

OzFoodNet

Enhancing Foodborne Disease Surveillance Across Australia

NSW ANNUAL REPORT 2021



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SHPN: (HP NSW) 210511 NSW
ISBN: 978-1-76081-809-8

Suggested citation:

Communicable Diseases Branch. *NSW OzFoodNet Annual Surveillance Report: 2021*. Sydney: Health Protection NSW, 2022.

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April, 2022

TABLE OF CONTENTS

Table of contents	3
Glossary	4
Summary – Enteric Infections in NSW	5
Campylobacteriosis.....	7
Salmonellosis.....	8
<i>Salmonella</i> Enteritidis infection	10
Typhoid & paratyphoid fever	11
Shigellosis.....	12
Listeriosis	13
Shiga toxin producing <i>E. Coli</i> infection (STEC)	14
Haemolytic Uraemic Syndrome (HUS)	15
Cryptosporidiosis	16
Giardiasis	17
Hepatitis A.....	18
Hepatitis E.....	19
Rotavirus infection	20
Denominator data	21
Culture Independent Testing.....	23
Surveillance of foodborne outbreaks	24
Outbreak summary 2021	26
Significant enteric outbreaks 2021	29
Institutional gastrointestinal outbreaks.....	32
Activity in NSW during 2021	33
Methods	34
Acknowledgements.....	36

GLOSSARY

ACF	Aged-care facility	N/A	Not available
CC	Central Coast LHD	NBM	Nepean Blue Mountains LHD
CCC	Childcare centre	NNSW	Northern NSW LHD
DPI	Department of Primary Industries	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>
MDR	Multi-drug resistant	SWS	South Western Sydney LHD
MLVA	Multi-locus variable number tandem repeat analysis	SYD	Sydney LHD
MLST	Multi-locus sequence typing	WGS	Whole genome sequencing
MNC	Mid North Coast LHD	WNSW	Western NSW LHD
N	Number	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 2021, changes in notifications over time, and other activities in 2021. 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 2021 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 2021

Notifications of enteric conditions: 16,679

Reported hospitalisations: 304

Reported deaths: 3

Notification rate per 100,000 population: 200.4

Notified incidence and reported hospitalisation due to enteric pathogens in NSW, 2021

	5Yr annual mean	N 2021	% change	Notified Rate	Reported Hospitalisations
Campylobacter ^b	N/A	11171	N/A	134.2	9
Salmonellosis	3564.6	3005	-16%	36.1	158
Giardiasis	2935.0	1499	-49%	18.0	0
Cryptosporidiosis	872.0	429	-51%	5.2	35
Rotavirus	1223.4	354	-71%	4.3	12
STEC/VTEC	73.8	122	65%	1.5	50
Shigellosis	480.0	59	-88%	0.7	13
Listeriosis	21.4	22	3%	0.3	17
Hepatitis A	53.2	10	-81%	0.1	6
Typhoid	48.6	3	-94%	0.04	1
Botulism	1.8	2	11%	0.02	2
Cholera	0.2	1	400%	0.01	0
Hepatitis E	16.8	1	-94%	0.01	1
Paratyphoid	24.4	1	-96%	0.01	0
Haemolytic Uremic Syndrome	3.2	0	-100%	0.0	0
TOTAL	N/A	16679	N/A	200.4	304

^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 2021 (compared to 5 year annual average, 2016-2020)

- Campylobacteriosis was the highest enteric infection notified in 2021. 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 65% compared to the five year annual average. This increase can be partly attributed to introductions of a more sensitive test across laboratories in NSW since 2020 (page 13).
- There were two notification of Botulism in 2021. One was thought to be due to injecting drug use and the other was a case of infant botulism of unknown source.
- One notification of Cholera occurred in 2021. This was serotype 01 Inaba and was acquired in Bangladesh.

Reported enteric disease outbreaks

- 31 foodborne or potentially foodborne disease outbreaks were reported affecting at least 493 people; a 6% decrease in the number of reported foodborne or probable foodborne disease outbreaks compared to 2020 (n=33)
- 1284 viral or probable viral gastroenteritis outbreaks in institutions were reported, affecting at least 15774 people; a 53% increase in the number of reported gastroenteritis outbreaks in institutions compared to 2020 (n=841)

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 only investigated if they are part of, or suspected to be part of, an outbreak.

Summary 2021

- Case count: 11171^a
- Reported hospitalisations: 9^b
- Reported deaths: 0
- Notification rate per 100,000: 134.6

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

Overall trend

There was an 18.8% increase when compared to the previous year (n=9405). Campylobacteriosis became a notifiable condition on 7 April 2017.

Groups with highest notification rate in 2021

Age: <5 years (10.1% of cases – 207.4 per 100,000)

Sex: Male (55% of cases – 150.1 per 100,000)

LHD: Murrumbidgee (6% of cases – 256.0 per 100,000)

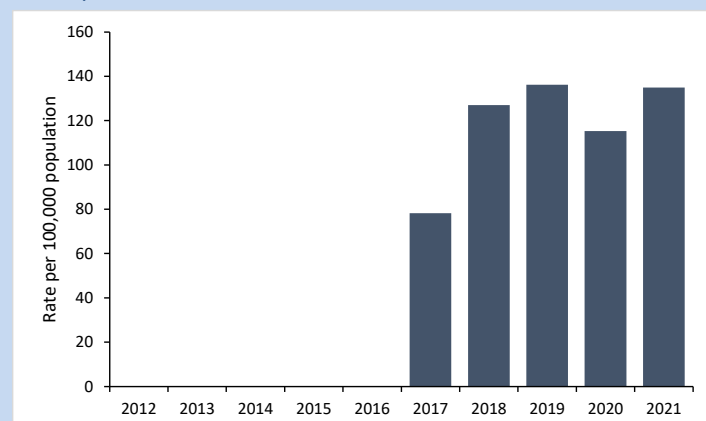
Seasonality

Campylobacteriosis notifications were highest in the warmer months, particularly in November (n=1159) and February 2021 (n=1037)

Outbreaks

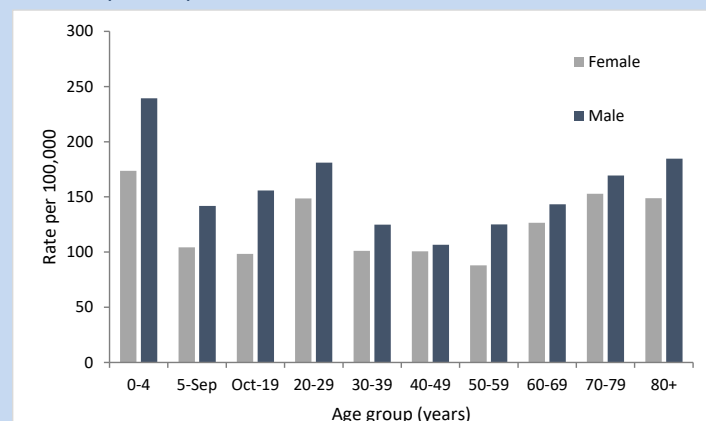
Three outbreaks were detected in NSW in 2021 affecting 12 people. (pages 23-27)

Notification rate per 100,000 population by year, 2017 – 2021, 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, 2021, NSW



Number of cases and rates (per 100,000) by Local Health District, 2021, NSW

LHD	Count		Rate	
	5Yr mean	2021	5yr mean	2021
CC	N/A	462	N/A	129.0
FW	N/A	33	N/A	109.0
HNE	N/A	853	N/A	88.3
IS	N/A	633	N/A	149.0
MNC	N/A	323	N/A	141.0
MURR	N/A	627	N/A	256.0
NBM	N/A	604	N/A	151.0
NNSW	N/A	581	N/A	184.0
NS	N/A	1652	N/A	170.0
SES	N/A	1504	N/A	154.0
SWS	N/A	815	N/A	76.2
SNSW	N/A	462	N/A	209.0
SYD	N/A	705	N/A	98.9
WNSW	N/A	552	N/A	192.0
WS	N/A	1365	N/A	125.0
NSW	N/A	11171	N/A	134.2

* 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 2021

- Case count: 3005
- Reported hospitalisations: 158*
- Reported deaths: 0
- Notification rate per 100,000: 36.1

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

Overall trend

19.4% decrease in the 2021 notification rate compared to the 5 year annual mean (44.8 per 100,000)

Groups with most notifications in 2021

- Age: <5 years (25.8% of cases – 141.9 per 100,000)
- Sex: Female (51% of cases – 36.6 per 100,000)
- LHD: Northern Sydney (11.6% of cases – 35.8 per 100,000)

Seasonality

Consistent peaks in summer months (Dec-Feb)

Top serotypes in 2021 (% of all types *Salmonella*) - % change compared to 2020

1. Typhimurium (39%) - ↑ 3%
2. Saintpaul (9%) - ↑ 69%
3. Wangata (8%) - ↓ 3%
4. Virchow (3%) - ↓ 19%
5. Birkenhead (3%) - ↓ 14%

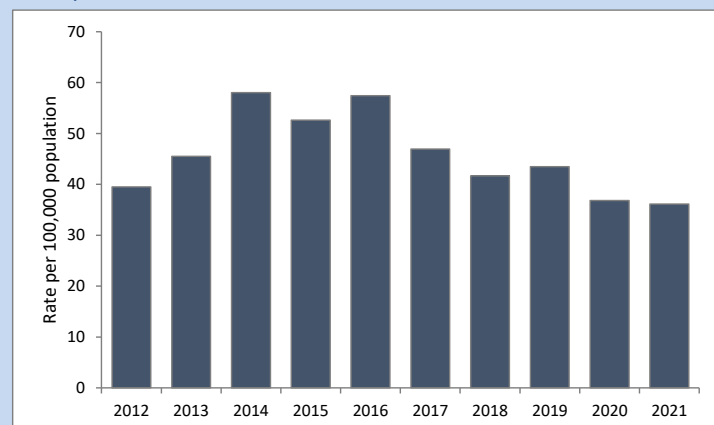
Outbreaks

13 foodborne outbreaks caused by *Salmonella* were detected in NSW in 2021, affecting 367 people (12.2% of all *Salmonella*) (pages 23-27)

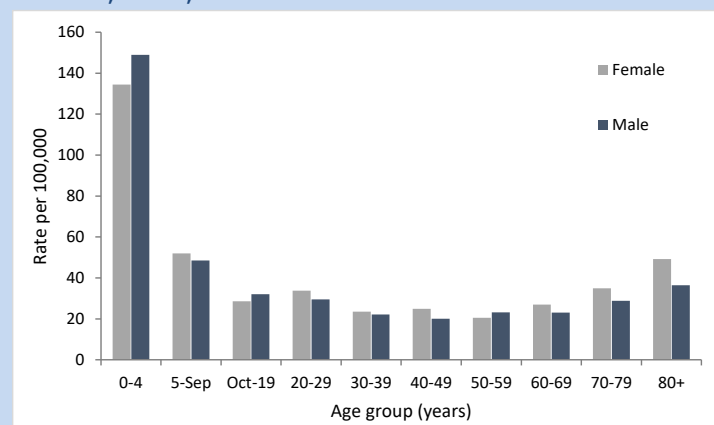
Deaths

No deaths related to salmonellosis infection were recorded in 2021.

Notification rate per 100,000 population by year, 2012 – 2021, NSW



Notification rate per 100,000 population by age category and sex, 2021, NSW



Number of cases and rates (per 100,000) by Local Health District, 2021, NSW

LHD	Count		Rate	
	5Yr mean	2021	5yr mean	2021
CC	166.4	134	48.4	37.3
FW	14.0	7	46.7	23.2
HNE	404.4	339	43.4	35.1
IS	161.8	106	39.2	24.9
MNC	143.2	127	64.8	55.5
MURR	143.2	142	59.0	58.0
NBM	149.8	122	39.5	30.6
NNSW	278.2	317	91.7	101.0
NS	471.8	348	50.5	35.8
SES	426.6	262	45.5	26.9
SWS	374.6	326	37.4	30.5
SNSW	82.2	77	38.9	34.8
SYD	260.8	189	38.5	26.5
WNSW	107.0	179	37.9	62.4
WS	389.8	330	37.9	30.2
NSW	3564.6	3005	44.8	36.1

Salmonellosis continued

Salmonella serotypes

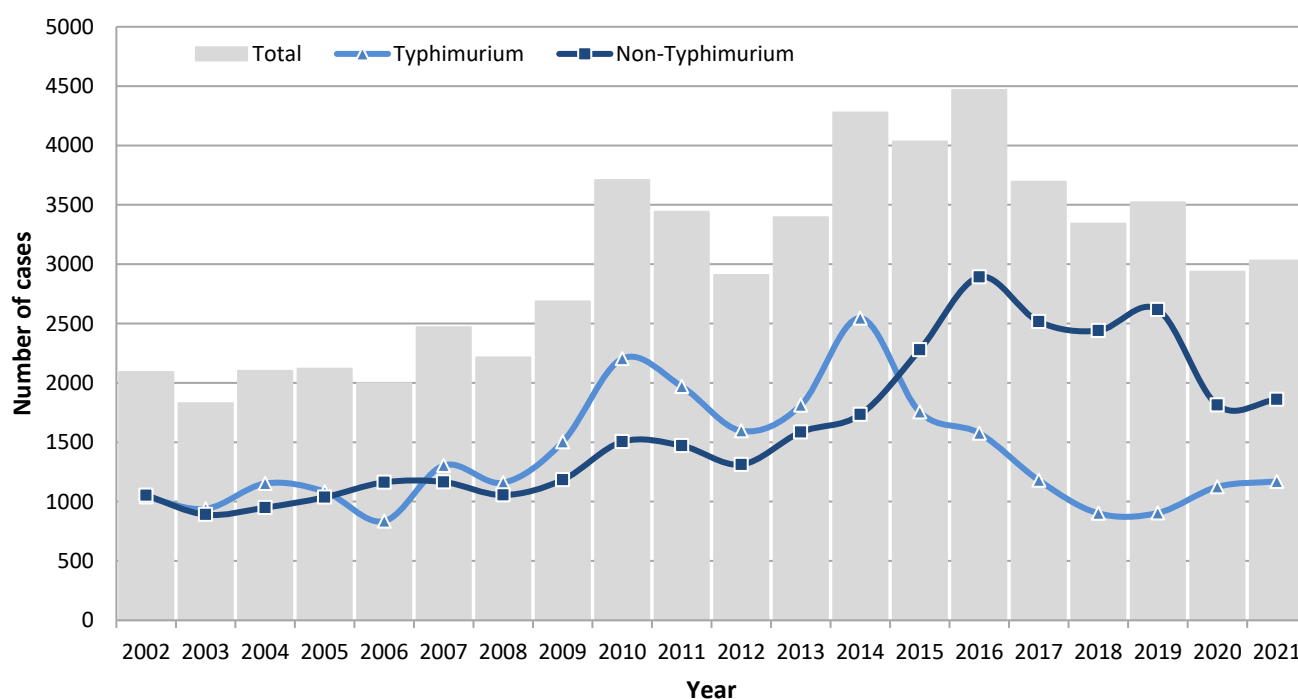
Top 5 *Salmonella* serotypes in NSW, 2017-2021 (number of notifications)

	2017	2018	2019	2020	2021
1	Typhimurium (1166)	Typhimurium (892)	Typhimurium (901)	Typhimurium (1120)	Typhimurium (1156)
2	Wangata (200)	Enteritidis (284)	Enteritidis (362)	Wangata (261)	Saintpaul (257)
3	Birkenhead (158)	Wangata (200)	Wangata (222)	Saintpaul (152)	Wangata (252)
4	Enteritidis (153)	Ser 4,5,12:i:- (136)	Paratyphi B bv Java (120)	Enteritidis (113)	Virchow (85)
5	Ser 4,5,12:I (133)	Birkenhead (119)	Virchow (117)	Virchow (105)	Birkenhead (83)

Salmonella Typhimurium trends

In 2021, *Salmonella* Typhimurium notifications increased by 3% when compared to 2020.

Number of *Salmonella* Typhimurium infections compared to other *Salmonella* serotypes in NSW, 2002-21.



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 2021

- Case count: 35
- Reported hospitalisations: 9
- Reported deaths: 0
- Notification rate per 100,000: 0.4

Overall trend

82.8% decrease in the 2021 notification rate compared to the 5 year annual mean (2.9 per 100,000)

Groups with highest notification rate in 2021

Age: <5 years (32.4% of cases – 2.2 per 100,000)

Sex: Female (57% of cases – 0.5 per 100,000)

LHD: South Eastern Sydney (23% of cases – 0.8 per 100,000)

Seasonality

Typically peaks in October, however in 2021 peak occurred in summer months (Dec-Feb).

Place of acquisition in 2021

In NSW: 96%

In Australia & outside NSW: 0%

Overseas: 0%

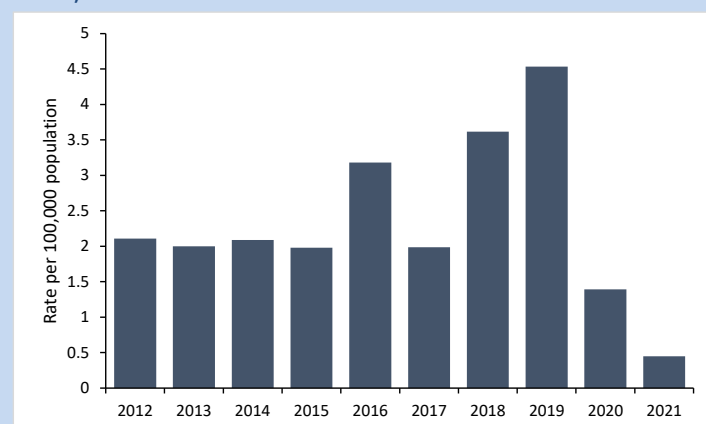
Unknown: 4%

(data available from 80% of cases)

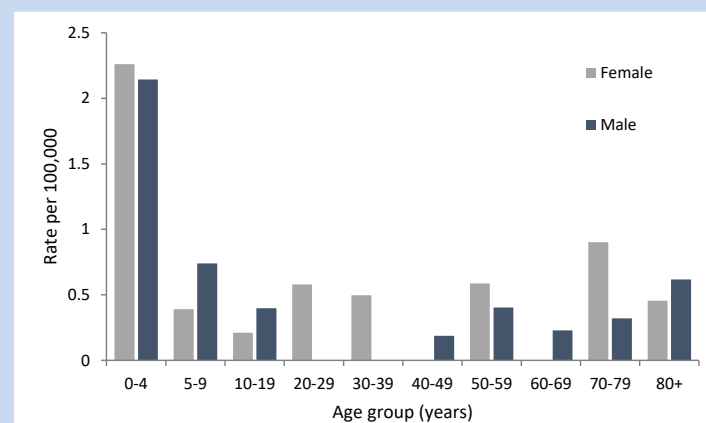
Outbreaks

There was 1 *Salmonella* Enteritidis outbreaks in 2021 which affected 4 people (pages 23-27).

Notification rate per 100,000 population by year, 2012 – 2021, NSW



Notification rate per 100,000 population by age category and sex, 2021, NSW



Number of cases and rates (per 100,000) by Local Health District, 2021, NSW

LHD	Count		Rate	
	5Yr mean	2021	5yr mean	2021
CC	8.6	0	2.5	0.0
FW	0.4	0	1.33	0.0
HNE	17.2	6	1.84	0.6
IS	10.8	0	2.62	0.0
MNC	7.6	0	3.44	0.0
MURR	4.6	0	1.9	0.0
NBM	9.4	1	2.48	0.3
NNSW	11.0	1	3.63	0.3
NS	42.0	3	4.49	0.3
SES	32.8	8	3.5	0.8
SWS	27.0	5	2.7	0.5
SNSW	4.6	0	2.18	0.0
SYD	20.6	5	3.04	0.7
WNSW	3.2	0	1.13	0.0
WS	31.2	6	3.12	0.6
NSW	234.0	35	2.9	0.5

*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 2021

- Case count: 4
- Reported hospitalisations: 1
- Reported deaths: 0
- Notification rate per 100,000: 0.05

Seasonality

Peaks typically in summer months (Jan-Feb)

Place of acquisition in 2021

In NSW: 25.0%
Overseas: 50.0%
Unknown: 25.0%

Overall trend

94.4% decrease in the 2021 notification rate compared to the 5 year annual mean (0.9 per 100,000)

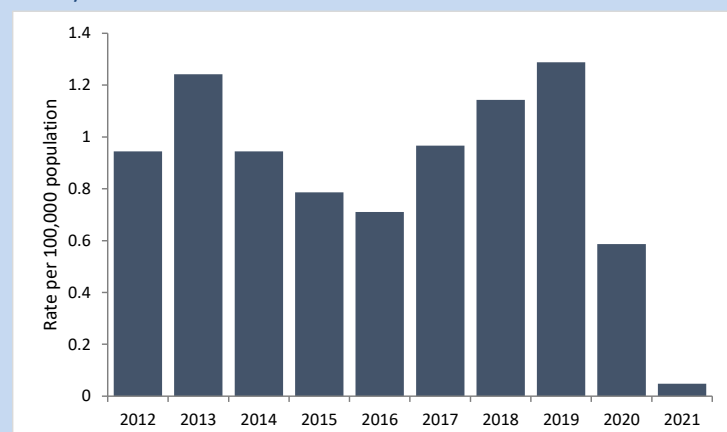
Groups with highest notification rate in 2021

LHD: South Western Sydney (75% of cases – 0.3 per 100,000)

Outbreaks

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

Notification rate per 100,000 population by year, 2012 – 2021, NSW

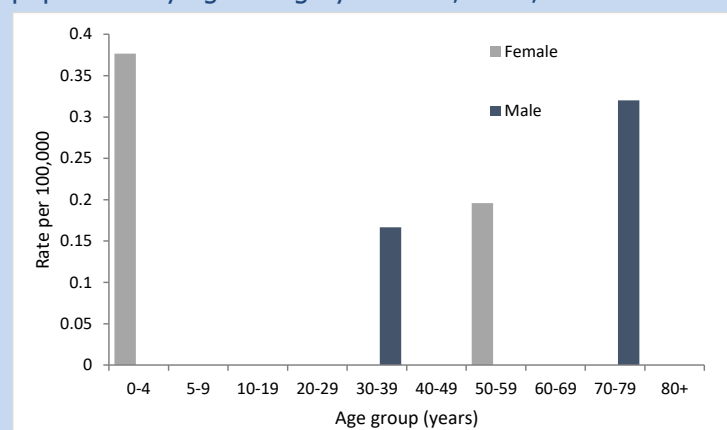


Number of cases and rates (per 100,000) by Local Health District, 2021, NSW

LHD	Count		Rate	
	5Yr mean	2021	5Yr mean	2021
CC	1.2	0	0.3	0.0
FW	0	0	0.0	0.0
HNE	2.6	0	0.3	0.0
IS	1.6	0	0.4	0.0
M	0.2	0	0.1	0.0
MNC	0.2	0	0.1	0.0
NBM	2.2	1	0.6	0.25
NNSW	0.8	0	0.3	0.0
NS	6.4	0	0.7	0.0
SES	8.2	0	0.9	0.0
SWS	10	3	1.0	0.28
SNSW	0.6	0	0.3	0.0
SYD	8	0	1.2	0.0
WNSW	0.8	0	0.3	0.0
WS	30.2	0	3.0	0.0
NSW	73.0	4	0.9	0.05

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

Typhoid and paratyphoid notification rate per 100,000 population by age category and sex, 2021, NSW



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. A change in the national case definition occurred on 1 July 2019 to include probable cases (detection by PCR test only), which has affected the trend in recent years.

Summary 2021

- Case count: 59
- Confirmed cases: 25, Probable cases: 34
- Reported hospitalisations: 13*
- Notification rate per 100,000: 0.71

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

Overall trend

88.3% decrease in the 2021 notification rate compared to the 5 year annual mean (6.0 per 100,000).

Groups with highest notification rate in 2021

Age: <5 years (20.3% of cases – 2.2 per 100,000)
 Sex: Male (66.1% of cases – 0.95 per 100,000)
 LHD: SES (28.8% of cases – 1.74 per 100,000)

Seasonality

No significant trend (highest in February and March)

Place of acquisition in 2021

In NSW: 79%

Overseas: 12%

Unknown: 9%

(information available from 58% of cases)

Risk exposures reported (locally acquired only)*

Men who have sex with men (MSM): 26%

Contact with a confirmed/possible case: 4%

Unknown: 70%

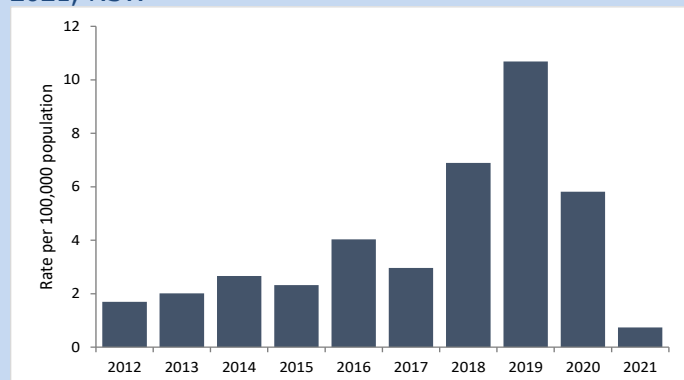
Typing of confirmed cases

Sonnei: 64%

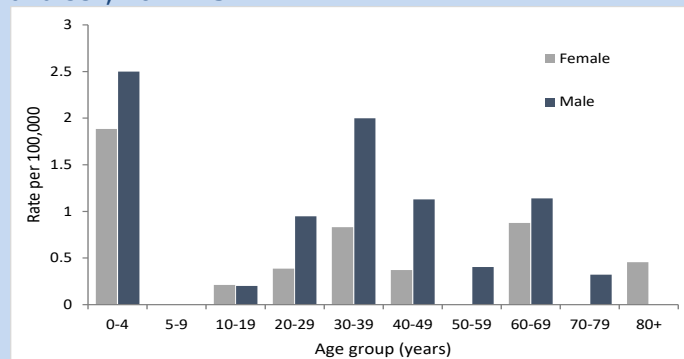
Flexneri: 32%

Dysenteriae: 4%

Notification rate per 100,000 population by year, 2012 – 2021, NSW



Notification rate per 100,000 population by age category and sex, 2021 NSW



Number of cases and rates (per 100,000) by Local Health District, 2021, NSW

LHD	Count		Rate	
	5Yr mean	2021	5Yr mean	2021
CC	14.6	0	4.2	0.0
FW	0.4	0	1.3	0.0
HNE	25.0	5	2.7	0.5
IS	12.2	0	3.0	0.0
MNC	5.2	1	2.4	0.4
MURR	6.4	0	2.6	0.0
NBM	13.8	2	3.6	0.5
NNSW	22.2	2	7.3	0.6
NS	67.6	7	7.2	0.7
SES	118.8	17	12.7	1.7
SWS	35.4	6	3.5	0.6
SNSW	6.4	2	3.0	0.9
SYD	91.0	10	13.4	1.4
WNSW	6.0	2	2.1	0.7
WS	55.2	5	5.5	0.5
NSW	480.2	59	6.0	0.7

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 2021

- Case count: 22
- Reported hospitalisations: 17
- Reported deaths: 3
- Notification rate per 100,000: 0.3

Overall trend

The 2021 notification rate was similar to the 5 year annual mean (0.3 per 100,000)

Groups with highest notification rate in 2021

Age: 80+ years (18% of cases – 1.0 per 100,000)

Sex: Male (73% of cases - 0.4 per 100,000)

LHD: Far West (4.6% of cases – 3.3 per 100,000)

Deaths

Two deaths occurred in people aged 49-76 years, from South Eastern Sydney and Hunter New England regions. One neonatal death also occurred from Western Sydney.

Place of acquisition in 2021

In NSW: 92%

In Australia & outside NSW: 0%

Overseas: 0%

Unknown: 8%

(based on responses from 59.1% of cases)

Seasonality

Notifications were highest in March and July (36.4%)

Outbreaks

There were no listeriosis outbreaks detected in 2021.

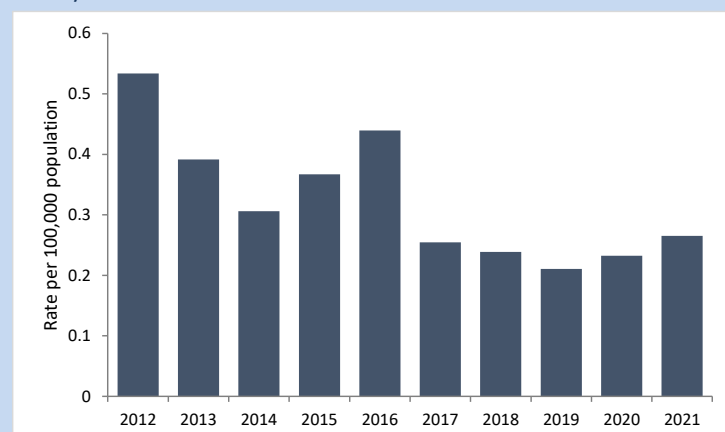
Most common comorbidities reported

Immunosuppressive agent or condition: 6

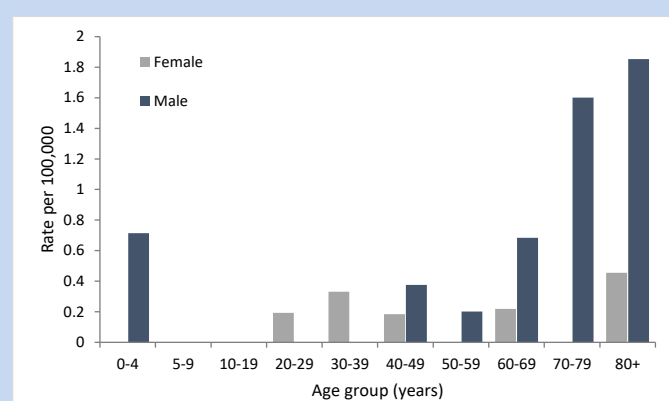
Perinatal

Two perinatal cases were reported in 2021, which resulted in a stillbirth and premature birth.

Notification rate per 100,000 population by year, 2012 – 2021, NSW



Notification rate per 100,000 population by age category and sex, 2021, NSW



Number of cases and rates (per 100,000) by Local Health District, 2021, NSW

LHD	Count		Rate	
	5Yr mean	2021	5yr mean	2021
CC	1.0	0	0.3	0.0
FW	0	1	0.0	3.3
HNE	1.2	4	0.1	0.4
IS	1.8	0	0.4	0.0
MNC	0.4	0	0.2	0.0
MURR	0.4	0	0.2	0.0
NBM	0.4	0	0.1	0.0
NNSW	0.6	1	0.2	0.3
NS	3.6	3	0.4	0.3
SES	3.4	4	0.4	0.4
SWS	2.6	3	0.3	0.3
SNSW	1.0	0	0.5	0.0
SYD	2.8	0	0.4	0.0
WNSW	0.4	0	0.1	0.0
WS	1.8	6	0.2	0.6
NSW	21.4	22	0.3	0.3

* 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 2021

- Case count: 122
- Reported hospitalisations: 50
- Reported deaths: 0
- Notification rate per 100,000: 1.5

Overall trend

In 2021 there was a 66.7% increase in notification rate compared to 5 year annual mean (0.9 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 2021

- Age: <5 years (15.6% of cases – 3.5 per 100,000)
- Sex: Males (54.1% of cases – 1.6 per 100,000)
- LHD: Western NSW (7.3 per 100,000, 17.2% of notifications)

Seasonality

The highest number of notifications occurred in October and December.

Place of acquisition in 2021

- In NSW: 55.7%
- Unknown: 2.5%

(based on responses from 58.2% of cases)

Risk exposures reported (locally acquired only)

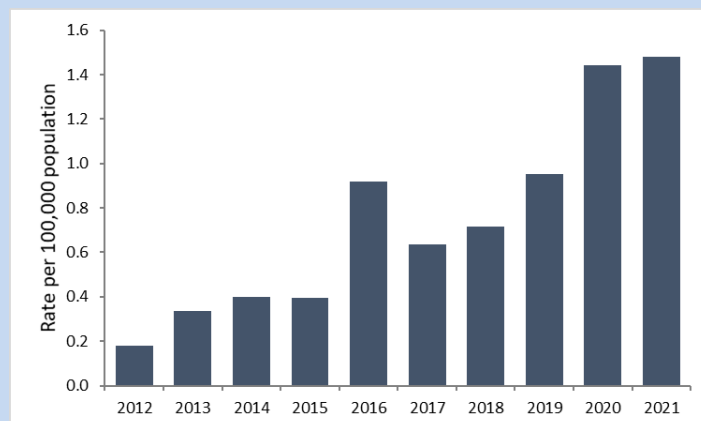
- Ate beef during incubation: 34%
- Any restaurant during incubation: 19%
- Animal contact: 21%
- Farm exposure: 10%

Note: Cases may report more than one risk factor. Only 50% of cases were followed up in 2021

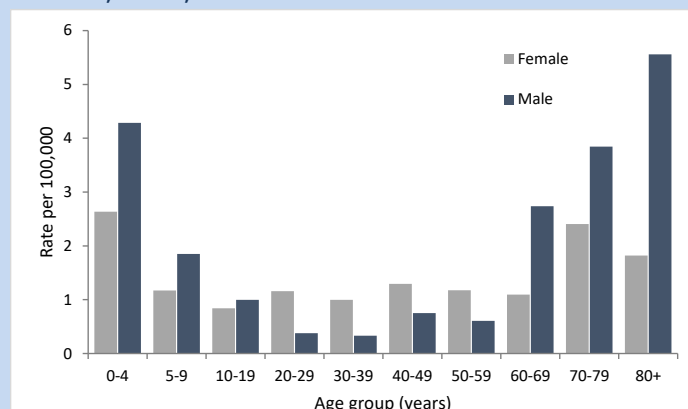
Deaths

No deaths relating to STEC were reported in 2021

Notification rate per 100,000 population by year, 2012 – 2021, NSW



Notification rate per 100,000 population by age category and sex, 2021, NSW



Number of cases and rates (per 100,000) by Local Health District, 2021, NSW

LHD	Count		Rate	
	5Yr mean	2021	5yr mean	2021
CC	1.4	0	0.4	0.0
FW	0.4	1	1.3	3.3
HNE	9.2	27	1.0	2.8
IS	1.0	2	0.2	0.5
MNC	0.4	6	0.2	2.6
MURR	12.6	15	5.2	6.1
NBM	3.2	6	0.8	1.5
NNSW	1.2	0	0.4	0.0
NS	1.6	4	0.2	0.4
SES	4.0	4	0.4	0.4
SWS	2.0	5	0.2	0.5
SNSW	9.4	9	4.5	4.1
SYD	0.4	1	0.1	0.1
WNSW	11.4	21	4.0	7.3
WS	15.2	21	1.5	1.9
NSW	73.8	122	0.9	1.5

* 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.

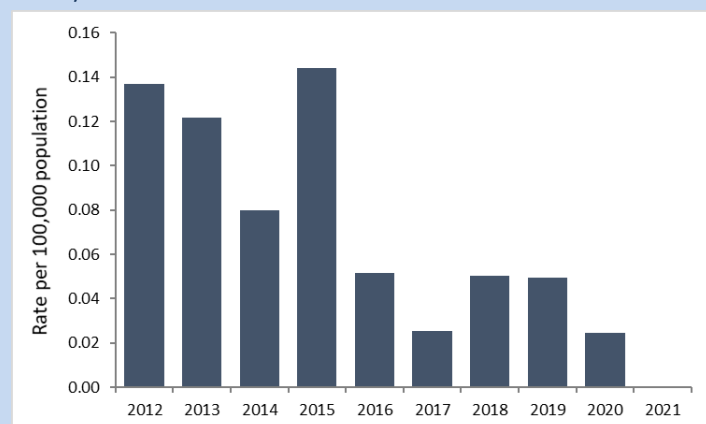
Summary 2021

- Case count: 0
- Reported hospitalisations: 0
- Reported deaths: 0
- Notification rate per 100,000: 0.0

Overall trend

In 2021, there were no notifications of HUS in NSW.

Notification rate per 100,000 population by year, 2012 – 2021, NSW



Number of cases and rates (per 100,000) by Local Health District, 2021, NSW

LHD	Count		Rate	
	5Yr mean	2021	5yr mean	2021
CC	0.2	0	0.06	0.0
FW	0.0	0	0.00	0.0
HNE	0.8	0	0.09	0.0
IS	0.4	0	0.10	0.0
MNC	0.0	0	0.00	0.0
MURR	0.2	0	0.08	0.0
NBM	0.0	0	0.00	0.0
NNSW	0.2	0	0.07	0.0
NS	0.4	0	0.04	0.0
SES	0.0	0	0.00	0.0
SWS	0.2	0	0.02	0.0
SNSW	0.2	0	0.09	0.0
SYD	0.0	0	0.00	0.0
WNSW	0.0	0	0.00	0.0
WS	0.6	0	0.06	0.0
NSW	3.2	0	0.04	0.0

* 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 2021

- Case count: 429
- Reported hospitalisations: 35
- Reported deaths: 0
- Notification rate per 100,000: 5.2

Overall trend

- 52.7% decrease in the 2021 notification rate compared to 5 year annual mean (11.0 per 100,000)

Groups with highest notification rate in 2021

- Age: <5 years (15.4% of cases – 12.1 per 100,000)
- Sex: Female (54.8% of cases – 5.6 per 100,000)
- LHD: Western NSW (9.4 per 100,000 – 6.3% of total notifications)

Seasonality

- Peaks in summer months (Dec-Feb)

Place of acquisition in 2021

- In NSW: 87%
- In Australia & outside NSW: 3%
- Unknown: 11%

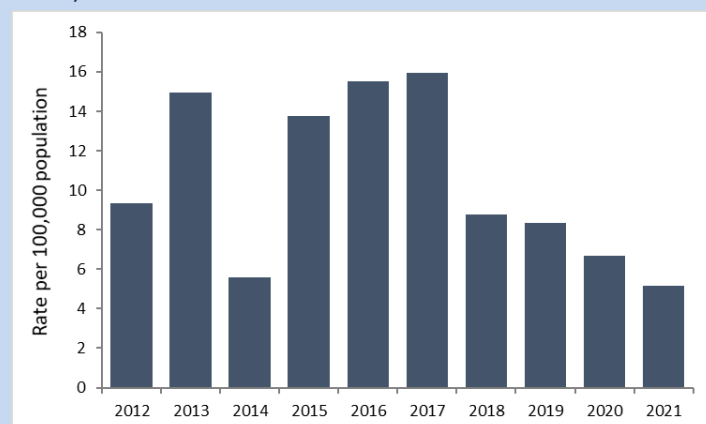
(based on responses from 56% of cases)

Risk exposures reported (locally acquired only)

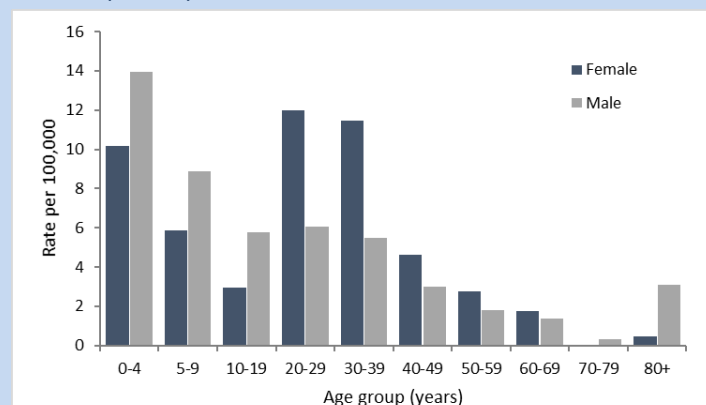
- Consumed salad items: 23%
- Farm/farm animal exposure: 11%
- Public swimming pool: 7%

Note: Some cases may report more than one risk factor. Responses only received from 56% of cases.

Notification rate per 100,000 population by year, 2012 – 2021, NSW



Notification rate per 100,000 population by age category and sex, 2021, NSW



Number of cases and rates (per 100,000) by Local Health District, 2021, NSW

LHD	Count		Rate	
	5Yr mean	2021	5yr mean	2021
CC	37.0	9	10.8	2.5
FW	1.2	0	4	0.0
HNE	113.0	77	12.1	8.0
IS	63.2	19	15.3	4.5
MNC	29.2	14	13.2	6.1
MURR	33.4	20	13.8	8.2
NBM	40.4	18	10.6	4.5
NNSW	55.2	25	18.2	7.9
NS	133.4	55	14.3	5.7
SES	102.8	60	11	6.2
SWS	70.6	34	7.05	3.2
SNSW	16.4	19	7.77	8.6
SYD	53.4	30	7.89	4.2
WNSW	50.8	27	18	9.4
WS	72.0	22	7.19	2.0
NSW	872.0	429	11.0	5.2

* 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 2021

- Case count: 1499
- Reported hospitalisations: 0*
- Reported deaths: 0
- Notification rate per 100,000: 18.0

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

Overall trend

- 51.2% decrease in 2021 notification rate compared to 5 year average (36.9 per 100,000)

Groups with highest notification rate in 2021

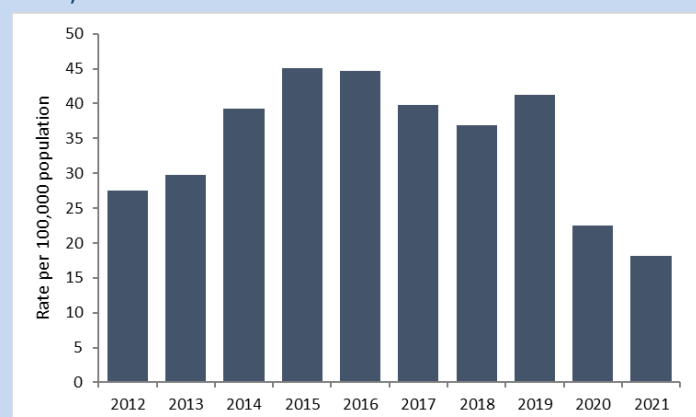
- Age: <5 years (18.4% of cases – 50.4 per 100,000)
- Sex: Male (58.0% of cases – 21.1 per 100,000)
- LHD: Northern NSW (10.4% of cases – 49.5 per 100,000)

Seasonality

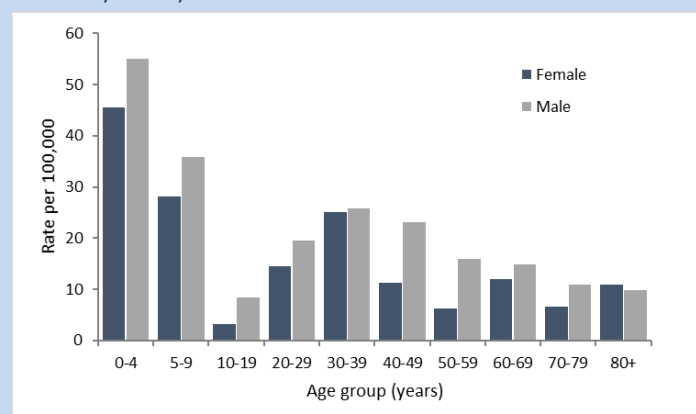
- Peaks in summer to autumn months (Jan-May)

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

Notification rate per 100,000 population by year, 2012 – 2021, NSW



Notification rate per 100,000 population by age category and sex, 2021, NSW



Number of cases and rates (per 100,000) by Local Health District, 2021, NSW

LHD	Count		Rate	
	5Yr mean	2021	5yr mean	2021
CC	129.4	66	37.6	18.4
FW	6.8	6	22.7	19.9
HNE	349.8	163	37.5	16.9
IS	151.0	75	36.6	17.7
MNC	83.8	45	37.9	19.7
MURR	112.6	45	46.4	18.4
NBM	126.8	61	33.4	15.3
NNSW	175.4	156	57.8	49.5
NS	438.4	239	46.9	24.6
SES	487.8	222	52.1	22.8
SWS	217.6	131	21.7	12.3
SNSW	40.4	30	19.1	13.6
SYD	254.2	81	37.6	11.4
WNSW	109.8	54	38.9	18.8
WS	251.0	124	25.1	11.3
NSW	2935.0	1499	36.9	18.0

* 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 2021

- Case count: 10
- Reported hospitalisations: 6
- Reported deaths: 0
- Notification rate per 100,000: 0.1

Overall trend

- 85.7% decrease in the 2021 notification rate compared to 5 year average (0.7 per 100,000)

Groups with highest notification rate in 2021

- Age: 20-29 years (30.0% of cases – 0.29 per 100,000)
- Sex: Male (60.0% of cases – 0.2 per 100,000)
- LHD: Illawarra Shoalhaven (0.5 per 100,000, 20.0% of cases)

Seasonality

- No seasonality

Place of acquisition in 2021

- In NSW: 60%
- In Australia & outside NSW: 0%
- Overseas: 40%
- Unknown: 0%

(note: data available on 100% of cases)

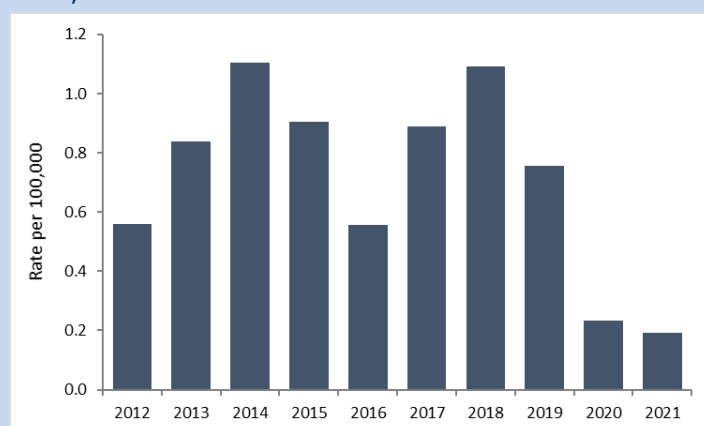
Risk exposures reported (locally acquired)

- Imported (commercial) fruit consumption: 100%

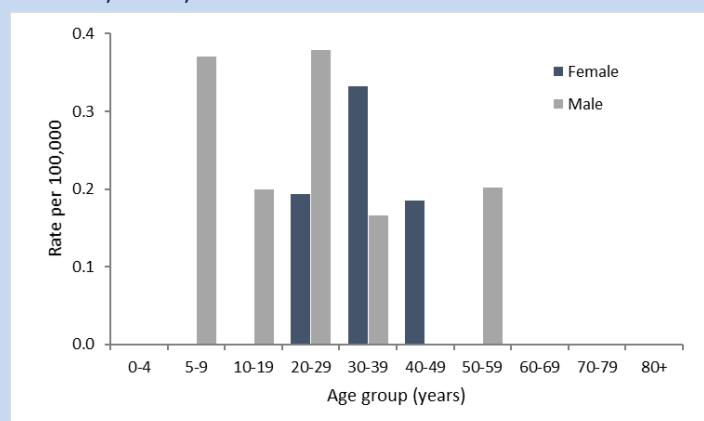
Outbreaks

There was one outbreak of hepatitis A detected in 2021 which affected 5 people (pages 23-27).

Notification rate per 100,000 population by year, 2012 – 2021, NSW



Notification rate per 100,000 population by age category and sex, 2021, NSW



Number of cases and rates (per 100,000) by Local Health District, 2021, NSW

LHD	Count		Rate	
	5Yr mean	2021	5yr mean	2021
CC	1.0	0	0.3	0.0
FW	0.4	0	1.3	0.0
HNE	2.8	0	0.3	0.0
IS	2.0	2	0.5	0.5
MNC	0.0	0	0.0	0.0
MURR	1.2	0	0.5	0.0
NBM	2.0	1	0.5	0.3
NNSW	0.4	0	0.1	0.0
NS	5.6	1	0.6	0.1
SES	8.0	2	0.9	0.2
SWS	7.8	1	0.8	0.1
SNSW	0.0	0	0.0	0.0
SYD	7.8	1	1.2	0.1
WNSW	0.8	0	0.3	0.0
WS	13.4	2	1.3	0.2
NSW	53.2	10	0.7	0.1

* 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 2021

- Case count: 1
- Reported hospitalisations: 1
- Reported deaths: 0
- Notification rate per 100,000: 0.01

Overall trend

- 95.2% decrease in 2021 notification rate compared to 5 year average (0.21 per 100,000)

Place of acquisition in 2021

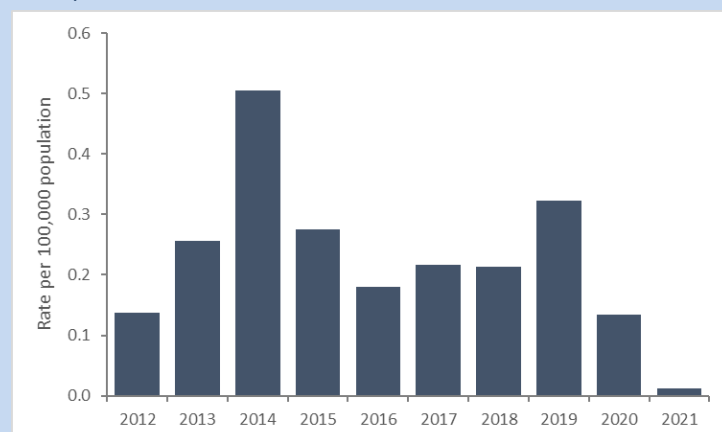
- In NSW: 100%
- In Australia & outside NSW: 0%
- Overseas: 0%
- Unknown: 0%

(note: data available on 100% of cases)

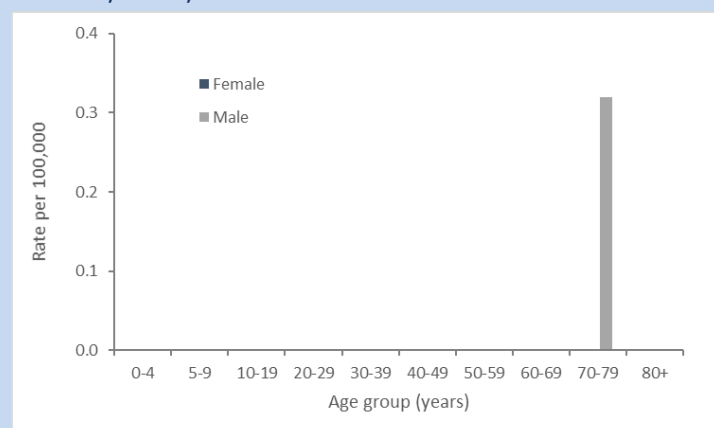
Risk exposures reported (locally acquired)

- Pig farm exposure and pork consumption: 100%

Notification rate per 100,000 population by year, 2012 – 2021, NSW



Notification rate per 100,000 population by age category and sex, 2021, NSW



Number of cases and rates (per 100,000) by Local Health District, 2021, NSW

LHD	Count		Rate	
	5Yr mean	2021	5yr mean	2021
CC	0.4	0	0.12	0.0
FW	0.0	0	0.00	0.0
HNE	0.4	0	0.04	0.0
IS	0.4	0	0.1	0.0
MNC	0.2	0	0.09	0.0
MURR	0.2	1	0.08	0.4
NBM	1.2	0	0.32	0.0
NNSW	0.2	0	0.07	0.0
NS	2.2	0	0.24	0.0
SES	1.2	0	0.13	0.0
SWS	2.4	0	0.24	0.0
SNSW	0.0	0	0.00	0.0
SYD	2.2	0	0.33	0.0
WNSW	0.0	0	0.00	0.0
WS	5.8	0	0.58	0.0
NSW	16.8	1	0.21	0.01

* 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 2021

- Case count: 354
- Reported hospitalisations: 12*
- Reported deaths: 0
- Notification rate per 100,000: 4.3

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

Overall trend

- 72.1% decrease in the 2021 notification rate compared to 5 year average (15.4 per 100,000)

Seasonality

- Usually peaks in spring to summer, in 2021 it peaked in June.

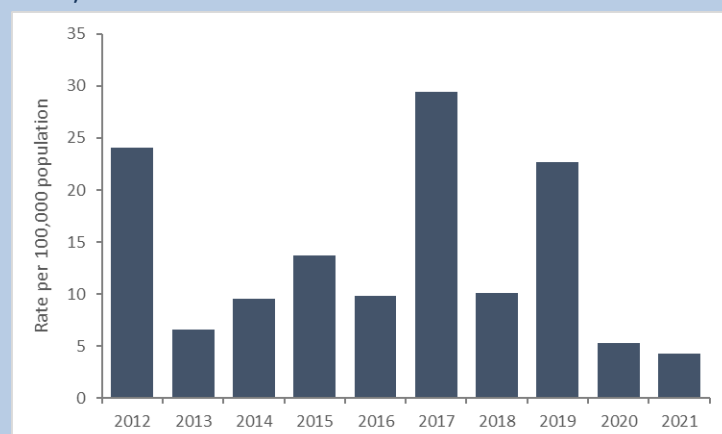
Groups with highest notification rate in 2021

- Age: <5 years (67.9% of cases – 43.8 per 100,000)
- Sex: Equal distribution
- LHD: South Western Sydney (6.8 per 100,000 – 20.7% of cases)

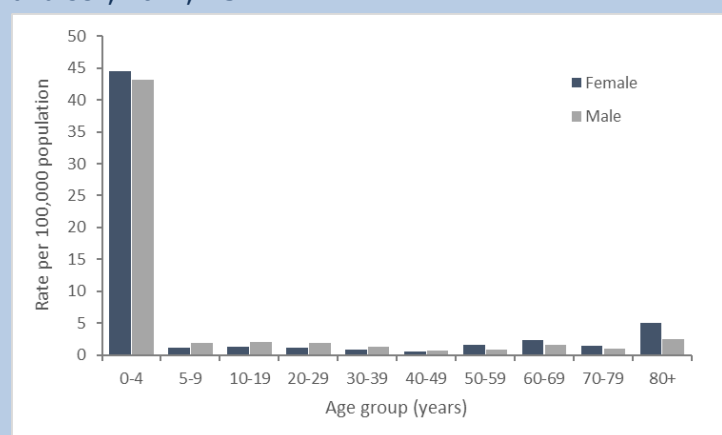
Outbreaks

- Cases found to be associated with an institutional outbreak: 5 cases (1.4%) associated with 4 institutional outbreaks

Notification rate per 100,000 population by year, 2012 – 2021, NSW



Notification rate per 100,000 population by age category and sex, 2021, NSW



Number of cases and rates (per 100,000) by Local Health District, 2021, NSW

LHD	Count		Rate	
	5Yr mean	2021	5yr mean	2021
CC	32.4	7	9.4	2.0
FW	2.8	0	9.3	0.0
HNE	88.4	28	9.5	2.9
IS	34.0	16	8.2	3.8
MNC	6.8	5	3.1	2.9
MURR	36.2	13	14.9	5.3
NBM	58.4	20	15.4	5.0
NNSW	57.8	21	19.0	6.7
NS	186.4	61	19.9	6.3
SES	181.4	27	19.4	2.8
SWS	191.6	73	19.1	6.8
SNSW	12.6	3	5.97	1.4
SYD	120.6	32	17.8	4.5
WNSW	32.2	4	11.4	1.4
WS	181.8	44	18.2	4.0
NSW	1223.4	354	15.4	4.3

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

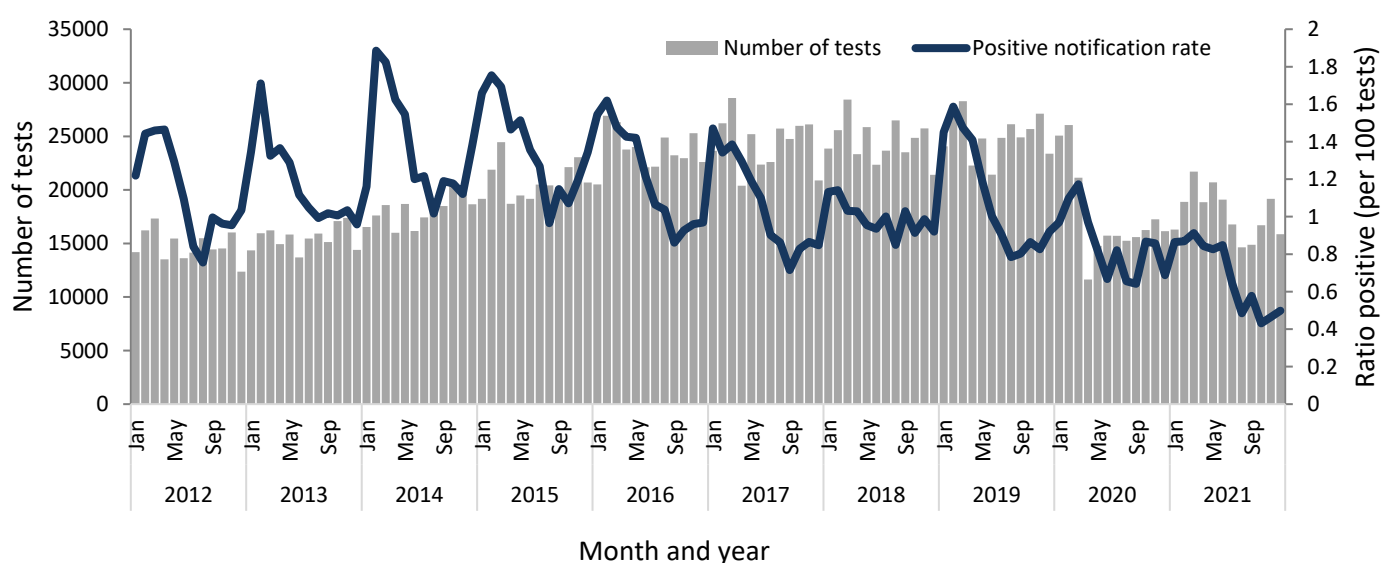
DENOMINATOR DATA

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 2021:

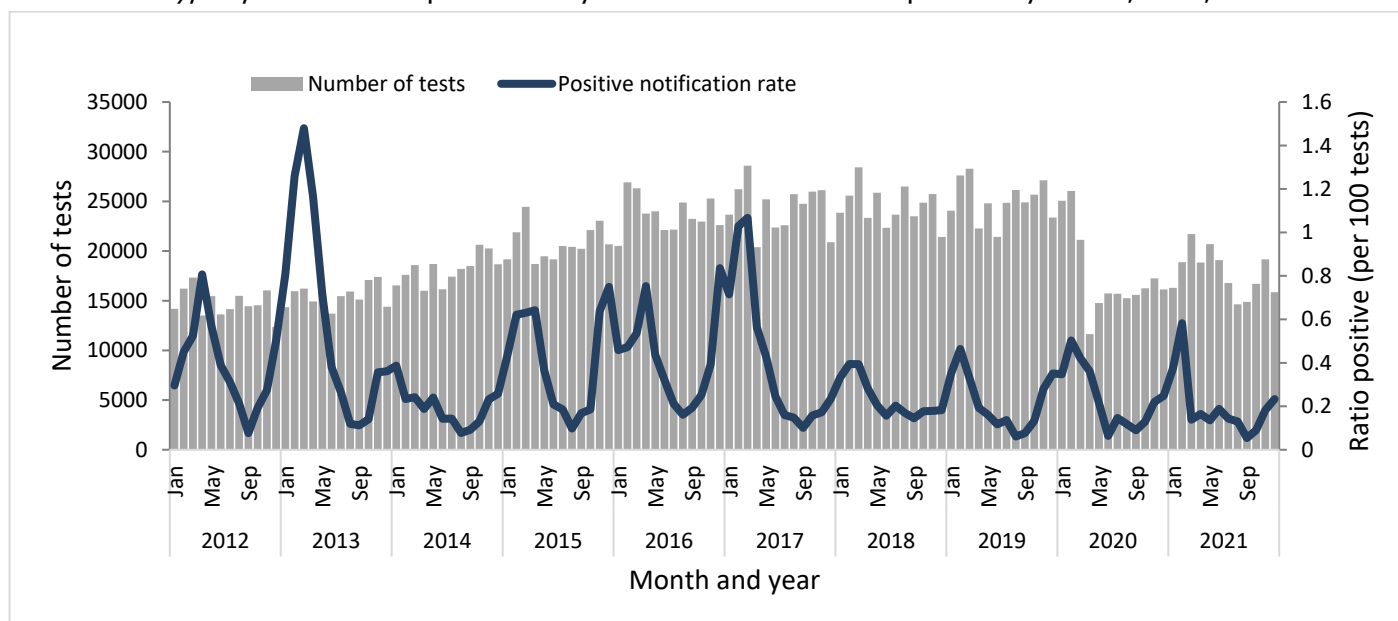
- *Giardia* positive notification rates peaked during March at 0.91 (per 100 tests performed)
- *Cryptosporidium* positive notification rates peaked during late-summer at 0.58 (per 100 tests performed)
- *Salmonella* positive notification rates followed the seasonal pattern, peaking in January at 2.52 (per 100 tests performed)
- *Shigella* positive notification rate was highest in March at 0.04 (per 100 tests performed)

Number of *Giardia* tests performed by 15 laboratories and rate positive by month and year, NSW, 2012–2021*



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

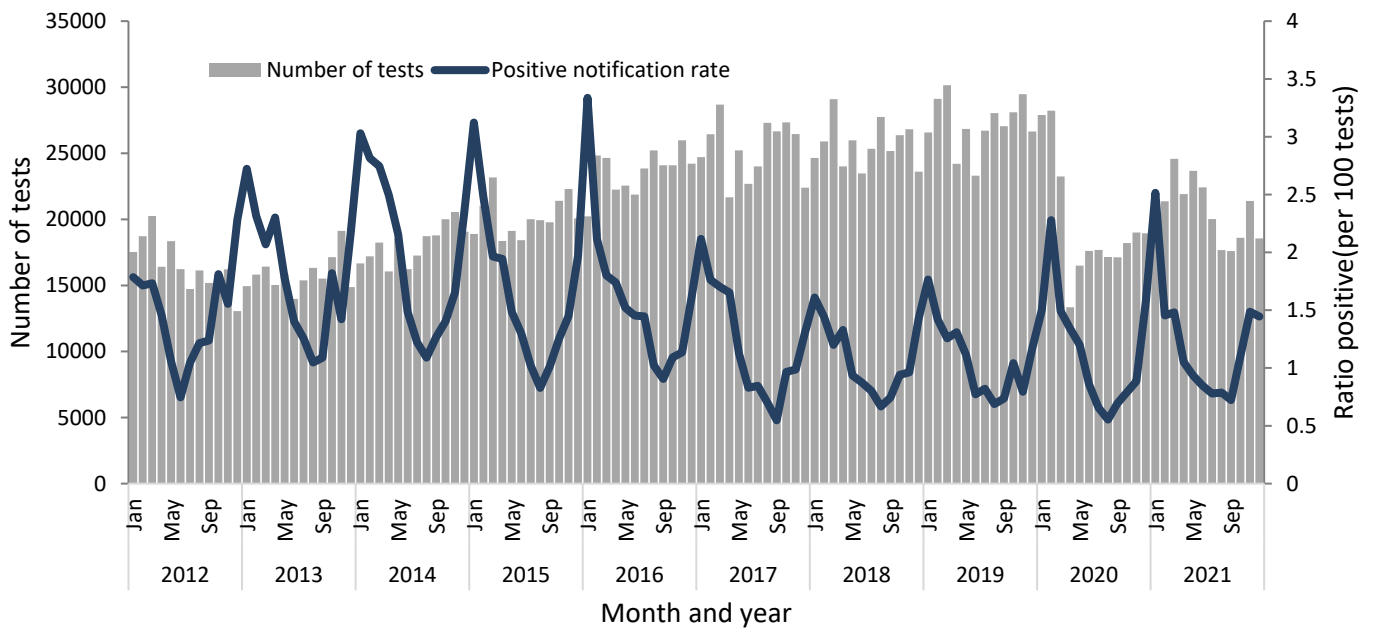
Number of *Cryptosporidium* tests performed by 15 laboratories and rate positive by month, NSW, 2012–2021*



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

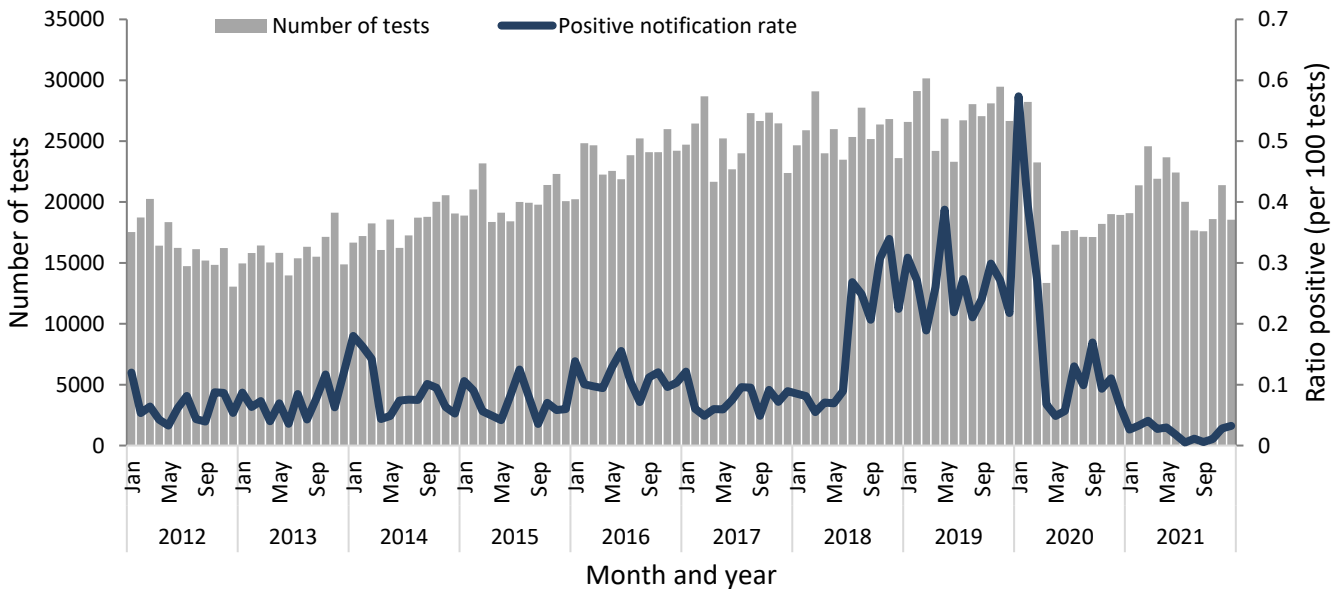
Denominator data continued

Number of *Salmonella* tests performed by 15 laboratories and rate positive by month, NSW, 2012–2021*



* 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, 2012–2021*



* 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).

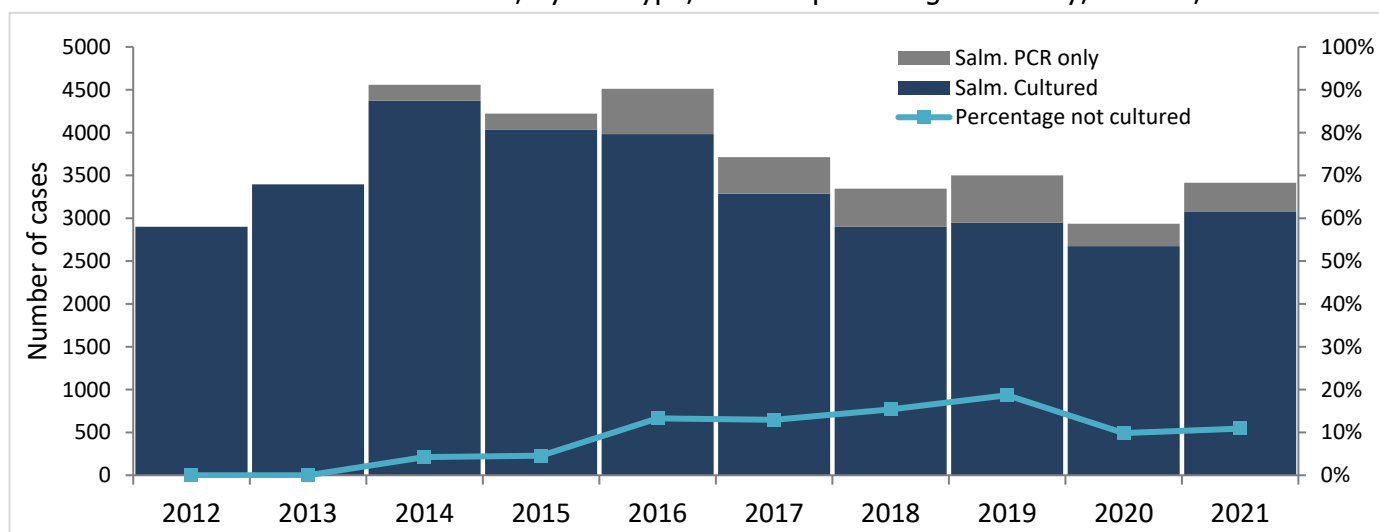
CULTURE INDEPENDENT TESTING

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.

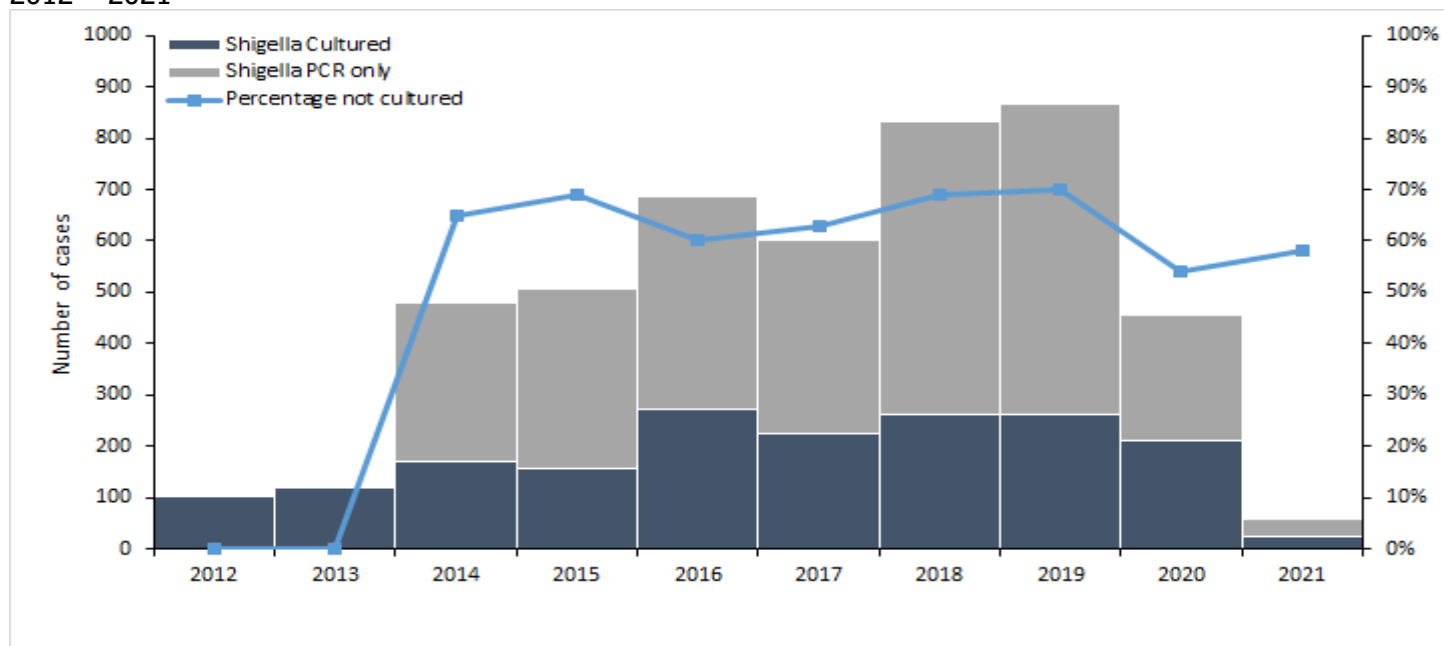
Summary for 2021:

- 11% of *Salmonella* notifications in 2021 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.
- 59% of *Shigella* notifications in 2021 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, 2012 – 2021



The number of *Shigella* notifications, by test type, and the percentage with only PCR positive result in NSW, 2012 – 2021



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 2021

- Foodborne outbreaks investigated: 31
- Outbreak related cases: 493

Overall trend

- 37% decrease in the number of outbreaks compared to 5 year annual mean (49 outbreaks)
- 33% decrease in the number of outbreak-related cases compared to 5 year annual mean (734 people ill)

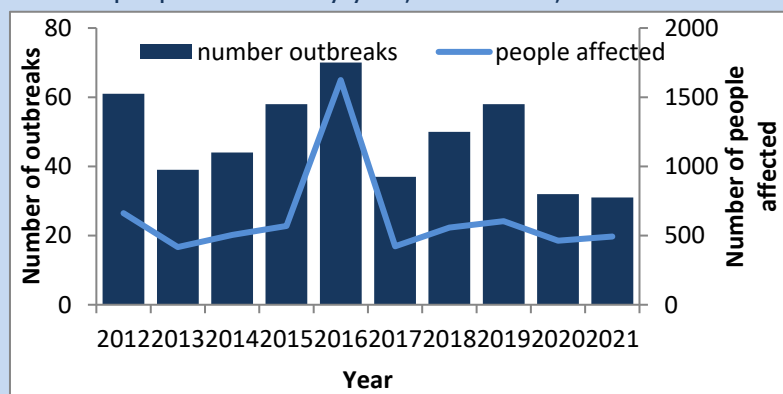
Top 5 Causative agent in 2021

- *Salmonella*: 42%
- Unknown: 23%
- Fish poisoning: 13%
- *Campylobacter*: 10%
- Other: 10%

Contributing factors in 2021

- Cross contamination raw ingredients: 29%
- Unknown: 29%
- Toxic substance or part of tissue: 13%
- Ingestion contaminated raw products intended to be eaten cooked: 13%

Number of foodborne or suspected foodborne outbreaks and number people affected by year, 2012-2021, NSW



Number of foodborne outbreaks and number of people affected by local health district, 2021, NSW

LHD	2021	No. ill
CC	2	12
HNE	2	20
IS	1	5
M	0	0
MNC	0	0
NBM	2	6
NS	4	24
SES	5	11
SNSW	0	0
SWS	1	2
Syd	4	15
WNSW	1	6
WS	3	18
NSW*	6	374
Total	31	493

Foodborne outbreak by causative agent and year, 2016-2021, NSW

Causative agent	2016	2017	2018	2019	2020	2021
Unknown	34	21	27	13	13	7
<i>Salmonella</i> (all serotypes)	20	5	11	24	10	13
<i>Salmonella</i> Typhimurium	14	4	6	12	6	5
Norovirus	6	3	1	3	1	0
<i>Campylobacter</i>	2	3	1	1	3	3
<i>Clostridium perfringens</i>	0	0	1	0	0	0
Fish poisoning	4	1	7	7	3	4
<i>Listeria</i>	1	0	1	2	0	0
Hepatitis E	0	0	0	1	0	0
STEC	0	0	0	0	0	0
Hepatitis A	0	0	1	1	0	1
<i>Shigella</i>	2	0	0	0	0	0
Bacillus cereus toxin	0	0	0	0	1	0
Other	0	0	0	1	1	3
Total outbreaks	69	37	50	53	32	31

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

Foodborne outbreaks continued

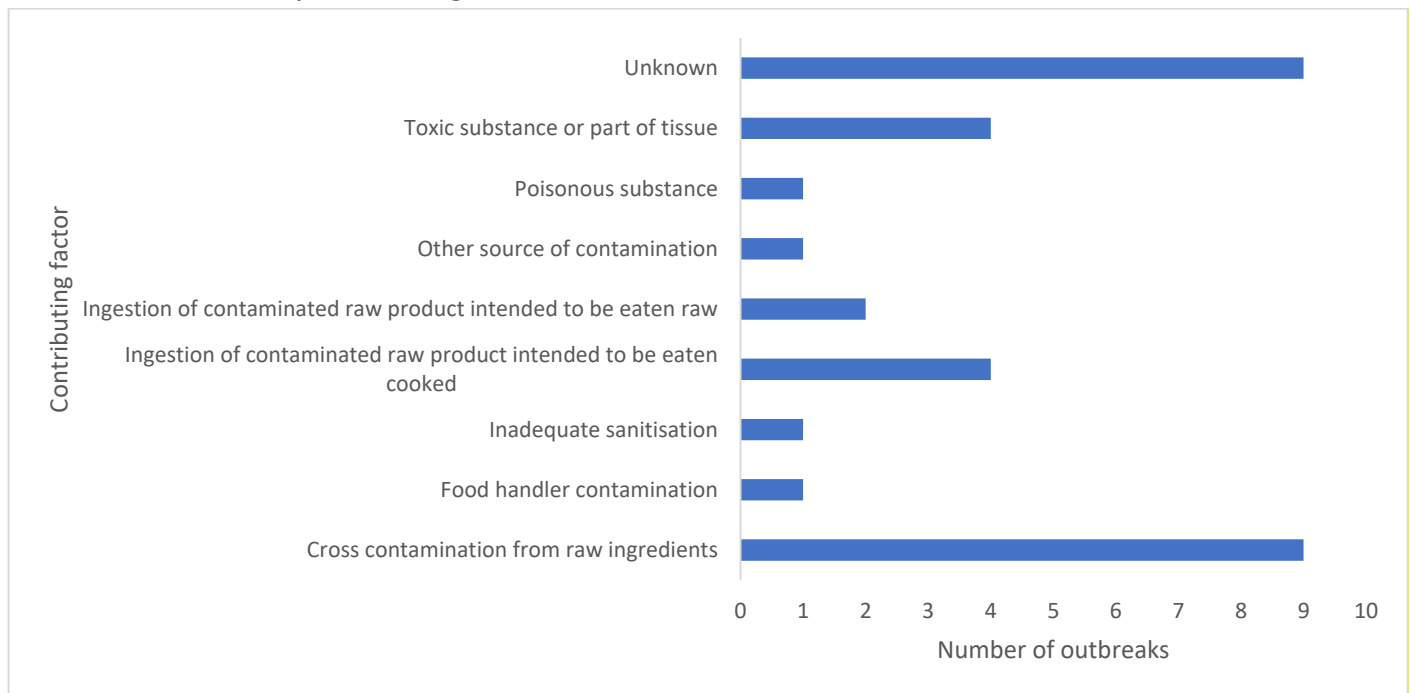
Description of outbreaks by causative agent

Number of outbreaks, number ill and number hospitalised by causative agent, 2021, NSW

Causative agent	Number of outbreaks	Number ill	Ratio ill per outbreak	Number hospitalised	Ratio hospitalised per outbreak
<i>Salmonella</i> Typhimurium	5	35	7	2	0.4
Unknown	7	40	5.7	3	0.4
Other <i>Salmonella</i>	8	332	41.5	53	6.6
Fish Poisoning	4	8	2	0	0
Hepatitis A	1	5	5	4	4
<i>Campylobacter</i>	3	12	4	3	1
Cryptosporidium	1	27	27	2	2
<i>Vibrio parahaemolyticus</i>	1	29	29	3	3
Cannabinoids	1	5	5	5	5
Total	31	493	15.9	75	2.4

Summary foodborne outbreaks by contributing factors

Foodborne outbreaks by contributing factors*, 2021, NSW



* Contributing factors are not mutually exclusive per outbreak

OUTBREAK SUMMARY 2021

Foodborne and potentially foodborne disease outbreaks investigated in NSW, 2021

PHU ID	Month ¹	Setting	Agent responsible	No. ill	Lab confirmed	No. Hospitalised	Evidence*	Responsible vehicles	Contributing factors
SLHD46-1	January	Restaurant	Salmonella Johannesburg	8	1	1	D	Chicken	Cross contamination from raw ingredients
MJOI202101	January	Community	Salmonella Saintpaul	214	214	42	D, M	Spring onions	Inadequate sanitisation
CCLHD46-5	February	Restaurant	Salmonella typhimurium	7	3	UNK	A	Aioli	Ingestion of contaminated raw product intended to be eaten cooked
SWSLHD46-6	February	Private residence	Scombroid	2	0	0	D	Tuna steak	Toxic substance or part of tissue
WSLHD46-7	March	Private residence	Salmonella typhimurium	5	2	2	A	Unknown	Cross contamination from raw ingredients
NSW46-24	March	Community	Cryptosporidium species	27	27	2	A	Bagged Baby spinach	Ingestion of contaminated raw product intended to be eaten raw
NSW46-17	January	Community	Salmonella infantis	29	29	9	D, A	Unknown	Unknown
WS46-10	April	Function	Salmonella Typhimurium 20-0023	7	7	UNK	D	Vegetarian buffet	Cross contamination from raw ingredients
NBM46-11	May	Restaurant	Campylobacter	2	1	1	D	Lamb offal	Ingestion of contaminated raw product intended to be cooked
SES46-12	May	Restaurant	Scombroid	2	0	0	D	Sashimi kingfish	Toxic substance or part of tissue
NS46-13	June	Private residence	Salmonella Enteritidis	4	1	0	D	Take away BBQ chicken and salad	Cross contamination from raw ingredients
SES46-14	June	Restaurant	Unknown	2	0	0	D	Calamari	Unknown
SES46-15	June	Restaurant	Unknown	3	0	UNK	D	Take away pasta	Unknown
SYD46-6	June	Private residence	Scombroid	2	0	0	D	Tuna steaks	Toxic substance or part of tissue

PHU ID	Month ¹	Setting	Agent responsible	No. ill	Lab confirmed	No. Hospitalised	Evidence*	Responsible vehicles	Contributing factors
WS46-16	June	Restaurant	Unknown	6	0	1	D	Self-serve buffet	Unknown
NS46-19	June	Private residence	Salmonella typhimurium 20-0068	10	10	UNK	D	Take away sushi	Other source of contamination
NSW46-20	August	Community	Hepatitis A	5	5	4	A, M	Medjool dates	Food handler contamination
HNE46-22	September	Restaurant	Unknown	10	0	0	D	Unknown	Unknown
CC46-23	September	Workplace	Cannabinoids	5	4	5	M	Homemade slice	Poisonous substance
NSW46-21	July	Community	Salmonella Hvittingfoss-21-0001	70	70	UNK	D, A	Unknown	Unknown
46-25	October	Restaurant	Campylobacter sp	3	1	1	D, A	Chicken wrap	Cross contamination from raw ingredients
46-26	October	Private residence	Salmonella bareilly	3	1	1	D, A	Unknown	Cross contamination from raw ingredients
46-27	November	Restaurant	Scombroid	2	0	0	D, A	Tuna cheeseburger	Toxic substance or part of tissue
46-28	November	Restaurant	Salmonella typhimurium, WGS cluster ID STM-21-0083	6	5	UNK	D, A	Eggs benedict/hollandaise sauce	Cross contamination from raw ingredients, ingestion of contaminated raw product intended to be cooked
46-29	November	Restaurant	Salmonella senftenberg	2	2	0	D, A	Chicken kebab	Cross contamination from raw ingredients
46-30	November	Restaurant	Salmonella senftenberg	2	2	0	D, A	Chicken kebab	Cross contamination from raw ingredients
46-31	November	Other	Unknown	4	0	1	D	Unknown	Unknown
46-32	December	Restaurant	Campylobacter sp	7	1	1	D, A	Pâté	Ingestion of contaminated raw product intended to be cooked
46-33/MJOI202102	December	Restaurant	Vibrio parahaemolyticus	29	29	3	D, A	Pacific oysters	Ingestion of contaminated raw product intended to be eaten raw

PHU ID	Month ¹	Setting	Agent responsible	No. ill	Lab confirmed	No. Hospitalised	Evidence*	Responsible vehicles	Contributing factors
46-34	December	Restaurant	Unknown	5	0	0	D	Unknown	Unknown
46-35	December	Private residence	Unknown	10	0	1	D	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 2021

***Salmonella* Johannesburg outbreak linked to a Nepalese restaurant – SLHD46-1**

An outbreak of foodborne illness was investigated by the local public health unit in January.

Eight cases of gastro illness occurred following consumption of food at a Nepalese restaurant in the Inner West region of Sydney for lunch on 24th of January. All cases had symptom onset the following day. The median incubation period was 13 hours (range 8-32 hours). Reported symptoms included vomiting, diarrhoea, fever, and abdominal cramps. One case presented to hospital and had salmonella typhimurium isolated on a stool sample. The other cases did not get tested.

The NSW Food Authority conducted a site inspection at the venue and collected several environmental and food samples. Salmonella was subsequently detected in shallots (unwrapped in contact with coriander), a 'chicken choila' dish, the dishwasher and internals, a bench top fridge, prep bench, kitchen floor, and ambient storage floors.

***Salmonella* typhimurium outbreak linked to a seafood restaurant – CCLHD46-5**

In February, an outbreak of salmonella linked to a seafood restaurant on the central coast was investigated by the public health unit.

A survey was distributed to patrons who dined at the restaurant between the 5th and 7th February. Survey responses found that fourteen of sixty people who dined at the restaurant from 5th to 7th February developed gastro symptoms. Symptoms included fever, diarrhoea, severe joint and back pain, and weight loss. The median incubation period was approximately 6 hours. At least one case was also hospitalised.

The survey also revealed that people who consumed menu items including the seafood platter, a crab bread dish, Louisiana corn bread, garlic and lemon scallops, and crumbed calamari with salad were more likely to be unwell than people who did not.

Of the fourteen cases, stool samples were collected from four people. This included three patrons and one employee. All of these cases tested positive for Salmonella typhimurium. Further testing indicated that these samples were linked to a genomic cluster, STM-19-0001; a cluster previously known to be associated with an egg farm. Subsequently, it was determined that the illness of patrons and the employee was likely caused by the use of raw egg products, including a home-made mayonnaise, which was used in a variety of dishes.

The NSW Food Authority was notified and commenced an investigation of the business. Site inspections were conducted on two occasions, during which, several areas for improvement were identified. The most significant of which included potential poor handling of eggs or incorrect heating of eggs used to make the in-house mayonnaise. To mitigate ongoing risk, the restaurant was advised to use commercially-produced mayonnaise.

***Salmonella* typhimurium STM-20-0068 associated with consumption of food from a sushi venue - NS46-19**

In June, several cases of salmonella typhimurium, cluster ID STM-20-0068 were noted to be clustering spatiotemporally; most cases were residents of Northern Sydney Local Health District.

Outbreak investigation commenced and in total, 22 cases in this cluster ID were notified between 1 June and 30 July. Of these, seventeen cases were interviewed. For the interviewed cases; ten either reported eating sushi from the same sushi outlet on the north shore of Sydney, or alternatively gave descriptions of eating sushi from a venue that fit this same location. All interviewed cases reported consuming food purchased from the venue between 10th June and 13th June. The median age of cases was 15 years old (age range 9 months old – 74 years old), 41% male.

Cases consumed a wide variety of food items from the venue including a teriyaki chicken and avocado roll, a cooked tuna and avocado roll, a chicken katsu and avocado roll, a Californian roll, and

salmon nigiri; there was no particular food item in common amongst all cases.

Whilst the cluster was being investigated, at least six chicken isolates were also notified as being linked to the same cluster ID upon whole genome sequencing. These isolates were derived from routine samples that were collected for a widely-distributed brand of chicken. As such, it was hypothesised that the outbreak at the sushi venue may have been the result of cross contamination from raw poultry, or mishandling of raw chicken.

The NSW Food Authority was notified of the outbreak, however follow-up was limited given that the cluster was identified after COVID-19 stay-at-home restrictions had begun for Sydney. This meant that venue was closed at the time of outbreak notification and therefore there was no immediate ongoing risk to the public.

Hepatitis A genotype 1B outbreak associated with imported fresh medjool dates– NSW46-20

An outbreak of hepatitis A associated with the consumption of fresh medjool dates imported from Jordan was investigated by the NSW Communicable Diseases Branch in August.

Between June and September 2021, five cases of Hepatitis A were notified in NSW, and one case in the ACT. All of these cases were genotype 1B and had an identical genetic sequence.

The cluster was identified in June when two locally-acquired Hepatitis A cases demonstrated a 100% match on genomic sequencing. Both cases were noted to have reported date consumption with their exposure period. The decision to include a question about date consumption in case interviews was prompted at this time due to the publication of an outbreak of Hepatitis A in the UK. This report linked imported medjool date consumption to Hep A between January and April 2021 in England and Wales.

The third case notified as part of this outbreak was the sole importer of a Jordanian brand of dates, and provided an avenue for further investigation. Following notification of this case, case two was then re-interviewed and asked whether they specifically recalled eating this brand of dates, which they then confirmed.

After sufficient epidemiological and microbiological evidence was gathered, the suspected brand of dates was tested. Two of ten samples that were collected had Hepatitis A detected by Polymerase Chain Reaction (PCR). However, sequencing was unable to be performed on these samples; this was due to insufficient ribonucleic acid (RNA) extraction, even after concentrating.

On 6 August, a consumer-level recall for the implicated dates was issued. A media release was also issued on the same day, informing the public of the recall and advising people to seek medical attention if symptoms appeared. Similarly, a clinician alert was disseminated to General Practitioners (GPs) and Emergency Departments (EDs). Lastly, an emergency holding order was placed under the Imported Food Control Act 1992. This meant that any consignments of the implicated brand of dates would be held at the Australian border until the competent government authority in Jordan could provide the department with assurance that the risk of Hepatitis A contamination in further imports of dates from the producer had been mitigated.

Two of six of the cases in this cluster had an onset of symptoms after the outbreak control measures were initiated.

***Salmonella typhimurium* linked to a café in Western NSW - WNSW 46-28**

The local public health unit investigated an outbreak of *Salmonella typhimurium* linked to a café in Western NSW in November. Five people became unwell with gastro symptoms following consumption of food at the café; each case dined there between 25th October and 1st November.

All cases were interviewed, which revealed all had consumed an egg-containing dish; four of the five cases had consumed hollandaise sauce, with three of these cases consuming the same 'Eggs Benedict' menu item. All five cases presented to the local Emergency Department and had salmonella typhimurium isolated on stool samples. Further sequencing revealed that all cases belonged to a newly-identified *Salmonella Typhimurium* cluster, STM-21-0083.

The NSW Food Authority initially referred the outbreak to local council, who inspected the venue.

Initial inspection confirmed that the business was following correct storage, cleaning, food preparation and cooking procedures. In addition, the business had ceased preparing their own hollandaise sauce by the time of inspection. Department of Primary Industries (DPI) personnel also followed-up, collecting swabs and samples, however all returned negative results. The source of the outbreak was suspected as being either inadequate cooking of eggs, or cross contamination from raw eggs.

Vibrio parahaemolyticus linked to pacific oysters from Coffin Bay, South Australia (MJOI202102)

Investigation into a national increase of vibrio parahaemolyticus infections commenced in November. This occurred following the endorsement of a multi-jurisdictional outbreak investigation (MJOI) by the Communicable Diseases Network of Australia (CDNA) on 17 November 2021.

As at 25 January 2022, there had been 269 cases notified nationally; including 29 cases in NSW. Of the 269 cases, 77% (n=207) were able to be completely or partially interviewed. Of these interviewed cases, 97% (n=200 cases) reported eating oysters during the exposure period.

Traceback of oysters consumed by cases revealed these were primarily South Australian oysters originating in the Coffin Bay region. Cases reported consuming oysters from a variety of venues including restaurants, whilst on oyster tours, and at home purchased from seafood retailers, supermarkets, market stalls and direct from farms.

A variety of control measures were introduced in response to the outbreak. These included media alerts which were issued in multiple jurisdictions detailing the risks of raw oysters and cases of Vibrio parahaemolyticus. Additionally, on 15 and 16 November 2021, various oyster harvesting areas in Coffin Bay were closed. On 19 November, emergency Orders were also served on 31 Coffin Bay oyster growers under the Food Act 2001 s31 to recall raw pacific oysters produced in Coffin Bay, South Australia. Lastly, compliance orders on Coffin Bay oyster growers placed by the Department of Primary Industries and Regions, South Australia (PIRSA) for growers to implement a Vibrio control program on 16 November 2021.

By February 2022, national case numbers of vibrio parahemolyticus had significantly decreased.

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 2021

- Number of outbreaks: 1284
- Number of people affected: 15774
- Number of outbreaks with at least one stool sample collected: 242 (19%)

Overall trend (compared to 5 year average)

- 48% increase in the number of outbreaks
- 31% increase in the number of people affected

Seasonality

- Childcare centres: Peaked in April
- Aged care facilities and hospitals: Peaked in June

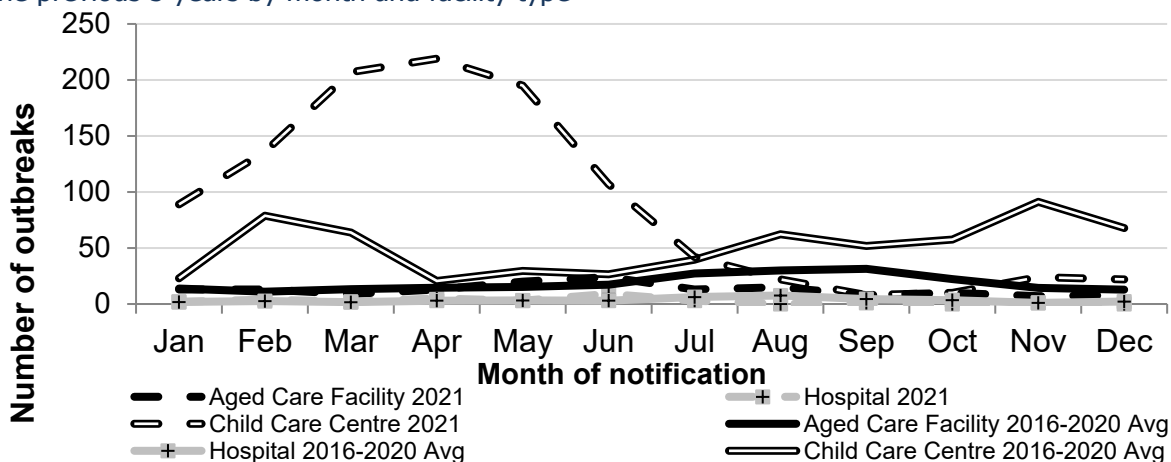
Groups with highest frequency in 2021

- Facility type: childcare centres, 1084 (84%) of outbreaks
- Attack rate in staff: other facilities at 13%
- Attack rate in non-staff: hospital patients at 22%
- Average duration of outbreaks: Childcare centres at 12 days

Causative agent

- Norovirus (laboratory confirmed): 8% of outbreaks (42% of outbreaks with a stool sample collected)

Figure: Number of reported outbreaks of gastrointestinal illness in institutions in 2021 and average of the previous 5 years by month and facility type



Characteristics of outbreaks of gastrointestinal illness in institutions reported to NSW in 2021

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	154	547: 4%	1772: 13%	6	118: 77%	56: norovirus
Child care	1084	2012: 10%	11077: 12%	12	99: 9%	28: norovirus 3: rotavirus
Hospital	30	94: 10%	230: 22%	9	22: 73%	16: norovirus 1: rotavirus
Other*	16	43: 13%	74: 8%	7	3: 19%	1: norovirus
TOTAL	1284	2696: 8%	13153: 12%	9	242: 19%	101: norovirus 4: rotavirus

*Camps, & other educational or residential care facilities

ACTIVITY IN NSW DURING 2021

Improving Surveillance

- **Communication:** The Hunter New England (HNE), NSW and Australian Capital Territory (ACT) OzFoodNet sites, the NSW Food Authority and the NSW Enteric Reference Laboratory at Centre for Infectious Diseases and Microbiology Laboratory Services held weekly teleconferences to discuss notifications and suspected clusters and outbreaks, and to communicate progress on recent investigations. Throughout the year, the OFN team communicated on a regular basis with public health units and the NSW Food Authority regarding clusters and outbreaks of enteric diseases.
- **Reporting:** Fortnightly, quarterly and annual reports were prepared for OzFoodNet and distributed to public health units. Weekly, quarterly and annual reports were also prepared for publication on the NSW Health website and the NSW Public Health Bulletin.
- **OneHealth Network:** Health Protection NSW, NSW Food Authority and NSW DPI (Animal Biosecurity) continued to hold an annual meeting to develop joint strategic priorities across Human health, Animal biosecurity and Food safety.
- Health Protection NSW is working with ICPMR on WGS for routine enteric diseases surveillance.
- **Childcare illness working group:** A new network was established with Department of Education who service child care centres to have a coordinated response to gastro outbreaks in child care centres.
- Working with UNSW School of Biotechnology and Biomedical Sciences to understand the norovirus strains circulating.

OzFoodNet

- Participated in multi-jurisdictional outbreak investigations.
- Lead epidemiologist for the Salmonella Saintpaul MJOI.
- Participated in all potential MJOI teleconferences.
- Attended all monthly OzFoodNet meetings and virtual face-to-face meeting in March 2021.
- Contributing to other national projects on enteric diseases including Salmonella Enteritidis, STEC and Shigellosis.

Guidelines and policy

- The NSW response protocols for foodborne illness investigation is under review, in-conjunction with the NSW Food Authority.
- Health Protection NSW is part of Hep A enhanced surveillance working group.
- NSW Health is working with the NSWFA and NSW DPI on a MOU for outbreaks such as salmonella from backyard chicken.
- Contributed to
- Reviewing and updating the cryptosporidiosis and STEC control guidelines for public health units in NSW.

Prevention Measures

- Health Protection NSW worked with Department of Education to push messages about hygiene in child care centres to help with notification of gastroenteritis in institutions.
- Health Protection NSW is working with NSW Food Authority to improve the communication of *Listeria monocytogenes* food safety risks to cancer patients and other at-risk populations and their families.

Staffing updates

- None

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*, *Salmonella* Paratyphi, *Salmonella* Typhi, *Listeria monocytogenes*, *Shigella*, STEC, *Cryptosporidium*, *Giardia*, *Campylobacter*, rotavirus, botulism, *Cholera* and hepatitis A & E viruses. There were no cases of HUS in 2021.

On 14 April 2022, 2021 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 diseaseⁱⁱⁱ for 2021 were compared with the average annual count for the years 2016 to 2020. The NSW estimated resident population for 30 June of each year from 2016-2021 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.

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

Notification data for *Campylobacter*, *Cryptosporidium*, *Giardia*, *Salmonella* and *Shigella* were analysed for the period between 1 January 2013 and 31 December 2021, 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 a Redcap 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.

^{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 2021 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