections.

ACKNOWLEDGEMENTS

The NSW OzFoodNet Annual Report 2019 was possible due to the collaborative work of many people, some mentioned by name here, who contribute in varying capacities to the management of communicable enteric diseases in NSW:

- NSW Public Health Unit staff for surveillance, reporting and investigation of enteric disease cases, clusters and outbreaks
- HAPS, ICPMR, IMVS, MDU and other public and private laboratory staff in New South Wales, Queensland, Victoria and South Australia
- Enteric diseases and OzFoodNet team, Communicable Diseases Branch, Health Protection, NSW
- Hunter New England OzFoodNet team and Dr Tony Merritt, Dr Craig Dalton and Dr David Durrheim, Hunter New England Local Health District
- Dr Shireen Durrani & Dr Elaine Tennant, Acting Directors, Communicable Diseases Branch
- Dr Richard Broome, Acting Director, Health Protection, NSW
- 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
- Roy Byun, Laboratory Liaison Officer and Alicia Arnott, WGS Epidemiologist with ICPMR Westmead
- All OzFoodNet epidemiologists and collaborators
- Partners in NSW Department of Primary Industries and associated stakeholders