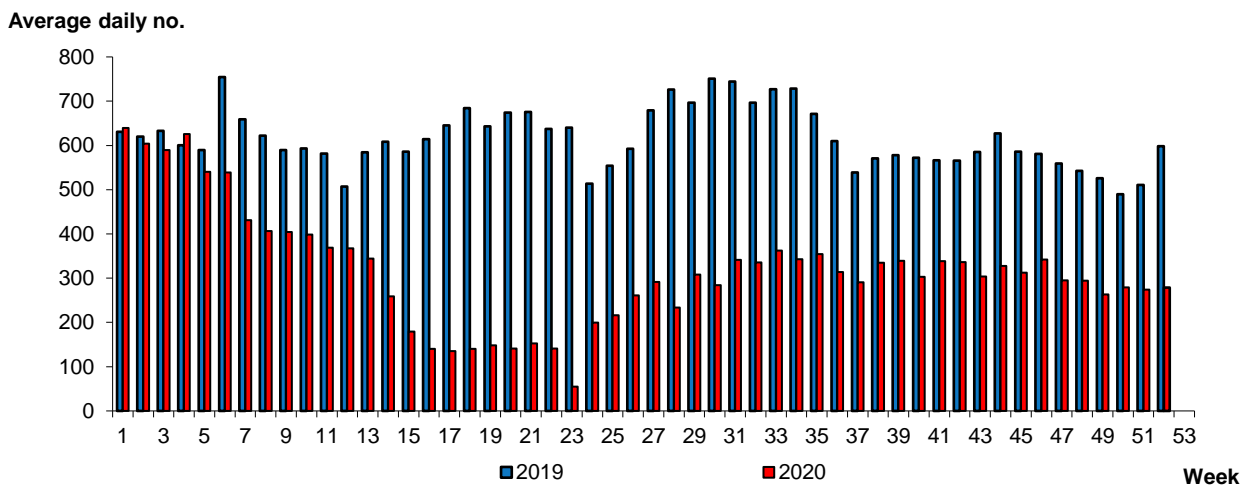


ACUTE DIARRHOEAL ILLNESS

There were a total of 88,644 attendances at polyclinics for acute diarrhoeal illness in 2020, a decrease of 47.2% compared to the 167,933 seen in 2019. The surveillance of weekly acute diarrhoeal illness attendances in 2020 showed a decline in average daily numbers from Week 7, with weekly attendances remaining relatively stable at lower levels throughout the year, as compared to 2019 (Figure 4.1).

Figure 4.1
Weekly attendances of diarrhoeal illnesses at polyclinics, 2019-2020



BOTULISM

Botulism is a rare but serious illness caused by neurotoxin produced by *Clostridium botulinum*. These neurotoxins affect the nervous system to cause muscle paralysis, in turn affecting the ability to breathe, and even death. *C. botulinum* is common in the environment but can only grow and produce the toxin under specific conditions facilitated on food products, in contaminated wounds, and in the intestinal tract of infants and adults with structurally or functionally compromised intestinal tracts.

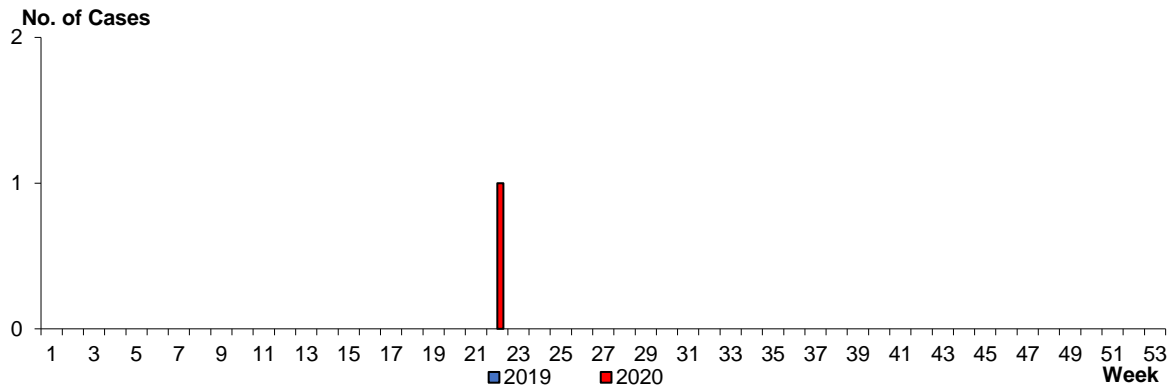
There are five kinds of botulism:

- Foodborne botulism through ingestion of pre-formed toxins, usually involving home canned foods (e.g. fruits, vegetables, fish);
- Infant botulism through intestinal colonization by *C. botulinum* after ingestion of environmental dust/soil or food contaminated with spores (e.g. honey);
- Wound botulism through introduction of *C. botulinum* spores into wounds, especially among injection drug users;
- Inhalation botulism through inhalation of botulinum toxins when released in the form of an aerosol (e.g. bioterrorism); and
- Iatrogenic botulism through cosmetic use of botulinum toxin.

Since botulism was made legally notifiable in September 2016, there have been three isolated indigenous cases of infant botulism, one each in 2017, 2018 and 2020.

There was one indigenous case of infant botulism in May 2020, involving a 14-week-old female (Figure 4.2). She was admitted to Hospital after developing poor feeding and lethargy since 22 May 2020. Stool sample from the case subsequently tested positive for *C. botulinum* toxin. The child was reported to have consumed honey prior to her onset of symptoms. However, analysis of leftover honey tested negative for *C. botulinum* toxin.

Figure 4.2
Weekly distribution of reported botulism cases, 2019-2020



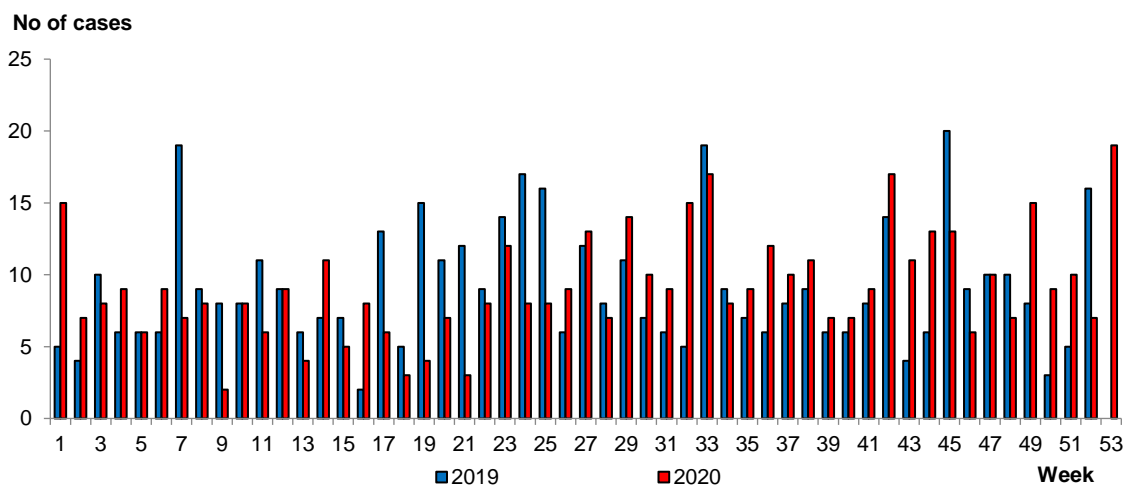
CAMPYLOBACTERIOSIS

Campylobacter enteritis is an acute bacterial enteric disease of variable severity, characterised by diarrhoea (which may be bloody), abdominal pain, fever, nausea and vomiting. *Campylobacter jejuni* is the causative agent of a large majority of human *Campylobacter* enteritis, with other species such as *C. coli* and *C. fetus* as less commonly causing infections. The mode of transmission is by ingestion of the organism in raw or undercooked poultry, contaminated food, water or unpasteurised milk.

A total of 485 cases of *Campylobacter* enteritis were reported in 2020, an increase of 2.5% compared to 473 cases reported in 2019 (Figure 4.3). *C. jejuni* was isolated in the majority of the cases in 2019 and 2020 (Table 4.1). Of the 473 confirmed cases reported in 2019, 428 were classified as indigenous cases and 28 as imported cases. The remaining 17 cases comprised of five tourists and 12 foreigners who travelled to Singapore to seek medical treatment. Of the 485 confirmed cases reported in 2020, 474 were classified as indigenous cases and nine as imported cases. The remaining two cases comprised of one tourist and one foreigner who travelled to Singapore to seek medical treatment (Table 4.2).

The resident incidence was highest in the 0-4 years age group in both 2019 and 2020 (Tables 4.3 and 4.4). Among the three major ethnic groups, Malays had the highest incidence rate in 2019 and 2020, respectively (Tables 4.5 and 4.6).

Figure 4.3
Weekly distribution of reported campylobacteriosis cases, 2019-2020



COMMUNICABLE DISEASES SURVEILLANCE SINGAPORE 2019 & 2020
CHAPTER 4

Table 4.1
Incidence rates of reported *Campylobacter* enteritis cases, 2016-2020

Year	No. of cases caused by				Incidence rate per 100,000 population*
	<i>C. jejuni</i>	<i>C. coli</i>	Other species	Total	
2016	364	33	45	442	7.9
2017	379	40	76	495	8.8
2018	371	40	16	427	7.6
2019	416	48	10	474 [^]	8.3
2020	439	39	7	485	8.5

[^]Count is higher as one case was concurrently infected with two campylobacter species.

*Rates are based on estimated mid-year population.

(Source: Singapore Department of Statistics)

Table 4.2
Total number of notifications* received for reported *Campylobacter* enteritis, 2016-2020

Age group	2016		2017		2018		2019		2020	
	Local	Imported	Local	Imported	Local	Imported	Local	Imported	Local	Imported
0-4	149	1	149	4	156	10	170	5	195	2
5-14	100	5	101	12	96	6	119	10	143	3
15-24	20	5	30	2	32	3	24	4	21	2
25-34	28	1	24	5	17	9	17	6	27	0
35-44	6	3	20	6	15	2	15	0	17	1
45-54	21	1	25	4	7	2	18	1	11	0
55+	82	2	92	1	52	4	65	2	60	1
Total	406	18	441	34	375	36	428	28	474	9

*Excluded tourists and foreigners seeking medical treatment in Singapore.

Table 4.3
Age-sex distribution and age-specific resident incidence rate of reported *Campylobacter* enteritis cases[^], 2019

Age group	Number of notifications				Incidence rate per 100,000 resident population*
	Male	Female	Total	%	
0-4	109	66	175	38.4	84.7
5-14	82	47	129	28.3	26.4
15-24	19	9	28	6.1	4.9
25-34	11	12	23	5.0	2.4
35-44	4	11	15	3.3	2.0
45-54	8	11	19	4.2	2.6
55-64	10	12	22	4.8	3.6
65+	26	19	45	9.9	7.7
Total	269	187	456	100	-

[^]Excluded five tourists and 12 foreigners seeking medical treatment in Singapore.

*Rates are based on 2019 estimated mid-year population.

(Source: Singapore Department of Statistics)

COMMUNICABLE DISEASES SURVEILLANCE SINGAPORE 2019 & 2020
CHAPTER 4

Table 4.4
Age-sex distribution and age-specific resident incidence rate of reported *Campylobacter* enteritis cases[^], 2020

Age group	Number of notifications				Incidence rate per 100,000 resident population*
	Male	Female	Total	%	
0-4	115	82	197	40.8	94.5
5-14	96	50	146	30.2	33.3
15-24	13	10	23	4.8	4.3
25-34	10	17	27	5.6	3.2
35-44	13	5	18	3.7	2.0
45-54	5	6	11	2.3	1.5
55-64	14	7	21	4.3	3.4
65+	18	22	40	8.3	6.2
Total	284	199	483	100	-

[^]Excluded one tourist and one foreigner seeking medical treatment in Singapore.

*Rates are based on 2020 estimated mid-year population.

(Source: Singapore Department of Statistics)

Table 4.5
Ethnic-sex distribution and ethnic-specific incidence rate of reported *Campylobacter* enteritis cases[^], 2019

	Male	Female	Total	%	Incidence rate per 100,000 population*
Singapore residents					
Chinese	162	118	280	61.4	9.4
Malay	34	22	56	12.3	10.4
Indian	13	18	31	6.8	8.5
Others	18	10	28	6.1	21.7
Foreign residents	42	19	61	13.4	3.6
Total	269	187	456	100	8.0

[^]Excluded five tourists and 12 foreigners seeking medical treatment in Singapore.

*Rates are based on 2019 estimated mid-year population.

(Source: Singapore Department of Statistics)

Table 4.6
Ethnic-sex distribution and ethnic-specific incidence rate of reported *Campylobacter* enteritis cases[^], 2020

	Male	Female	Total	%	Incidence rate per 100,000 population*
Singapore residents					
Chinese	187	119	306	63.4	10.2
Malay	28	33	61	12.6	11.2
Indian	17	13	30	6.2	8.3
Others	17	12	29	6.0	22.4
Foreign residents	35	22	57	11.8	3.5
Total	284	199	483	100	8.5

[^]Excluded one tourist and one foreigner seeking medical treatment in Singapore.

*Rates are based on 2020 estimated mid-year population.

(Source: Singapore Department of Statistics)

CHOLERA

Cholera is an acute bacterial enteric disease characterised by its severe form with sudden onset, profuse, painless watery stools, nausea and vomiting. Untreated cases may deteriorate rapidly, developing dehydration with ensuing electrolyte imbalance, hypoglycaemia, renal failure and circulatory collapse. The mode of transmission is through ingestion of food or water contaminated by faeces of

COMMUNICABLE DISEASES SURVEILLANCE SINGAPORE 2019 & 2020
CHAPTER 4

infected persons. A disease commonly associated with poor sanitation and inadequate access to clean water, cases of cholera are typically imported to Singapore. The usual causative agent for cholera detected in Singapore is *Vibrio cholerae* serogroup O1, which includes two biotypes, Classical and El Tor. Each of these biotypes can be further classified into serotypes Inaba, Ogawa and Hikojima.

Of the two confirmed cases in 2019, one was an imported case and the remaining case involved a tourist (Figure 4.4, Tables 4.7 and 4.8). The overall incidence rate was zero per 100,000 population in 2019 (Table 4.9). There was no cholera case reported in 2020.

Figure 4.4
Weekly distribution of reported cholera cases, 2019-2020

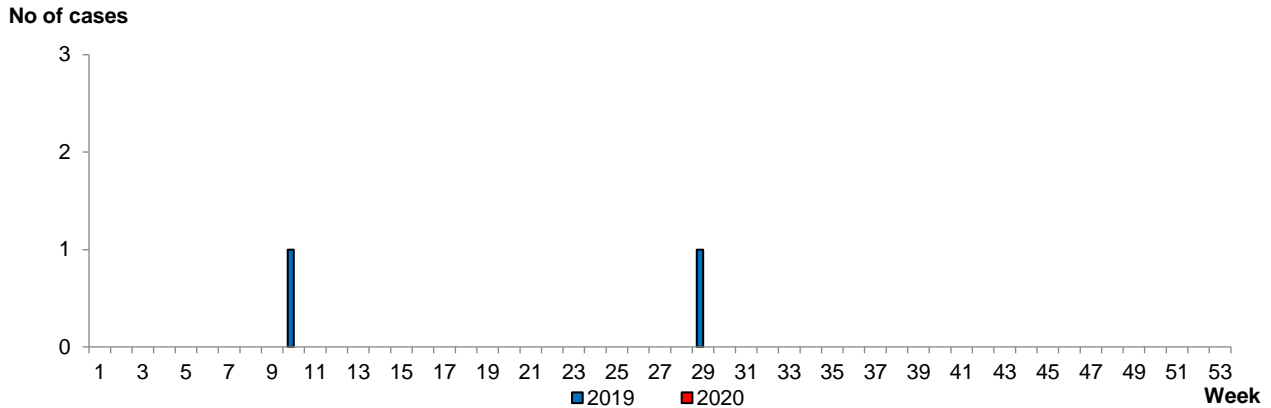


Table 4.7
Total number of notifications* received for reported cholera cases, 2016-2020

Age group	2016		2017		2018		2019		2020	
	Local	Imported	Local	Imported	Local	Imported	Local	Imported	Local	Imported
0-4	0	0	0	0	0	0	0	0	0	0
5-14	0	0	0	0	0	0	0	0	0	0
15-24	0	0	0	0	0	0	0	0	0	0
25-34	0	0	0	2	0	1	0	1	0	0
35-44	0	0	0	0	0	0	0	0	0	0
45-54	0	0	0	0	0	0	0	0	0	0
55-64	0	0	0	0	0	0	0	0	0	0
65+	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	2	0	1	0	1	0	0

*Excluded tourists and foreigners seeking medical treatment in Singapore.

Table 4.8
Age-sex distribution and age-specific resident incidence rate of reported cholera cases[^], 2019

Age group	Number of notifications				Incidence rate per 100,000 resident population*
	Male	Female	Total	%	
0-4	0	0	0	0	0
5-14	0	0	0	0	0
15-24	0	0	0	0	0
25-34	1	0	1	100	0
35-44	0	0	0	0	0
45-54	0	0	0	0	0
55-64	0	0	0	0	0
65+	0	0	0	0	0
Total	1	0	1	100	-

[^] Excluded one tourist.

*Rates are based on 2019 estimated mid-year population.
(Source: Singapore Department of Statistics)

Table 4.9
Ethnic-sex distribution and ethnic-specific incidence rate of reported cholera cases[^], 2019

	Male	Female	Total	%	Incidence rate per 100,000 population*
Singapore residents					
Chinese	0	0	0	0	0
Malay	0	0	0	0	0
Indian	0	0	0	0	0
Others	0	0	0	0	0
Foreign residents	1	0	1	100	0.1
Total	1	0	1	100	0

[^] Excluded one tourist.

*Rates are based on 2019 estimated mid-year population.
(Source: Singapore Department of Statistics)

ENTERIC FEVERS

Enteric fevers, namely typhoid and paratyphoid fevers, are caused by *Salmonella* Typhi and *Salmonella* Paratyphi (types A or B) respectively. While typhoid fever typically presents as a systemic, bacterial disease characterised by insidious onset of sustained fever, bacteraemia, and diarrhoea, paratyphoid fever typically presents mild or even asymptomatic, rarely progressing to systemic disease. Typhoid fever, on the other hand, can progress beyond the initial presentation to complications resulting in hepatosplenomegaly, intestinal bleeding and perforation. Infections by either of the bacteria are usually associated with travel to endemic countries, with a faecal-oral route of transmission through contaminated food or water.

During the period from 2016 to 2020, a total of 335 cases of enteric fever were reported, of which 262 (78.2%) cases were typhoid and 73 (21.8%) cases were paratyphoid. The majority (83.0%) were imported cases (Table 4.10).

COMMUNICABLE DISEASES SURVEILLANCE SINGAPORE 2019 & 2020
CHAPTER 4

Table 4.10
Classification of reported enteric fever cases, 2016-2020

Year	Typhoid	Paratyphoid		Total
		A	B	
2016	51 (39)	19 (17)	0 (0)	70 (56)
2017	65 (62)	16 (15)	0 (0)	81 (77)
2018	43 (40)	16 (15)	0 (0)	59 (55)
2019	73 (51)	12 (12)	0 (0)	85 (63)
2020	30 (17)	10 (10)	0 (0)	40 (27)
Total	262 (209)	73 (69)	0 (0)	335 (278)

(): number of imported cases.

There were 40 cases of enteric fevers comprising 30 cases of typhoid and 10 cases of paratyphoid A in 2020. The total number of cases in 2020 decreased by 52.9%, from 85 cases reported in 2019.

In 2019, there were 73 reported cases of typhoid comprising 26 Singapore residents, 38 foreign residents and nine tourists/foreigners seeking medical treatment in Singapore, while there were 12 reported cases of paratyphoid, comprising six Singapore residents, five foreign residents, and one foreigner seeking medical treatment in Singapore.

In 2020, there were 30 reported cases of typhoid comprising 15 Singapore residents and 15 foreign residents, while there were 10 reported cases of paratyphoid, comprising four Singapore residents and six foreign residents (Figure 4.5 and Table 4.11).

Figure 4.5
Weekly distribution of reported enteric fever cases, 2019-2020

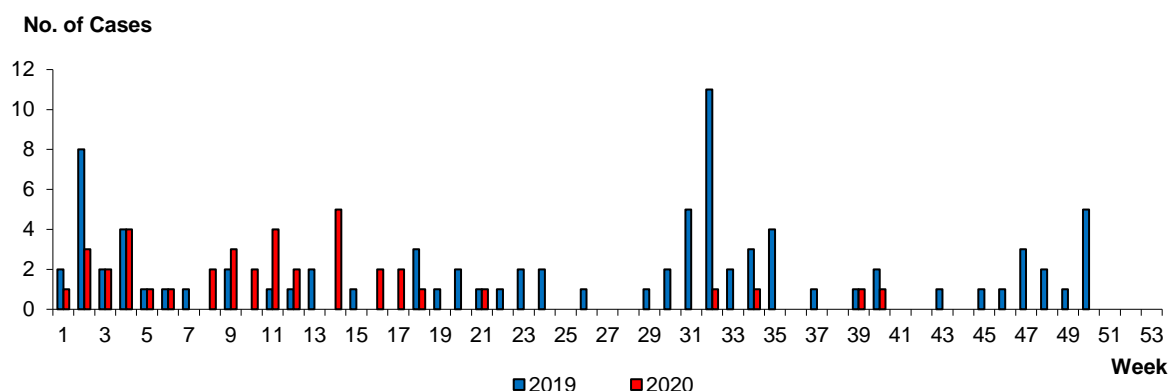


Table 4.11
Classification of reported typhoid and paratyphoid cases, 2019 and 2020

Population Group	2019		2020	
	Typhoid No. (%)	Paratyphoid No. (%)	Typhoid No. (%)	Paratyphoid No. (%)
Singapore residents	26 (35.6)	6 (50.0)	15 (50.0)	4 (40.0)
Foreigners seeking medical treatment in Singapore	8 (11.0)	1 (8.4)	0 (0)	0 (0)
Tourists	1 (1.4)	0 (0)	0 (0)	0 (0)
Foreign residents	38 (52.0)	5 (41.6)	15 (50.0)	6 (60.0)
Total	73 (100)	12 (100)	30 (100)	10 (100)

Typhoid

During the period from 2016 to 2020, majority of the cases of typhoid were imported (Table 4.12). The resident incidence rate was highest in the 25-34 years age group and the 0-4-years age group in 2019 and 2020, respectively (Tables 4.13 and 4.14). Among the three major ethnic groups, Indians had the highest incidence in both 2019 and 2020. (Tables 4.15 and 4.16).

Table 4.12
Total number of notifications* received for reported typhoid cases, 2016–2020

Age group	2016		2017		2018		2019		2020	
	Local	Imported	Local	Imported	Local	Imported	Local	Imported	Local	Imported
0-4	0	2	1	1	0	3	1	0	2	2
5-14	0	5	0	15	1	6	4	2	0	4
15-24	1	5	0	6	0	6	3	6	2	1
25-34	2	15	0	23	0	13	7	20	6	4
35-44	1	10	2	4	2	5	4	11	1	4
45-54	1	1	0	3	0	3	2	1	0	1
55-64	0	0	0	1	0	0	0	2	0	1
65+	1	1	0	1	0	1	1	0	2	0
Total	6	39	3	54	3	37	22	42	13	17

*Excluded tourists and foreigners seeking medical treatment in Singapore.

Table 4.13
Age-sex distribution and age-specific resident incidence rate of reported typhoid cases[^], 2019

Age group	Number of notifications				Incidence rate per 100,000 resident population*
	Male	Female	Total	%	
0-4	0	1	1	1.6	0.5
5-14	3	3	6	9.4	1.0
15-24	6	3	9	14.1	0.4
25-34	19	8	27	42.2	1.4
35-44	11	4	15	23.4	1.0
45-54	1	2	3	4.7	0.3
55-64	0	2	2	3.1	0.3
65+	1	0	1	1.6	0.2
Total	41	23	64	100	-

[^] Excluded one tourist and eight foreigners seeking medical treatment in Singapore.

* Rates are based on 2019 estimated mid-year population.

(Source: Singapore Department of Statistics)

Table 4.14
Age-sex distribution and age-specific resident incidence rate of reported typhoid cases, 2020

Age group	Male	Female	Total	%	Incidence rate per 100,000 resident population*
0-4	2	2	4	13.3	1.6
5-14	3	1	4	13.3	0.7
15-24	1	3	4	13.3	0.2
25-34	4	5	9	30.0	0.5
35-44	2	3	5	16.7	0.3
45-54	1	0	1	3.3	0.0
55-64	0	1	1	3.3	0.2
65+	2	0	2	6.7	0.3
Total	15	15	30	100	-

* Rates are based on 2020 estimated mid-year population.

(Source: Singapore Department of Statistics)

COMMUNICABLE DISEASES SURVEILLANCE SINGAPORE 2019 & 2020
CHAPTER 4

Table 4.15
Ethnic-sex distribution and ethnic-specific incidence rate of reported typhoid cases[^], 2019

	Male	Female	Total	%	Incidence rate per 100,000 population*
Singapore residents					
Chinese	6	9	15	23.4	0.5
Malay	1	1	2	3.1	0.4
Indian	4	5	9	14.1	2.5
Others	0	0	0	0.0	0.0
Foreign residents	30	8	38	59.4	2.3
Total	41	23	64	100	1.1

[^]Excluded one tourist and eight foreigners seeking medical treatment in Singapore.

* Rates are based on 2019 estimated mid-year population.

(Source: Singapore Department of Statistics)

Table 4.16
Ethnic-sex distribution and ethnic-specific incidence rate of reported typhoid cases, 2020

	Male	Female	Total	%	Incidence rate per 100,000 population*
Singapore residents					
Chinese	4	2	6	20.0	0.2
Malay	3	0	3	10.0	0.5
Indian	1	3	4	13.3	1.1
Others	0	2	2	6.7	1.5
Foreign residents	7	8	15	50.0	0.9
Total	15	15	30	100	0.5

* Rates are based on 2020 estimated mid-year population.

(Source: Singapore Department of Statistics)

Majority of cases acquired the infection from South Asia in 2019 and 2020 (Table 4.17). Most Singapore residents acquired the disease while overseas on vacation in 2019 and 2020 (Table 4.18).

Table 4.17
Imported typhoid cases by country/ region of origin[^], 2019-2020

	2019		2020	
	No.	(%)	No.	(%)
Southeast Asia				
Indonesia	3	(7.0)	2	(11.8)
Myanmar	2	(4.8)	2	(11.8)
Philippines	1	(2.4)	0	
Thailand	2	(4.8)	0	
South Asia				
Bangladesh	20	(47.6)	6	(35.3)
India	13	(31.0)	6	(35.3)
Pakistan	1	(2.4)	1	(5.9)
Total	42	(100)	17	(100)

[^]Excluded tourists and foreigners seeking medical treatment in Singapore.

Table 4.18
Singapore residents who contracted typhoid overseas, 2016–2020

Purpose of travel	2016		2017		2018		2019		2020	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Vacation	12	85.7	16	88.9	6	66.7	8	80.0	5	83.3
Business/employment	2	14.3	0	0	2	22.2	1	10.0	0	0
Others	0	0	2	11.1	1	11.1	1	10.0	1	16.7
Total	14	100	18	100	9	100	10	100	6	100

Paratyphoid

During the period from 2016 to 2020, all of the cases of paratyphoid were imported (Table 4.19). The resident incidence rate was highest in the 25-34 years age group and the 45-54 years age groups in 2019 and 2020, respectively (Tables 4.20 and 4.21). Among the three major ethnic groups, Indians and Malays had the highest incidence in 2019 and 2020, respectively (Tables 4.22 and 4.23).

Table 4.19
Total number of notifications* received for reported paratyphoid cases, 2016 - 2020

Age group	2016		2017		2018		2019		2020	
	Local	Imported	Local	Imported	Local	Imported	Local	Imported	Local	Imported
0-4	0	1	0	0	0	2	0	0	0	2
5-14	0	2	0	2	0	2	0	2	0	2
15-24	0	2	0	3	0	1	0	1	0	0
25-34	1	7	0	2	0	0	0	6	0	4
35-44	0	4	0	2	0	1	0	1	0	0
45-54	0	0	1	1	0	2	0	1	0	2
55-64	0	0	0	1	0	2	0	0	0	0
65+	1	0	0	0	1	0	0	0	0	0
Total	2	16	1	11	1	10	0	11	0	10

* Excluded tourists and foreigners seeking medical treatment in Singapore.

Table 4.20
Age-sex distribution and age-specific resident incidence rate of reported paratyphoid cases[^], 2019

Age group	Number of notifications				Incidence rate per 100,000 resident population*
	Male	Female	Total	%	
0-4	0	0	0	0.0	0.0
5-14	2	0	2	18.2	0.0
15-24	1	0	1	9.1	0.2
25-34	5	1	6	54.5	0.7
35-44	0	1	1	9.1	0.2
45-54	0	1	1	9.1	0.0
55-64	0	0	0	0.0	0.0
65+	0	0	0	0.0	0.0
Total	8	3	11	100	-

[^]Excluded one foreigner seeking medical treatment in Singapore.

* Rates are based on 2019 estimated mid-year population.

(Source: Singapore Department of Statistics)

COMMUNICABLE DISEASES SURVEILLANCE SINGAPORE 2019 & 2020
CHAPTER 4

Table 4.21
Age-sex distribution and age-specific resident incidence rate of reported paratyphoid cases, 2020

Age group	Number of notifications				Incidence rate per 100,000 resident population*
	Male	Female	Total	%	
0-4	2	0	2	20.0	0.0
5-14	1	1	2	20.0	0.2
15-24	0	0	0	0.0	0.0
25-34	2	2	4	40.0	0.2
35-44	0	0	0	0.0	0.0
45-54	1	1	2	20.0	0.3
55-64	0	0	0	0.0	0.2
65+	0	0	0	0.0	0.0
Total	6	4	10	100	-

* Rates are based on 2020 estimated mid-year population.
(Source: Singapore Department of Statistics)

Table 4.22
Ethnic-sex distribution and ethnic-specific incidence rate of reported paratyphoid cases[^], 2019

	Male	Female	Total	%	Incidence rate per 100,000 population*
Singapore residents					
Chinese	2	1	3	27.3	0.1
Malay	0	0	0	0.0	0.0
Indian	1	1	2	18.2	0.6
Others	1	0	1	9.1	0.8
Foreign residents	4	1	5	45.4	0.3
Total	8	3	11	100	0.2

[^] Excluded one foreigner seeking medical treatment in Singapore.
* Rates are based on 2019 estimated mid-year population.
(Source: Singapore Department of Statistics)

Table 4.23
Ethnic-sex distribution and ethnic-specific incidence rate of reported paratyphoid cases, 2020

	Male	Female	Total	%	Incidence rate per 100,000 population*
Singapore residents					
Chinese	0	1	1	10.0	0.0
Malay	0	1	1	10.0	0.2
Indian	0	0	0	0.0	0.0
Others	1	1	2	20.0	1.5
Foreign residents	5	1	6	60.0	0.4
Total	6	4	10	100	0.2

* Rates are based on 2020 estimated mid-year population.
(Source: Singapore Department of Statistics)

Majority of the cases acquired the infection from South Asia in 2019 and 2020 (Table 4.24). Majority of the Singapore residents acquired the disease while overseas on vacation in 2019 and 2020 (Table 4.25).

Table 4.24
Imported paratyphoid cases by country/ region of origin, 2019-2020

	2019	2020
	No. (%)	No. (%)
Southeast Asia		
Cambodia	0	1 (10)
Indonesia	2 (18.2)	2 (20)
Myanmar	1 (9.1)	0
South Asia		
Bangladesh	1 (9.1)	2 (20)
India	6 (54.5)	5 (50)
Pakistan	1 (9.1)	0
Total	11 (100)	10 (100)

Table 4.25
Singapore residents who contracted paratyphoid overseas, 2016-2020

Purpose of travel	2016		2017		2018		2019		2020	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Vacation	6	66.7	5	71.4	8	100	5	83.3	3	75.0
Business/employment	3	33.3	0	0	0	0	1	16.7	1	25.0
Others	0	0	2	28.6	0	0	0	0	0	0
Total	9	100	7	100	8	100	6	100	4	100

HEPATITIS A

Hepatitis A is a liver infection caused by the Hepatitis A virus. It is transmitted primarily via the faecal-oral route, which includes consumption of contaminated food or water. It can also be spread from close contact with infected persons such as certain sexual acts or sharing needles when using drugs. Compared to the other hepatitis viruses, hepatitis A infections are typically self-limiting and does not become chronic. Clinical features include jaundice, fever, nausea and vomiting, loss of appetite, abdominal pain, dark urine and pale stools.

There were 66 cases of laboratory confirmed acute hepatitis A in 2019 as compared to 26 cases in 2020 (Figure 4.6). The 66 cases in 2019 comprised of 46 Singapore residents, 17 foreign residents and three foreigners who sought medical treatment in Singapore, while there were 19 Singapore residents and seven foreign residents in 2020 (Table 4.26). Among the Singapore residents, there were 28 imported and 35 indigenous cases in 2019 as compared to eight imported and 18 indigenous cases in 2020 (Table 4.27).

The resident incidence rate was highest in the 65+ years age group in both 2019 and 2020 (Tables 4.28 and 4.29). Among the three major ethnic groups, Malays had the highest incidence in both 2019 and 2020 (Tables 4.30 and 4.31).

Figure 4.6
Weekly distribution of reported acute hepatitis A cases, 2019-2020

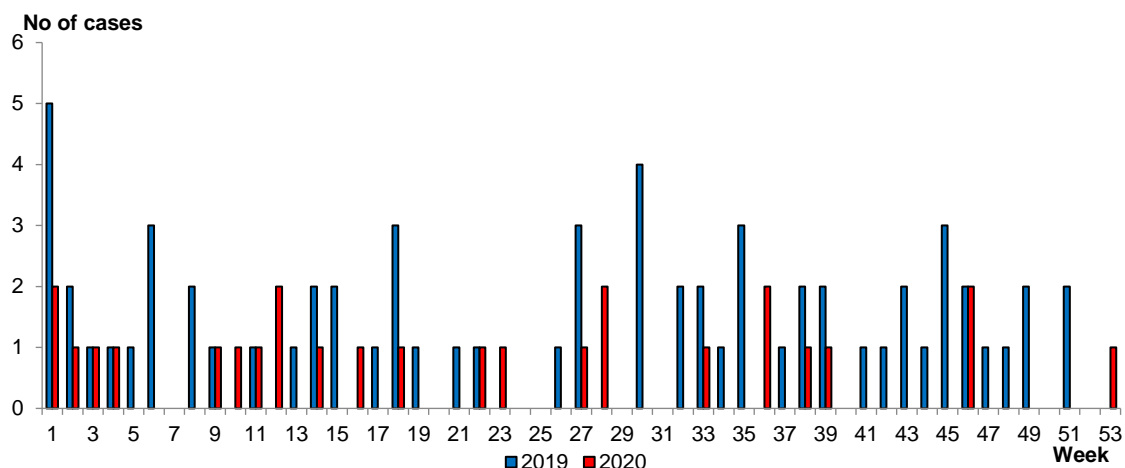


Table 4.26
Classification of reported acute hepatitis A cases, 2019 and 2020

Population group	No. of cases (%)	
	2019	2020
Singapore residents	46 (69.8)	19 (73.1)
Work permit holders/other foreigners	17(25.8)	7(26.9)
Foreigners seeking medical treatment in Singapore	3 (4.4)	0
Total	66 (100)	26 (100)

Table 4.27
Total number of notifications* received for acute hepatitis A, 2016-2020

Age group	2016		2017		2018		2019		2020	
	Local	Imported	Local	Imported	Local	Imported	Local	Imported	Local	Imported
0-4	0	0	0	0	0	1	0	0	0	1
5-14	0	3	3	2	0	1	2	1	1	0
15-24	1	5	5	5	4	2	3	4	1	0
25-34	1	13	14	12	5	9	4	10	4	2
35-44	1	5	5	5	6	4	3	6	0	1
45-54	2	2	3	4	7	7	4	4	0	2
55-64	1	0	5	4	5	3	6	1	3	0
65+	2	2	14	0	12	2	13	2	9	2
Total	8	30	49	32	39	29	35	28	18	8

*Excluded tourists and foreigners seeking medical treatment in Singapore.

COMMUNICABLE DISEASES SURVEILLANCE SINGAPORE 2019 & 2020
CHAPTER 4

Table 4.28

Age-sex distribution and age-specific resident incidence rate of acute hepatitis A cases[^], 2019

Age group	Number of notifications				Incidence rate per 100,000 resident population*
	Male	Female	Total	%	
0-4	0	0	0	0	0.0
5-14	3	0	3	4.8	0.5
15-24	3	4	7	11.1	0.8
25-34	6	8	14	22.2	1.0
35-44	3	6	9	14.3	0.8
45-54	2	6	8	12.7	1.1
55-64	4	3	7	11.1	1.2
65+	9	6	15	23.8	2.6
Total	39	33	63	100	-

[^]Excluded three foreigners seeking medical treatment in Singapore in 2019.

*Rates are based on 2019 estimated mid-year population.

(Source: Singapore Department of Statistics)

Table 4.29

Age-sex distribution and age-specific resident incidence rate of acute hepatitis A cases, 2020

Age group	Number of notifications				Incidence rate per 100,000 resident population*
	Male	Female	Total	%	
0-4	1	0	1	3.8	0.0
5-14	0	1	1	3.8	0.0
15-24	1	0	1	3.8	0.2
25-34	4	2	6	23.1	0.3
35-44	0	1	1	3.8	0.2
45-54	1	1	2	7.8	0.3
55-64	1	2	3	11.6	0.5
65+	7	4	11	42.3	1.6
Total	15	11	26	100	-

*Rates are based on 2020 estimated mid-year population.

(Source: Singapore Department of Statistics)

Table 4.30

Ethnic-sex distribution and ethnic-specific incidence rate of acute hepatitis A cases[^], 2019

	Male	Female	Total	%	Incidence rate per 100,000 population*
Singapore residents					
Chinese	14	15	29	46.0	1.0
Malay	3	6	9	14.3	1.7
Indian	2	4	6	9.5	1.4
Others	2	0	2	3.2	2.3
Foreign residents	9	8	17	27.0	1.0
Total	30	33	63	100	1.1

[^]Excluded three foreigners seeking medical treatment in Singapore.

*Rates are based on 2019 estimated mid-year population.

(Source: Singapore Department of Statistics)

COMMUNICABLE DISEASES SURVEILLANCE SINGAPORE 2019 & 2020
CHAPTER 4

Table 4.31
Ethnic-sex distribution and ethnic-specific incidence rate of acute hepatitis A cases, 2020

	Male	Female	Total	%	Incidence rate per 100,000 population*
Singapore residents					
Chinese	8	4	12	46.2	0.4
Malay	2	2	4	15.4	0.7
Indian	0	1	1	3.8	0.3
Others	1	1	2	7.7	1.5
Foreign residents	4	3	7	26.9	0.4
Total	15	11	26	100	0.5

*Rates are based on 2020 estimated mid-year population.
(Source: Singapore Department of Statistics)

Imported acute hepatitis A

In 2019, 31 out of 66 cases (47.0%) acquired the infection overseas as compared to eight out of 26 cases (30.8%) of acute Hepatitis A in 2020 (Table 4.32). Majority of the cases acquired the infection from Southeast Asia and South Asia in 2019 and 2020 (Table 4.33).

Table 4.32
Classification of imported acute hepatitis A cases, 2019 and 2020

Population group	No. of cases (%)	
	2019	2020
Singapore residents	16 (51.6)	7 (87.5)
Foreign residents	12 (38.7)	1 (12.5)
Foreigners seeking medical treatment in Singapore	3 (9.7)	0 (0)
Total	31 (100)	8 (100)

Table 4.33
Imported acute hepatitis A cases by country/ region of origin, 2019* and 2020

Country/ region of origin	No. of cases (%)	
	2019	2020
Southeast Asia		
Indonesia	9 (25.7)	2 (25)
Cambodia	1 (2.9)	0
Malaysia	3 (8.5)	1 (12.5)
Philippines	1 (2.9)	1 (12.5)
Vietnam	2 (5.7)	0
South Asia		
Bangladesh	2 (5.7)	0
India	12 (34.3)	2 (25)
Pakistan	0	1 (12.5)
Others		
Egypt	0	1 (12.5)
Kyrgyzstan	1 (2.9)	0
Korea	1 (2.9)	0
Area visited		
Taiwan	3 (8.5)	0
Total	35 (100)	8 (100)

*Count is higher than table 4.32 as some individuals visited more than one country during the incubation period.

HEPATITIS E

Similar to hepatitis A, hepatitis E is also a viral infection of the liver. It is spread largely via the faecal-oral route, most often through faecal-contaminated drinking water. It can also be spread via the consumption of raw or undercooked meat or organs from infected animals (e.g. pork, venison) or shellfish. Clinical features include jaundice, fever, nausea and vomiting, loss of appetite, abdominal pain and tenderness, dark urine and pale stools.

There were 53 reported cases of acute hepatitis E in 2020, as compared to 40 cases in 2019 (Figure 4.7). In 2019, there were 34 Singapore residents and six foreign residents, while 47 Singapore residents, five foreign residents and one foreigner seeking medical treatment were reported in 2020 (Table 4.34). Of the reported cases in 2019 and 2020, majority were indigenous cases (Table 4.35).

The resident incidence rate was highest in the 55-64 and 65+ years age groups in 2019 and 2020, respectively (Tables 4.36 and 4.37). Among the three major ethnic groups, Chinese had the highest incidence in both 2019 and 2020 (Tables 4.38 and 4.39).

Figure 4.7
Weekly distribution of reported acute hepatitis E cases, 2019-2020

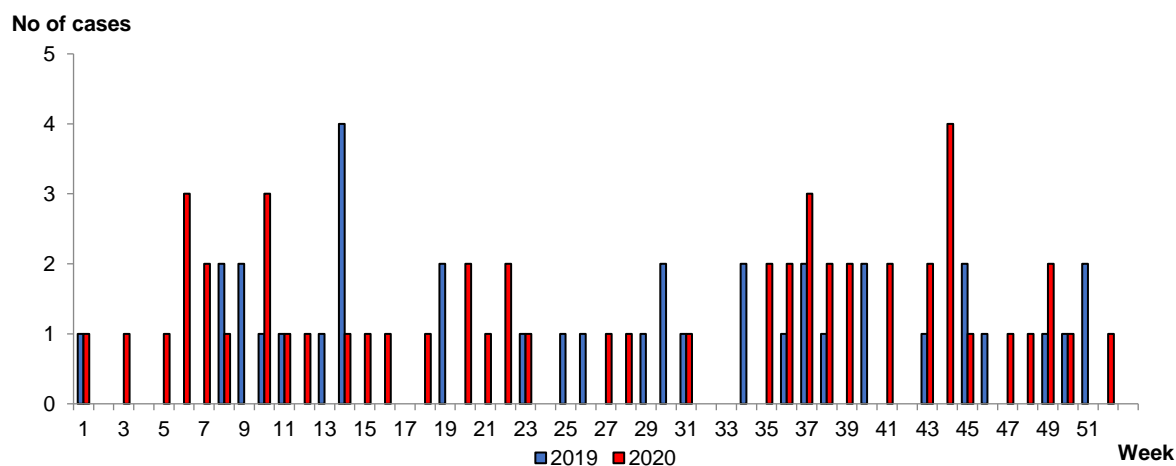


Table 4.34
Classification of reported acute hepatitis E cases, 2019 and 2020

Population group	No. of cases (%)	
	2019	2020
Singapore residents	34 (85.0)	47 (88.7)
Foreign residents	6 (15.0)	5 (9.4)
Foreigners seeking medical treatment in Singapore	0	1 (1.9)
Total	40 (100)	53 (100)

COMMUNICABLE DISEASES SURVEILLANCE SINGAPORE 2019 & 2020
CHAPTER 4

Table 4.35
Total number of notifications* received for acute hepatitis E cases, 2016-2020

Age group	2016		2017		2018		2019		2020	
	Local	Imported	Local	Imported	Local	Imported	Local	Imported	Local	Imported
0-4	0	0	0	0	0	0	0	0	0	0
5-14	1	0	0	0	0	0	0	0	0	0
15-24	0	0	3	1	0	1	0	0	0	0
25-34	0	4	7	5	4	6	5	2	2	1
35-44	6	2	4	1	6	2	6	2	7	0
45-54	9	2	5	1	11	1	4	1	8	0
55-64	17	6	19	2	7	1	9	1	12	0
65+	23	2	20	2	14	1	10	0	22	0
Total	56	16	58	12	42	12	34	6	51	1

*Excluded tourists and foreigners seeking medical treatment in Singapore.

Table 4.36
Age-sex distribution and age-specific resident incidence rate of acute hepatitis E cases, 2019

Age group	Number of notifications				Incidence rate per 100,000 resident population*
	Male	Female	Total	%	
0-4	0	0	0	0.0	0.0
5-14	0	0	0	0.0	0.0
15-24	0	0	0	0.0	0.0
25-34	4	3	7	17.5	0.7
35-44	3	5	8	20.0	1.0
45-54	1	4	5	12.5	0.7
55-64	8	2	10	25.0	1.7
65+	7	3	10	25.0	1.7
Total	23	17	40	100	-

*Rates are based on 2019 estimated mid-year population.
(Source: Singapore Department of Statistics)

Table 4.37
Age-sex distribution and age-specific resident incidence rate of acute hepatitis E cases[^], 2020

Age group	Number of notifications				Incidence rate per 100,000 resident population*
	Male	Female	Total	%	
0-4	0	0	0	0.0	0.0
5-14	0	0	0	0.0	0.0
15-24	0	0	0	0.0	0.0
25-34	2	1	3	5.8	0.2
35-44	3	4	7	13.4	0.7
45-54	4	4	8	15.4	1.3
55-64	6	6	12	23.1	2.0
65+	10	12	22	42.3	3.6
Total	25	27	52	100	-

[^]Excluded one foreigner seeking medical treatment in Singapore.

*Rates are based on 2020 estimated mid-year population.
(Source: Singapore Department of Statistics)

COMMUNICABLE DISEASES SURVEILLANCE SINGAPORE 2019 & 2020
CHAPTER 4

Table 4.38
Ethnic-sex distribution and ethnic-specific incidence rate of acute hepatitis E cases, 2019

	Male	Female	Total	%	Incidence rate per 100,000 population*
Singapore residents					
Chinese	14	14	28	70.0	0.9
Malay	0	0	0	0.0	0.0
Indian	2	0	2	5.0	0.6
Others	2	2	4	10.0	3.1
Foreign residents	5	1	6	15.0	0.4
Total	23	17	40	100	0.7

*Rates are based on 2019 estimated mid-year population.
(Source: Singapore Department of Statistics)

Table 4.39
Ethnic-sex distribution and ethnic-specific incidence rate of acute hepatitis E cases[^], 2020

	Male	Female	Total	%	Incidence rate per 100,000 population*
Singapore residents					
Chinese	22	24	46	88.5	1.5
Malay	0	0	0	0.0	0.0
Indian	0	0	0	0.0	0.0
Others	1	0	1	1.9	0.8
Foreign residents	2	3	5	9.6	0.3
Total	25	27	52	100	0.9

[^]Excluded one foreigner seeking medical treatment in Singapore in 2020.

*Rates are based on 2020 estimated mid-year population.
(Source: Singapore Department of Statistics)

Imported acute hepatitis E

Of the 40 cases in 2019, six (15.0%) cases acquired the infection overseas while of the 53 cases in 2020, two (3.8%) acquired the infection overseas (Table 4.40). In 2019 and 2020, the majority of the cases acquired the infection from Southeast Asia and South Asia (Table 4.41).

Table 4.40
Classification of imported acute hepatitis E cases, 2019 and 2020

Population group	No. of cases (%)	
	2019	2020
Singapore residents	2 (33.3)	0
Foreign residents	4 (66.7)	1 (50.0)
Foreigners seeking medical treatment in Singapore	0	1 (50.0)
Total	6 (100)	2 (100)

Table 4.41
Imported acute hepatitis E cases by country/ region of origin, 2019 and 2020

Country/ region of origin	No. of cases (%)	
	2019	2020
Southeast Asia		
Malaysia	0	1 (50.0)
Myanmar	1 (16.7)	0
Thailand	1 (16.7)	0
South Asia		
Bangladesh	2 (33.2)	0
India	1 (16.7)	1 (50.0)
Others		
Japan	1 (16.7)	0
Total	6 (100)	2 (100)

Hepatitis E Virus Genotypes

Genotyping was done by the National Public Health Laboratory for 19 laboratory-confirmed cases in 2019. 16 (84.2%) were genotype 3, two (10.5%) were genotype 1, and the genotype for the remaining sample was indeterminate. For 2020, out of the 28 laboratory-confirmed cases genotyped, 18 (64.3%) were genotype 3, one (3.6%) was genotype 4, and the genotypes for the remaining samples were indeterminate.

SALMONELLOSIS

Salmonellosis is a bacterial disease commonly presenting as acute enterocolitis, with sudden onset of fever, headache, abdominal pain, diarrhoea, nausea and sometimes vomiting. Dehydration, especially among infants or in the elderly, may be severe. The causative pathogen, *Salmonella* is a genus of gram-negative, facultative anaerobic motile rod-shaped bacteria. It is divided into two species, *Salmonella enterica* and *Salmonella bongori*. *Salmonella enterica* is further subdivided into subspecies and serotypes based on biochemical and antigenic reactions. Most of the human pathogenic *Salmonella* serovars belong to the *enterica* subspecies, most commonly reported *Salmonella enterica* serovar Typhimurium (*S. Typhimurium*) and *Salmonella enterica* serovar Enteritidis (*S. Enteritidis*). Additionally, within the *S. enterica* subsp. *Enterica*, the most common O-antigen serogroups identified are classed from A through E.

Poultry is the most common source of human salmonellosis. Consumption of contaminated, raw or undercooked meat and eggs is also a frequent cause. A wide range of other domestic and wild animals, including swine, cattle, rodents and pets, may also act as reservoirs for *Salmonella*.

A total of 1,447 laboratory-confirmed cases of salmonellosis were reported in 2020, a decrease of 23.6% compared to 1,894 cases reported in 2019 (Figure 4.8). *Salmonella* Group D was the predominant serogroup identified in both 2019 and 2020 (Table 4.42). Ofcamp these Group D cases, 534 and 364 cases were caused by *S. Enteritidis* in 2019 and 2020, respectively.

Figure 4.8
Weekly distribution of reported salmonellosis cases, 2019-2020

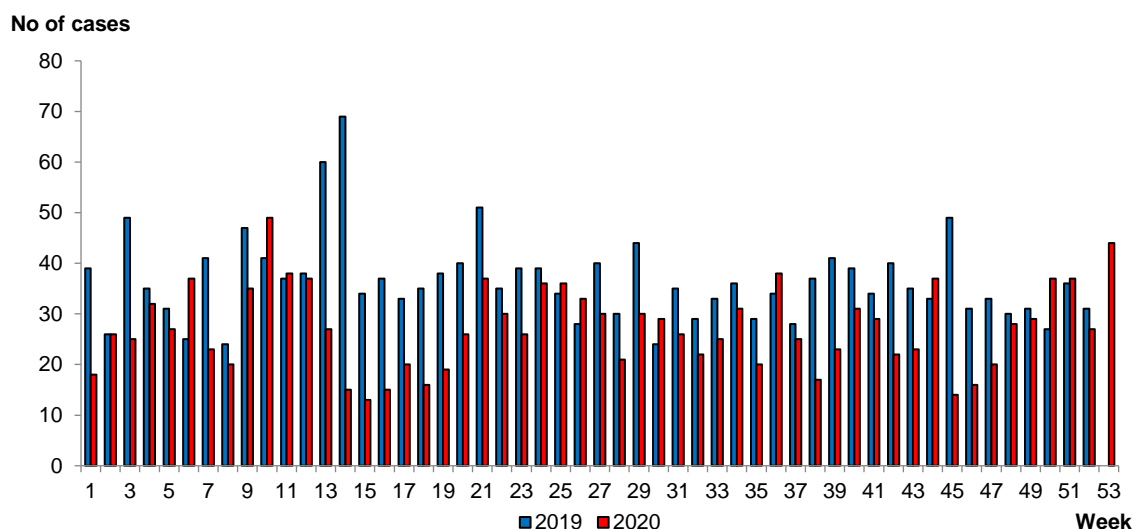


Table 4.42
Reported salmonellosis cases by serogroups, 2019-2020

Salmonella serogroups	2019		2020	
	No. of cases	Incidence rate per 100,000 population*	No. of cases	Incidence rate per 100,000 population*
Enterica-A	0	0	0	0
Enterica-B	389	6.8	321	5.6
Enterica-C	236	4.1	154	2.7
Enterica-C/D	0	0	1	0
Enterica-D	932	16.3	708	12.4
Enterica-E	72	1.3	77	1.4
Enterica-E/G	16	0.3	12	0.2
Enterica-F	1	0	0	0
Enterica-G	10	0.2	3	0.1
Enterica-I	10	0.2	4	0.1
Enterica-J	4	0.1	1	0
Enterica-L	0	0	1	0
Enterica-M	2	0	1	0
Enterica-N	3	0.1	0	0
Enterica-O	3	0.1	1	0
Enterica-Unspecified	216	3.8	163	2.9
Grand Total	1,894	33.2	1,447	25.4

*Rates are based on 2019 and 2020 estimated mid-year population.
(Source: Singapore Department of Statistics)

Salmonella Enteritidis in 2019 and 2020

Of the 534 cases reported in 2019, 466 were Singapore residents, 62 were foreign residents, three were foreigners who sought medical treatment in Singapore and three were tourists. Of the 364 cases reported in 2020, 306 were Singapore residents and 58 were foreign residents (Table 4.43).

During the period from 2016 to 2020, majority of the cases of *S. Enteritidis* were indigenous, and in the 65+ years age group from 2016 to 2018 and in 0-4 years age group from 2019-2020 (Table 4.44). In 2019 and 2020, the resident incidence rate was highest in the 0-4 years age group (Tables 4.45 and 4.46). Among the three major ethnic groups, Malays had the highest incidence rate in both 2019 and

COMMUNICABLE DISEASES SURVEILLANCE SINGAPORE 2019 & 2020
CHAPTER 4

2020 (Tables 4.47 and 4.48).

Table 4.43
Classification of reported acute S. Enteritidis cases, 2019-2020

Population group	No. of cases (%)	
	2019	2020
Singapore residents	466 (87.2)	306 (84.1)
Foreign residents	62(11.6)	58 (15.9)
Foreigners seeking medical treatment in Singapore	3 (0.6)	0
Tourists	3 (0.6)	0
Total	534 (100)	364 (100)

Table 4.44
Total number of notifications* received for reported S. Enteritidis cases, 2016-2020

Age group	2016		2017		2018		2019		2020	
	Local	Imported	Local	Imported	Local	Imported	Local	Imported	Local	Imported
0-4	21	1	27	1	28	0	206	1	110	0
5-14	7	0	6	0	5	0	45	0	37	0
15-24	19	1	21	0	16	1	21	0	24	0
25-34	40	2	22	2	16	0	41	3	42	1
35-44	30	0	31	1	15	1	24	0	33	0
45-54	42	0	28	2	23	0	32	1	21	0
55-64	40	1	35	4	32	1	39	2	35	0
65+	103	0	106	4	78	2	109	4	61	0
Total	302	5	276	14	213	5	517	11	363	1

*Excluded tourists and foreigners seeking medical treatment in Singapore.

Nb: Serotyping results were routinely updated from 2018 onwards.

Table 4.45
Age-sex distribution and age-specific resident incidence rate of reported S. Enteritidis cases[^], 2019

Age group	Number of notifications				Incidence rate per 100,000 resident population*
	Male	Female	Total	%	
0-4	113	94	207	39.2	99.3
5-14	22	23	45	8.5	10.1
15-24	11	10	21	4.0	3.6
25-34	16	28	44	8.3	4.6
35-44	13	11	24	4.5	3.2
45-54	20	13	33	6.3	4.9
55-64	30	11	41	7.8	7.0
65+	66	47	113	21.4	18.4
Total	291	237	528	100	-

[^]Excluded three tourists and three foreigners seeking treatment in Singapore.

*Rates are based on 2019 estimated mid-year population.

(Source: Singapore Department of Statistics)

COMMUNICABLE DISEASES SURVEILLANCE SINGAPORE 2019 & 2020
CHAPTER 4

Table 4.46
Age-sex distribution and age-specific resident incidence rate of reported S. Enteritidis cases, 2020

Age group	Number of notifications				Incidence rate per 100,000 resident population*
	Male	Female	Total	%	
0-4	67	43	110	30.2	55.2
5-14	30	7	37	10.2	7.9
15-24	18	6	24	6.6	4.1
25-34	22	21	43	11.8	4.3
35-44	17	16	33	9.1	3.5
45-54	10	11	21	5.8	3.1
55-64	21	14	35	9.6	5.3
65+	32	29	61	16.8	9.4
Total	217	147	364	100	-

*Rates are based on 2020 estimated mid-year population.
(Source: Singapore Department of Statistics)

Table 4.47
Ethnic-sex distribution and ethnic-specific incidence rate of reported S. Enteritidis cases[^], 2019

	Male	Female	Total	%	Incidence rate per 100,000 population*
Singapore residents					
Chinese	181	150	331	62.7	11.1
Malay	50	38	88	16.7	16.3
Indian	16	10	26	4.9	7.2
Others	10	11	21	4.0	16.3
Foreign residents	34	28	62	11.7	3.7
Total	291	237	528	100	9.3

[^] Excluded three tourists and three foreigners seeking treatment in Singapore.

*Rates are based on 2019 estimated mid-year population.
(Source: Singapore Department of Statistics)

Table 4.48
Ethnic-sex distribution and ethnic-specific incidence rate of reported S. Enteritidis cases, 2020

	Male	Female	Total	%	Incidence rate per 100,000 population*
Singapore residents					
Chinese	126	80	206	56.6	6.9
Malay	29	26	55	15.1	10.1
Indian	13	8	21	5.8	5.8
Others	14	10	24	6.6	18.5
Foreign residents	35	23	58	15.9	3.5
Total	217	147	364	100	6.4

*Rates are based on 2020 estimated mid-year population.
(Source: Singapore Department of Statistics)

FOOD POISONING

There were 425 notifications with 2,540 cases in 2019, as compared with 223 notifications of food poisoning with 1,366 cases in 2020. (Figure 4.9). Most of the notifications involved restaurants, while majority of the cases reported to have developed gastroenteritis symptoms after consuming catered food (Table.4.49).

Figure 4.9
Notifications of food poisoning in Singapore, 2001 – 2020

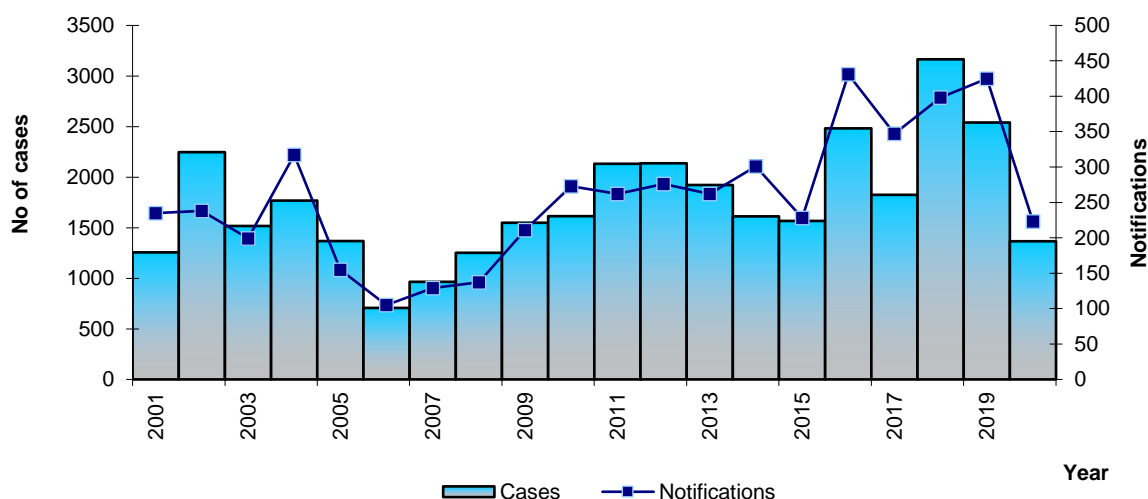


Table 4.49
Food poisoning notifications by type of food establishments, 2019-2020

Type of food establishments	2019		2020	
	No. of notifications	No of cases	No. of notifications	No of cases
General outlets				
Bakery	4	32	2	3
Canteens				
School	4	59	1	44
Tertiary Institution	2	93	0	0
Others	10	208	6	52
Caterer (licensed)	25	718	12	397
Eating house	56	134	32	117
Fair (food fair)	2	5	0	0
Fair (others)	3	5	1	3
Food court	13	28	11	21
Foodshop (takeaway)	18	46	11	21
Hawker centre	25	62	13	77
Other licensed premises	0	0	2	8
Restaurants				
In Hotel	14	114	4	40
Fast Food	16	37	6	15
Others	193	582	90	252
Supermarket	4	6	1	4

COMMUNICABLE DISEASES SURVEILLANCE SINGAPORE 2019 & 2020
CHAPTER 4

Snackbar	19	44	5	15
Food factory	6	120	21	174
Sub-total (General outlets)	414	2,293	218	1,243
In house kitchens				
Preschool	5	48	3	118
Nursing home	4	141	0	0
School	0	0	0	0
Workers dormitory	0	0	0	0
Others (home based business)	1	35	0	0
Others	0	0	1	2
Unlicensed premises	1	23	1	3
Sub-total (Others)	11	247	5	123
Total	425	2,540	223	1,366