# National Enteric Surveillance Program (NESP)

**ANNUAL SUMMARY 2018** 



PROTECTING CANADIANS FROM ILLNESS



Public Health Agence de la santé Agency of Canada publique du Canada



# TO PROMOTE AND PROTECT THE HEALTH OF CANADIANS THROUGH LEADERSHIP, PARTNERSHIP, INNOVATION AND ACTION IN PUBLIC HEALTH.

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### **ANNUAL SUMMARY 2018**

INCLUDING SEROTYPE TABLES FOR 2018, NESP AND NML

The National Microbiology Laboratory (NML) and Centre for Foodborne, Environmental and Zoonotic Infectious Diseases (CFEZID), Public Health Agency of Canada

&

Provincial Public Health Laboratories

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## Overview

The National Enteric Surveillance Program (NESP) is a collaborative program between the Public Health Agency of Canada (PHAC) and the Provincial Public Health Laboratories. Through NESP, weekly analysis and reporting is conducted for 14 different organisms causing enteric illness, including 10 which are nationally notifiable. The data derived from the surveillance system support detection of multi-provincial clusters and outbreaks, guides public health interventions, and are designed to integrate with national and international efforts to limit the transmission of enteric diseases.

In 2018, a total of 15,107 isolate results were reported, a decrease from the average number of notifications received in the previous five years (15,634). *Salmonella* spp. continue to be the most common organism identified with 7,300 notifications provided in 2018, representing 48% of all isolates reported in that year. As in previous years, *Salmonella* Enteritidis (42%), *S.* Typhimurium (8%), and *S.* Heidelberg (5%) remain the top three serotypes of all *Salmonella* reported to NESP in 2018, collectively 55% of all serotypes identified.

The incidence rate of shiga toxigenic *Escherichia coli* (STEC) O157 remained stable since 2010, with 1.15 cases per 100,000 population reported in 2018. An increase in the incidence rate of non-O157 isolates was observed in 2018 (1.42 cases per 100,000 population) compared to 2017 (0.99 cases per 100,000 population). This is the second year where more non-O157 isolates were reported than O157 isolates.

The incidence rate of invasive listeriosis in 2018 (0.40 per 100,000 population) is similar to what has been seen in the past 5 years. Over the 6-year period Hepatitis A has been under national surveillance, the highest incidence was reported to the program in 2018 (1.08 cases per 100,000 population). As in previous years, *Shigella sonnei* constituted the majority of Shigella species reported in 2018, representing 58% of all *Shigella* reported. Trends for all other *Shigella* species have remained unchanged over the past 20 years, with a slight increase in overall incidence rate reported in 2018.

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# Information to the reader on the National Enteric Surveillance Program (NESP)

In Canada, the surveillance of enteric diseases is conducted through NESP and the Canadian Notifiable Diseases Surveillance System (CNDSS)<sup>a</sup>. NESP is jointly administered by PHAC's National Microbiology Laboratory (NML) and the Centre for Foodborne, Environmental and Zoonotic Infectious Diseases (CFEZID). Since 1997, weekly analysis and reporting on laboratory-confirmed cases of enteric illness submitted by the Provincial Public Health Laboratories has been conducted through NESP.

NESP provides the first and most timely level of characterization (primarily species and serotype) of data critical to, and integrated with, other surveillance programs. Monitoring aggregated data allows for the rapid evaluation and response to enteric illness outbreaks. In addition, the data allows for the description of trends in pathogen subtypes and in the incidence of nationally notifiable enteric pathogens. CNDSS receives data that are collected by local health units, forwarded to provincial/territorial health authorities and collated by the Centre for Communicable Diseases and Infection Control (CCDIC). These data may be more representative of total numbers of annual illnesses; however CNDSS is not designed to provide timely information required for cluster or outbreak detection. These two surveillance systems (CNDSS and NESP) are complementary in providing both epidemiological and laboratory results; however discrepancies between them do exist. Due to the reporting protocols and requirements, CNDSS is a more reliable source of information in terms of total number of illnesses, while NESP trends are more current and responsive to trends. A comparison of national case counts and incidence rates for enteric diseases is included (Appendix 1).

NESP is also highly complementary to another laboratory-based surveillance system, PulseNet Canada<sup>b</sup>. Also administered by PHAC, PulseNet Canada collects high resolution data in real-time on cases of enteric diseases for the purpose of outbreak detection and response. Due to the additional testing performed (molecular or genomic subtyping), there are differences in turnaround

<sup>&</sup>lt;sup>a</sup> Canadian Notifiable Diseases Surveillance System, Public Health Agency of Canada: https://diseases.canada.ca/notifiable/

<sup>&</sup>lt;sup>b</sup> PulseNet Canada, National Microbiology Laboratory, Public Health Agency of Canada: <u>https://www.nml-lnm.gc.ca/index-eng.htm</u>

time compared to weekly NESP data; also, PulseNet Canada surveillance is conducted only for a subset of the organisms that are tracked by NESP.

#### **Data Collection**

Isolates (or specimens) are submitted to provincial public health microbiology laboratories for testing and/or confirmation of the enteric pathogen. On a weekly basis, each provincial public health laboratory summarizes the number of enteric microorganisms isolated from human patients. The information details the genus, species and serotype (where appropriate). The 'report week' for NESP spans the period from Sunday to Saturday and is based on the date the laboratory test was completed. Data are submitted to NML either directly (faxing or emailing), or by entering the data via the web-based application (webNESP) hosted on the Canadian Network for Public Health Intelligence (CNPHI). The information is submitted as soon as possible and no later than the second day after a weekend or holiday. An exception to this reporting scheme occurs when the isolate must be sent to another laboratory for completion of the identification. In this case, the isolate is reported at the level of typing or identification attained (e.g. *Salmonella* sp.) for the week in which it was sent to the reference laboratory. The NESP record is then updated when the final identification is received from the reference laboratory (e.g. report in week 35 that one "*Salmonella* sp." reported in week 33 has been confirmed as "*S*. Banana"). This updated information is submitted with the next weekly NESP report form.

All data submitted are aggregated by province and pathogen and do not contain any patient identifiers, locators, or other confidential information. NESP partners endeavor to include only the number of isolates from new cases identified at the laboratory that week, or updates to previously reported numbers. To avoid duplication, the provincial laboratories attempt to identify multiple, repeat, or follow-up specimens from the same individual, and consider all identical isolates from the same patient that are collected over a three month period as a single case.

Data collected for surveillance purposes are increasingly being generated using whole genome sequencing instead of by classical microbiological methods. Most of the data collected by NESP, however, can be derived from whole genome sequence data *in silico* (e.g., species identification, serotype), ensuring that the over two decades of data used for NESP analyses will remain compatible with surveillance in the genomics era. Starting in 2018, portions of the data collected and analyzed by NESP will have been generated via whole genome sequencing.

#### Data Analysis and Dissemination

Data analysis is conducted weekly by using an algorithm to determine if the current week case counts are significantly higher than the expected baseline. Statistical significance is based on the cumulative Poisson probability between the reported case count and the retrospective five year median.

Results from the weekly analysis included in the "NESP Weekly Report" are disseminated to all provincial laboratories, at least one epidemiologist or Medical Officer of Health in each province/territory and multiple stakeholders at the federal level. Protocol allows sharing of the reports with other public health professionals who have an operational need to have this information however, the weekly reports are not intended for public distribution. No response is required by public health professionals to the statistical elevations noted in the reports. The aim is to provide useful and timely information for those responsible for public health action.

In addition to the NESP Weekly Reports, partners can perform real-time data analysis, examine trends and display the data for their respective jurisdictions within webNESP. PulseNet Canada uses these data in conjunction with laboratory DNA fingerprinting data determined by pulsed-field gel electrophoresis (PFGE) and other molecular/genomic data to detect disease clusters and outbreaks. The resulting data analyses are also shared on CNPHI with provincial public health microbiology laboratories, the Canadian Food Inspection Agency (CFIA), Health Canada (HC), PHAC and provincial/territorial epidemiologists. Notably, the coordinated assessment of laboratory evidence collected through these two complementary laboratory surveillance networks allows for the interpretation of clinical microbiological evidence during multi-jurisdictional epidemiologic investigations, as described in the Food-borne Illness Outbreak Response Protocol (FIORP)<sup>c</sup>.

#### Limitations

It should be noted that there are some inherent limitations of these data. For some organisms the number of isolates reported is a subset of laboratory isolations and may not reflect the incidence of disease at the provincial or national level. For example, *Campylobacter* isolates are not routinely forwarded to provincial or central reference laboratories for further testing beyond genus/species characterizations and are therefore greatly under-represented in NESP. By

<sup>&</sup>lt;sup>°</sup> Food-borne Illness Outbreak Response Protocol (FIORP) 2010: To guide a multi-jurisdictional response. Public Health Agency of Canada: <u>http://www.phac-aspc.gc.ca/zoono/fiorp-pritioa/index-eng.php</u>

contrast, *Salmonella* and *E. coli* O157 isolates captured by NESP are more representative of the true incidence of disease in Canada, as the number of cases reported to CNDSS and isolates reported to NESP show a high degree of concurrence for both diseases. There may be over-reporting of organisms in NESP due to reporting of multiple specimens from a single patient, but efforts are made to minimize this occurrence. Information regarding extra-intestinal isolation sites and foreign travel are not consistently reported to NESP from all laboratories and therefore any interpretation should be considered with caution.

#### Questions and correspondence may be forwarded via email to:

PHAC.NESP-PNSME.ASPC@canada.ca

# Laboratory-confirmed Isolate Counts & Incidence Rates

In 2018, provincial laboratories reported the results of 15,107 isolates of enteric pathogens to NESP, a decrease from the average number of notifications in the previous five years (15,634). The most frequently reported enteric pathogen group was *Salmonella*, followed by enteric viruses (Norovirus, Hepatitis A, Rotavirus and Adenovirus) and enteric parasites (*Giardia, Cryptosporidium, Entamoeba histolytica/dispar* and *Cyclospora*) (Table 1). A complete list of organisms isolate counts reported by province and territory in 2018 is shown in Appendix 2.

Table 1. Number of isolates reported to NESP by major organism group per province orterritory, 2018

GROUP	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	TOTAL	% OF TOTAL ISOLATES REPORTED
Campylobacter <sup>1</sup>	47	333	138	99	143	117	202	99	39	109	7	0	0	1333	8.82
E. coli <sup>2</sup>	186	301	86	33	147	250	8	4	2	72	1	1	0	1091	7.22
Listeria	9	16	3	0	74	40	3	3	1	1	0	0	0	150	0.99
Salmonella	1052	908	192	265	2782	1554	194	185	32	121	2	13	0	7300	48.32
Shigella	115	64	11	9	300	269	9	3	1	2	0	1	0	784	5.19
Vibrio	25	16	2	1	6	3	9	4	1	0	0	0	0	67	0.44
Yersinia	95	68	14	2	181	39	1	2	0	1	1	0	0	404	2.67
Parasites <sup>1</sup>	245	15	77	96	678	263	114	107	22	36	22	0	0	1675	11.09
Viruses <sup>1</sup>	260	262	97	162	998	59	137	108	89	125	6	0	0	2303	15.24
Total	2034	1983	620	667	5309	2594	677	515	187	467	39	15	0	15 107	100

<sup>1</sup>*Campylobacter*, parasitic (*Giardia*, *Cryptosporidium*, *Entamoeba histolytica/dispar* and *Cyclospora*), and viral (Norovirus, Rotavirus and Adenovirus) isolates are not routinely forwarded to the provincial or central reference laboratories and are greatly under-represented in NESP.

<sup>2</sup>*E. coli* includes O157 serotypes (426 cases), non-O157 serotypes (525 cases), CIDT positive for STX/STEC (72 isolates), and non-typed (68 cases).

Annual national incidence rates for the groups of enteric pathogens reported to NESP between 2013 and 2018 are shown in Table 2 and Appendix 1. Isolates of *E. coli* O157, *Listeria monocytogenes, Salmonella* and *Shigella* are routinely forwarded to provincial microbiology laboratories, while isolates for *Campylobacter, Yersinia*, enteric parasites (*Giardia, Cryptosporidium, Entamoeba histolytica/dispar* and *Cyclospora*) and enteric viruses (Norovirus, Rotavirus and Adenovirus) are not routinely reported to the provincial or central reference laboratories. As such, NESP incidence rates are considered to be reflective of the true incidence rate for those routinely reported pathogens enabling the calculation of provincial and territorial incidence rates as shown in Table 3.

GROUP	20	13	20	14	20	15	20	16	20	17	20	18
	Total	Rate <sup>1</sup>										
<i>E. coli</i> O157	472	1.35	458	1.29	379	1.06	415	1.15	348	0.95	426	1.15
<i>E. coli</i> non- O157 <sup>2</sup>	131	0.37	151	0.43	229	0.64	205	0.57	361	0.99	525	1.42
Listeria	117	0.33	133	0.38	125	0.35	191	0.53	109	0.30	150	0.40
Salmonella	6270	17.87	7850	22.15	7717	21.61	7816	21.65	7313	20.01	7300	19.70
Shigella	621	1.77	681	1.92	739	2.07	807	2.23	699	1.91	784	2.12
Campylobacter	1866	5.32	1676	4.73	1514	4.24	1378	3.81	1287	3.52	1333	3.60
Vibrio	48	0.14	82	0.23	85	0.24	44	0.12	54	0.15	67	0.18
Yersinia	278	0.79	341	0.96	383	1.07	353	0.98	387	1.06	404	1.09
Parasites	1665	4.75	1811	5.11	1845	5.17	1921	5.32	1679	4.59	1675	4.52
Viruses	4058	11.57	2934	8.28	3075	8.61	2295	6.36	2600	7.12	2303	6.21

# Table 2. Annual national totals and rates (per 100,000 population) for enteric pathogens and organism groups reported to NESP, 2013-2018

<sup>1</sup>Rates calculated using the population estimates for Canada as reported by Statistics Canada.

<sup>2</sup>E. coli non-O157 is not consistently reported by provinces and territories.

# Table 3. Annual rates<sup>1</sup> (per 100,000 population) of infection per province and territory for select groups of pathogens routinely reported to NESP, 2018

GROUP	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU
E. coli O157	0.64	3.27	1.64	1.26	0.77	1.13	0.91	0.42	0	0	0	2.25	0
<i>E. coli</i> non-O157 <sup>2</sup>	1.88	3.74	5.77	1.11	0.26	1.76	0.13	0	0	0.38	2.47	0	0
Listeria	0.18	0.37	0.26	0	0.52	0.48	0.39	0.31	0.65	0.19	0	0	0
Salmonella	21.08	21.08	16.52	19.60	19.42	18.52	25.17	19.27	20.88	23.03	4.94	29.19	0
Shigella	2.30	1.49	0.95	0.67	2.09	3.21	1.17	0.31	0.65	0.38	0	2.25	0

<sup>1</sup>Rates calculated using the population estimates for Canada as reported by Statistics Canada.

<sup>2</sup>E. coli non-O157 is not consistently reported by provinces and territories.

# Salmonella

A total of 7,300 *Salmonella* isolates representing 247 serotypes were reported in 2018. *Salmonella* Enteritidis accounted for 42% of all human salmonellosis, and together with the nine remaining most common serotypes (Figure 1), they constituted 74% of all *Salmonella* infections reported. National, provincial and territorial case counts for *Salmonella* reported in 2018 are shown in Table 4 and Appendix 2.

Figure 1. Proportion of *Salmonella* serotypes causing human illness as reported to NESP, 2018 (n=7300)



\*Other serotypes (1,910 isolates) were divided among 237 serotypes and 79 isolates were reported as unspecified *Salmonella* species.

 Table 4. Number of isolates reported to NESP per province and territory for the ten most commonly reported Salmonella serotypes, 2018

GROUP	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	TOTAL	% of Salmonella total
Enteritidis	445	445	93	126	1054	654	97	112	14	34	1	8	0	3083	42
Typhimurium	58	62	25	16	220	139	16	11	2	2	0	0	0	551	8
Heidelberg	14	29	10	7	179	108	19	17	4	2	0	1	0	390	5
Infantis	77	34	5	15	106	57	11	5	0	3	0	0	0	313	4
ssp I 4,[5],12:i:-	38	22	7	5	103	80	6	1	0	0	0	1	0	263	4
Typhi	43	23	2	10	104	16	0	0	0	0	0	0	0	198	3
Newport	27	34	4	7	72	44	1	1	1	1	0	0	0	192	3
Thompson	6	2	1	1	73	56	7	1	1	0	0	0	0	148	2
Braenderup	7	12	2	2	68	31	2	1	0	1	0	1	0	127	2
Agona	10	17	4	6	62	21	1	2	0	2	0	0	0	125	2
Total	725	680	153	195	2041	1206	160	151	22	45	1	11	0	5390	74

Compared to the average number of *Salmonella* notifications received between 2013 and 2017 (7,393 cases), there was a 1.3% decrease observed in 2018 (7,300) (Figure 2). While *S*. Enteritidis remained the most common serotype over this time period, changes were observed among the other most commonly reported *Salmonella* serotypes (Table 5).





Serotypes	2014	2015	2016	2017	2018	Average no.				
Enteritidis	3337 (1)	3200 (1)	3/33 (1)	3278 (1)	3083 (1)	3268				
Linterniuis	3337 (1)	5203 (1)	5455(1)	5270(1)	3003 (1)	5200				
Typhimurium	671 (2)	642 (2)	607 (2)	602 (2)	551 (2)	615				
Heidelberg	628 (3)	571 (3)	580 (3)	444 (3)	390 (3)	523				
Infantis	164 (7)	279 (6)	378 (4)	244 (5)	313 (4)	276				
ssp I 4,[5],12:i:-	251 (5)	280 (5)	259 (6)	265 (4)	263 (5)	264				
Typhi	140 (8)	121 (10)	136 (8)	181 (6)	198 (6)	155				
Newport	224 (6)	235 (7)	198 (7)	143 (8)	192 (7)	198				
Thompson	392 (4)	311 (4)	290 (5)	135 (9)	148 (8)	255				
Braenderup	71	123 (9)	81	145 (7)	127 (9)	109				
Agona	78	63	120 (9)	103	125 (10)	98				
Javiana	133 (9)	136 (8)	114 (10)	0) 111 (10)	) 111 (10)	) 111 (10)	0) 111 (10)	0) 111 (10)	118	122
Saintpaul	131 (10)	108	70	87	87	97				

Table 5. National total counts (overall rank) for the ten most commonly reported *Salmonella* serotypes to NESP, 2014-2018

In May 2017, PulseNet Canada began performing WGS on all *Salmonella* isolates submitted for routine laboratory-based surveillance, providing highly discriminatory genomic subtype data for outbreak detection and response. The potential impacts of this change on NESP data collection and analysis are currently under assessment.

#### Salmonella Enteritidis

In 2018, 3,083 isolates of *S*. Enteritidis, 42% of all Salmonella submissions, were reported to NESP. The incidence rate observed in 2018 was 22% higher (8.3 cases per 100,000 population) relative to the 2009-2013 baseline period (6.8 cases per 100,000 population) and lower compared to the incidence rate in 2017 (9.0 per 100,000 population). An increase in incidence can be seen in 2014 from the 2009-2013 baseline, with the incidence remaining stable from 2014-2016 and then slightly decreasing from 2016-2018 (Figure 3).



Figure 3. Relative incidence rates<sup>1</sup> of *S.* Enteritidis, *S.* Heidelberg, *S.* Typhimurium and other *Salmonella* serotype reported to NESP by Year, 2014-2018 compared to the 2009-2013 baseline period

<sup>1</sup> Rates are compared to the 2009-2013 baseline period.

#### Salmonella Typhimurium

Compared to the 2009-2013 baseline period, a 32% decrease in the incidence of *S*. Typhimurium cases was noted in 2018 (2.2 versus 1.5 cases per 100,000 population, respectively). From 2013-2018, a slight decreasing trend can be seen in the incidence of S. Typhimurium (Figure 3). Although *S*. Typhimurium continues to rank among the top 3 most common serotypes causing human salmonellosis in Canada, it represents only 8% of all *Salmonella* isolates reported to NESP in 2018 (Table 4 and Table 5).

#### Salmonella Heidelberg

*Salmonella* Heidelberg, the third most common serotype in Canada, represented 5% of all human *Salmonella* isolates reported to NESP in 2018. The 2018 overall incidence (1.1 per 100,000 population) decreased 52% compared to the 2009-2013 baseline period (2.3 per 100,000 population). From 2013-2018, a decreasing trend can be seen in the incidence of *S*. Heidelberg (Figure 3).

## Escherichia coli

The current rate of Shiga toxigenic *Escherichia coli* (STEC) O157 (1.15 cases per 100,000 population) has remained relatively stable since 2010 (1.2 cases per 100,000 population) (Figure 4). In 2018, several provinces reported incidence rates higher than the national reported incidence rate: Alberta (3.27 cases per 100,000 population), Saskatchewan (1.64 cases per 100,000 population), Manitoba (1.26 cases per 100,000 population), and Northwest Territories (2.25 cases per 100,000 population) (Table 3). The incidence rate of *E. coli* non-O157 increased in 2018 (1.42 cases per 100,000 population) from 2017 (0.99 cases per 100,000 population) (Figure 4). This is the second year where the proportion of non-O157 isolates reported has exceeded the proportion of O157 isolates. It should be noted that *E. coli* non-O157 are reported less consistently than *E. coli* O157 to NESP and therefore any changes observed over time are a reflection in testing practices by some provincial laboratories. Further, 7% of isolates were identified using culture-independent diagnostic tests (CIDT), which are PCR-based tests used for the identification of organisms that result in a lack of isolates available for further sub-typing.

Among non-O157 isolates, in 2018, 42% of these were represented by six serotypes: *E. coli* O26, *E. coli* O121, *E. coli* O103, *E. coli* O111, *E. coli* O118, and *E. coli* O145 (Figure 5). In 2018, 40% of *E. coli* non-O157 did not have additional sub-type information. In 2017, a request was submitted by NML to provincial public health laboratories to report the testing method used for the identification of organisms, as the use of CIDTs are becoming more prevalent in Canada.

A large increase in incidence rate was seen in *E. coli* O26 (0.15 cases per 100,000 population in 2017, 0.21 cases per 100,000 population in 2018). Smaller increases in incidence rate were seen in *E. coli* O103 (0.07 in 2017, 0.09 in 2018), *E. coli* O111 (0.06 in 2017, 0.09 in 2018), *E. coli* O118 (0.02 in 2017, 0.04 in 2018), and *E. coli* O145 (0.03 in 2017, 0.04 in 2018). A decrease in incidence rate was seen in *E. coli* O121 (0.17 in 2017, 0.11 in 2018) (Figure 6). All *E. coli* serotypes, including confirmed non-O157 STEC isolates, are summarized in Appendix 2.







Figure 5. Distribution of *E. coli* non-O157 serotypes reported to NESP in 2018





<sup>1</sup>O118 and O145 tied for fifth place

# Listeria monocytogenes

As per the case definition for invasive listeriosis, only isolates obtained from a normally sterile site or placental/fetal tissues should be reported. An increased number of isolates for invasive listeriosis were reported in 2018 (150) compared to 2017 (109). Incidence in all P/Ts changed from the previous year, except for British Columbia. As there are small numbers of cases of invasive listeriosis within most jurisdictions, the magnitude of the change is greatly affected with a difference of even one case (Figure 7). There were no cases of invasive listeriosis reported in 2018 by Manitoba, Nunavut, Yukon, and Northwest Territories.





# Shigella

There were 784 *Shigella* isolates reported in 2018, representing a rate of 2.12 cases per 100,000 population compared to an average of 1.98 cases per 100,000 population reported between 2013 and 2017 (Figure 8). Isolates of *Shigella sonnei* and *Shigella flexneri* comprised 58% and 37% of total notifications respectively. Overall trends for *Shigella* are driven by the incidence of *S. sonnei* (Figure 8). Among the other *Shigella* species, incidence trends over time have remained relatively unchanged with an incidence of 0.78 cases per 100,000 population for *Shigella flexneri*, 0.07 cases per 100,000 population for *Shigella boydii*, and 0.02 cases per 100,000 population for *Shigella dysenteriae* observed in 2018 (Figure 8).





# Hepatitis A

The national incidence rate for Hepatitis A in 2018 was the highest since its inclusion in NESP in 2012, with a rate of 1.08 cases per 100,000 population (Figure 9). At the provincial level, increases in reported incidence rates were observed among British Columbia, Alberta, Saskatchewan, Ontario, and Newfoundland and Labrador (Figure 9). The increases observed could be a result of change of laboratory detection methods. Each provincial laboratory makes the choice as to whether or not they report a case based solely on lab testing. The positive results that get reported are based on anything IgM positive. As a result, these positive IgM could be due to false positive or recent immunization. When local public health follow up occurs, they determine whether case meets confirmed case definition or not. If local public health determines it is not a case (e.g. recent immunization) they may not always communicate back to the laboratory to ensure the lab then ask us to correct our surveillance figures. There were also a number of outbreaks which occurred in 2018. Conversely, since not all specimens/isolates are referred from the regional and local laboratories to the provincial public health laboratories, viruses, including Hepatitis A, are under-represented in NESP and reported case counts are not representative of the true incidence of the disease in Canada.



Figure 9. National and provincial incidence rate (per 100,000 population) of Hepatitis A reported to NESP, 2013-2018

Appendix 1. Comparison of national totals, incidence per 100 000 population and proportion captured between the Canadian Notifiable Disease Surveillance System (CNDSS) and the National Enteric Surveillance Program (NESP) for enteric diseases, 2017<sup>1</sup>

Enteric, Food and Waterborne Diseases	Ca Notifia Sur Syste	anadian Ible Disease Veillance m (CNDSS)	Nati Sເ Proູ	onal Enteric Irveillance gram (NESP)	% of CNDSS cases captured in NESP (NESP
2017	N	Rate per 100,000 population	N	Rate per 100,000 population	CNDSS cases <sup>8</sup> )
Botulism	4	0.01	-	-	N/A
Campylobacteriosis <sup>2</sup>	10382	28.3	1287	-	12.4
Cholera <sup>3</sup>	5	0.01	4	0.01	75.0
Cryptosporidiosis <sup>2</sup>	790	2.2	335	-	42.4
Cyclosporiasis <sup>2</sup>	374	1.0	48	-	12.8
Giardiasis <sup>2</sup>	3644	9.9	801	-	22.0
Hepatitis A	275	0.8	290	0.8	105.5 <sup>8</sup>
Invasive Listeriosis	120	0.3	109	0.3	90.8
Norovirus <sup>2,4,5</sup>	273	5.6	1733	-	N/A
Paralytic Shellfish Poisoning <sup>6</sup>	0	0.0	-	-	N/A
Salmonellosis	7133	19.4	7132	19.5	100.0
Shigellosis	833	2.3	699	1.9	83.9
Typhoid <sup>7</sup>	190	0.5	181	0.5	95.3
Shiga toxigenic <i>Escherichia coli</i> Infection	819	2.2	764	2.1	93.3

<sup>1</sup>CNDSS data for 2018 was not available at the time this summary was produced.

<sup>2</sup>Campylobacter, parasites (*Cryptosporidium*, *Cyclospora* and *Giardia*) and Norovirus are not routinely reported to provincial or central reference laboratories and are greatly under-represented in NESP; therefore no rate was calculated for NESP.

<sup>3</sup>Includes Vibrio cholerae serotype O1 or O139.

<sup>4</sup>BC, MB, NB, NS, NT, ON, QC and SK did not report on norovirus in 2017. The populations of these provinces and territory have been removed for rate calculation.

<sup>5</sup>For Norovirus some provinces/territories report only on aggregated outbreak related data; these data are not included here.

<sup>6</sup>AB, MB, NT, QC and SK did not report on paralytic shellfish poisoning in 2017. The populations of these provinces and territory have been removed for rate calculation.

<sup>7</sup>Typhoid includes lab confirmation of *Salmonella* Typhi; *Salmonella* Paratyphi A, B and C are reported under salmonellosis.

<sup>8</sup>Cases reported through the CNDSS and laboratory-confirmed isolations through NESP have not been linked, this is the degree of concurrence represented as a percentage of NESP isolations compared to the case count reported by the CNDSS. Percentages greater than 100 likely reflect cases with more than one isolate.

#### Appendix 2. Species and serotype data reported to NESP by province and territory, 2018

· · · ·	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	TOTAL
Campylobacter									<u> </u>					
Campylobacter coli	12	18	7	7	18	25	6	4	4	1	1	0	0	103
Campylobacter concisus	3	1	0	0	0	0	0	0	0	0	0	0	0	4
Campylobacter curvus	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Campylobacter fetus ssp fetus	2	2	1	0	5	13	0	0	0	1	0	0	0	24
Campylobacter hyointestinalis	0	0	0	0	2	2	0	0	0	0	0	0	0	4
Campylobacter jejuni	17	301	130	90	71	63	141	88	32	88	6	0	0	1027
Campylobacter jejuni/coli	0	0	0	2	0	0	0	0	0	0	0	0	0	2
Campylobacter lanienae	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Campylobacter lari	3	1	0	0	6	5	3	1	1	0	0	0	0	20
Campylobacter rectus	0	0	0	0	0	1	1	0	0	0	0	0	0	2
Campylobacter sp	0	0	0	0	0	0	48	1	0	19	0	0	0	68
Campylobacter upsaliensis	6	10	0	0	41	5	3	5	2	0	0	0	0	72
Campylobacter ureolyticus	3	0	0	0	0	2	0	0	0	0	0	0	0	5
Total Campylobacter	47	333	138	99	143	117	202	99	39	109	7	0	0	1333
										1			1	
Escherichia coli	1													
E. coli CIDT Positive for STX/STEC	58	0	0	0	0	0	0	0	0	14	0	0	0	72
E. coli Non-O157 VTEC	65	0	0	13	0	131	1	0	0	0	1	0	0	211
E. coli Non-Typed EAEC	0	0	0	0	0	0	0	0	0	10	0	0	0	10
E. coli Non-Typed EPEC	0	0	0	1	0	0	0	0	0	43	0	0	0	44
E. coli Non-Typed ETEC	0	0	0	0	0	0	0	0	0	1	0	0	0	1
E. coli Non-Typed VTEC	2	0	0	0	0	7	0	0	2	2	0	0	0	13
E. coli O undetermined:H11 VTEC	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O undetermined:H16	0	0	0	0	0	0	0	0	0	1	0	0	0	1
E. coli O undetermined:H19	0	0	2	0	1	0	0	0	0	0	0	0	0	3
E. coli O undetermined:H19 VTEC	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O undetermined:H8	0	0	1	0	0	0	0	0	0	0	0	0	0	1
E. coli O undetermined:H9	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O undetermined:HNM	0	0	6	0	2	3	0	0	0	0	0	0	0	11
E. coli O undetermined:HNM VTEC	0	3	0	0	0	0	0	0	0	0	0	0	0	3
E. coli O-Rough:H Nonmotile	0	0	1	0	0	0	0	0	0	0	0	0	0	1
E. coli O-Rough:H Nonmotile VTEC	0	2	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O-Rough:H undetermined	0	0	0	0	0	1	0	0	0	0	0	0	0	1
E. coli O-Rough:H21	0	0	1	0	0	0	0	0	0	0	0	0	0	1
E. coli O-Rough:H8 VTEC	1	1	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O100:HNM	0	0	1	0	0	0	0	0	0	0	0	0	0	1
E. coli O101:HNM	0	0	1	0	0	0	0	0	0	0	0	0	0	1

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	ΥT	NT	NU	TOTAL
E. coli O103	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O103:H11 VTEC	0	2	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O103:H19 VTEC	0	2	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O103:H2	0	0	5	0	2	1	0	0	0	0	0	0	0	8
E. coli O103:H2 VTEC	0	12	0	0	0	0	0	0	0	0	0	0	0	12
E. coli O103:H25 VTEC	0	7	1	0	1	0	0	0	0	0	0	0	0	9
E. coli O103:HNM VTEC	0	1	0	0	0	0	0	0	0	0	0	0	0	1
<i>E. coli</i> O108:H25	0	0	0	0	0	1	0	0	0	0	0	0	0	1
E. coli O109:H25 VTEC	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O111	3	0	0	0	0	0	0	0	0	0	0	0	0	3
E. coli O111 VT-	0	0	0	1	0	0	0	0	0	0	0	0	0	1
E. coli O111:H Nonmotile	0	0	5	0	3	0	0	0	0	0	0	0	0	8
E. coli O111:H Non-motile VTEC	0	18	0	0	0	0	0	0	0	0	0	0	0	18
E. coli O111:H undetermined VTEC	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O111:H8	0	0	1	1	1	0	0	0	0	0	0	0	0	3
E. coli O113:H21 VTEC	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O113:H4	0	0	0	0	1	0	0	0	0	0	0	0	0	1
E. coli O117:H7	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O117:NM	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O118:H undetermined VTEC	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O118:H16 VTEC	0	2	1	0	0	0	0	0	0	0	0	0	0	3
E. coli O118:H2	0	0	7	0	1	1	0	0	0	0	0	0	0	9
E. coli O118:H2 VTEC	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O11:H undetermined VTEC	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O121	13	0	0	0	0	0	0	0	0	0	0	0	0	13
<i>E. coli</i> O121:H19	2	0	5	0	3	0	0	0	0	0	0	0	0	10
E. coli O121:H19 VTEC	2	15	0	0	0	0	0	0	0	1	0	0	0	18
E. coli O121:H9	0	0	1	0	0	0	0	0	0	0	0	0	0	1
E. coli O123:H2	0	0	2	0	1	0	0	0	0	0	0	0	0	3
<i>E. coli</i> O132:H34	0	0	1	0	0	0	0	0	0	0	0	0	0	1
E. coli O13:HNM	0	0	1	0	0	0	0	0	0	0	0	0	0	1
E. coli O145	2	0	0	0	0	0	0	0	0	0	0	0	0	2
<i>E. coli</i> O145:H25	0	0	0	0	1	0	0	0	0	0	0	0	0	1
E. coli O145:HNM	0	0	1	0	0	0	0	0	0	0	0	0	0	1
E. coli O145:HNM VTEC	0	10	0	0	0	0	0	0	0	0	0	0	0	10
E. coli O145:NM	0	0	0	0	1	0	0	0	0	0	0	0	0	1
E. coli O146:H21	0	0	1	0	0	0	0	0	0	0	0	0	0	1
E. coli O146:H21 VTEC	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O148:NM	0	0	1	0	0	0	0	0	0	0	0	0	0	1
E. coli O156:HNM	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	1													 

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	ΥT	NT	NU	TOTAL
E. coli O157	0	0	0	0	0	1	0	4	0	0	0	0	0	5
E. coli O157 VTEC	0	0	0	15	0	4	1	0	0	0	0	0	0	20
E. coli O157:H undetermined	0	1	0	0	0	0	0	0	0	0	0	0	0	1
<i>E. coli</i> O157:H16	0	1	0	0	0	0	0	0	0	0	0	0	0	1
<i>E. coli</i> O157:H7	30	136	18	2	99	80	6	0	0	0	0	1	0	372
E. coli O157:HNM	2	3	1	0	11	10	0	0	0	0	0	0	0	27
<i>E. coli</i> O166:H28	0	0	0	0	0	1	0	0	0	0	0	0	0	1
E. coli O168:H8	0	0	1	0	0	1	0	0	0	0	0	0	0	2
E. coli O180:H10 VTEC	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O186:H2	0	0	0	0	1	0	0	0	0	0	0	0	0	1
E. coli O186:H2 VTEC	0	2	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O22:H27 VTEC	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O26:H undetermined	0	0	0	0	1	0	0	0	0	0	0	0	0	1
E. coli O26:H undetermined VTEC	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O26:H11	1	0	12	0	5	4	0	0	0	0	0	0	0	22
E. coli O26:H11 VTEC	0	35	0	0	0	0	0	0	0	0	0	0	0	35
E. coli O26:HNM	0	0	1	0	3	0	0	0	0	0	0	0	0	4
E. coli O26:HNM VTEC	0	15	0	0	0	0	0	0	0	0	0	0	0	15
E. coli O27:H30 VTEC	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O45:H2	0	0	0	0	0	1	0	0	0	0	0	0	0	1
E. coli O52:H45	0	0	0	0	6	0	0	0	0	0	0	0	0	6
E. coli O57:H2 VTEC	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O57:HNM	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O5:HNM	0	0	1	0	0	2	0	0	0	0	0	0	0	3
E. coli O5:HNM VTEC	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O63:HNM	0	0	1	0	0	0	0	0	0	0	0	0	0	1
E. coli O69:H11 VTEC	0	9	0	0	0	0	0	0	0	0	0	0	0	9
E. coli 071:H11	0	0	0	0	1	0	0	0	0	0	0	0	0	1
E. coli O71:H11 VTEC	0	4	0	0	0	0	0	0	0	0	0	0	0	4
E. coli O71:H8	0	1	0	0	0	1	0	0	0	0	0	0	0	2
<i>E. coli</i> O73:H18	0	0	0	0	1	0	0	0	0	0	0	0	0	1
E. coli O78:H2	0	0	0	0	1	0	0	0	0	0	0	0	0	1
E. coli O7:H2	0	0	1	0	0	0	0	0	0	0	0	0	0	1
E. coli O84:HNM	0	0	1	0	0	0	0	0	0	0	0	0	0	1
E. coli O84:HNM VTEC	0	2	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O86:H7	0	0	1	0	0	0	0	0	0	0	0	0	0	1
E. coli O8:H12 VTEC	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O98:HNM	0	0	1	0	0	0	0	0	0	0	0	0	0	1
E. coli O98:HNM VTEC	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Total E. coli	186	301	86	33	147	250	8	4	2	72	1	1	0	1091

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	ΥT	NT	NU	TOTAL
Listeria														
Listeria monocytogenes	9	16	3	0	74	40	3	3	1	1	0	0	0	150
Salmonella														
Salmonella Abaetetuba	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Aberdeen	2	1	0	0	1	0	0	0	0	0	0	0	0	4
Salmonella Adelaide	2	0	1	0	3	1	0	1	0	0	0	0	0	8
Salmonella Agbeni	0	0	0	0	4	0	0	0	0	1	0	0	0	5
Salmonella Agona	10	17	4	6	62	21	1	2	0	2	0	0	0	125
Salmonella Agoueve	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Alachua	1	0	0	1	1	1	0	0	0	0	0	0	0	4
Salmonella Albany	0	1	0	0	1	0	0	1	0	0	0	0	0	3
Salmonella Altona	0	0	0	0	3	0	0	0	0	0	0	0	0	3
Salmonella Amager	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Salmonella Anatum	7	5	1	1	13	3	0	0	0	0	0	0	0	30
Salmonella Antsalova	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Apeyeme	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Arechavaleta	0	0	0	0	3	0	0	0	0	0	0	0	0	3
Salmonella Augustenborg	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Baildon	0	0	0	0	1	2	0	1	0	0	0	0	0	4
Salmonella Banana	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Bardo	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Bareilly	7	4	0	1	8	3	0	2	0	0	0	0	0	25
Salmonella Barranquilla	0	0	0	0	0	2	0	0	0	0	0	0	0	2
Salmonella Berta	0	1	0	0	2	4	0	1	0	0	0	0	0	8
Salmonella Blancmesnil	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Blegdam	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Blockley	0	0	0	0	4	4	1	0	0	0	0	0	0	9
Salmonella Bonariensis	0	0	0	0	5	0	0	0	0	0	0	0	0	5
Salmonella Bovismorbificans	4	3	0	0	5	0	1	0	0	2	0	0	0	15
Salmonella Braenderup	7	12	2	2	68	31	2	1	0	1	0	1	0	127
Salmonella Brancaster	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Brandenburg	12	2	1	2	3	4	0	0	0	0	0	0	0	24
Salmonella Bredeney	1	1	0	0	2	3	0	1	0	0	0	0	0	8
Salmonella Brunei	1	1	0	0	1	0	0	0	0	0	0	0	0	3
Salmonella Cannstatt	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Carno	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Carrau	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Salmonella Cerro	0	1	0	0	0	1	0	0	0	0	0	0	0	2

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	ΥT	NT	NU	TOTAL
Salmonella Chailey	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Chester	4	1	0	0	5	1	0	3	0	0	0	0	0	14
Salmonella Choleraesuis	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Salmonella Cleveland	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Coeln	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Colindale	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Concord	0	0	0	0	27	0	0	0	0	0	0	0	0	27
Salmonella Corvallis	4	2	0	0	7	0	0	0	0	0	0	0	0	13
Salmonella Cubana	0	0	0	0	1	1	0	0	0	0	0	0	0	2
Salmonella Curacao	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Daytona	3	1	0	0	0	0	0	0	0	0	0	0	0	4
Salmonella Denver	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Derby	0	2	0	1	5	6	1	0	0	0	0	0	0	15
Salmonella Dublin	2	3	2	2	2	7	0	0	0	0	0	0	0	18
Salmonella Durban	1	0	0	0	3	2	0	0	0	1	0	0	0	7
Salmonella Ealing	0	0	0	2	0	0	0	0	0	0	0	0	0	2
Salmonella Eastbourne	0	0	1	0	1	2	1	0	0	0	0	0	0	5
Salmonella Ebrie	1	0	0	0	1	0	0	0	0	0	0	0	0	2
Salmonella Enteritidis	445	445	93	126	1054	654	97	112	14	34	1	8	0	3083
Salmonella Farmsen	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Fluntern	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Freetown	0	0	1	0	0	1	0	0	0	0	0	0	0	2
Salmonella Fresno	0	0	0	0	2	0	0	1	0	0	0	0	0	3
Salmonella Gaminara	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Salmonella Gatuni	1	0	0	0	4	0	0	0	0	0	0	0	0	5
Salmonella Give	1	1	0	0	2	1	0	1	2	0	0	0	0	8
Salmonella Glostrup	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Goldcoast	1	0	0	0	1	0	0	0	0	0	0	0	0	2
Salmonella Goverdhan	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Grandhaven	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Guinea	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Haardt	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Hadar	5	5	2	0	25	5	1	0	0	0	0	0	0	43
Salmonella Haifa	2	1	0	0	1	2	0	0	0	0	0	0	0	6
Salmonella Hartford	0	0	0	0	13	6	1	0	0	0	0	0	0	20
Salmonella Havana	0	0	0	0	3	1	0	0	0	0	0	0	0	4
Salmonella Heerlen	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Heidelberg	14	29	10	7	179	108	19	17	4	2	0	1	0	390
Salmonella Hidalgo	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Hindmarsh	1	0	0	0	0	0	0	0	0	0	0	0	0	1

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	ΥT	NT	NU	TOTAL
Salmonella Holcomb	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Hull	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Hvittingfoss	6	1	1	0	9	4	0	1	0	0	0	0	0	22
Salmonella Ibadan	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Idikan	1	1	0	0	0	0	0	0	0	0	0	0	0	2
Salmonella Indiana	1	2	1	0	0	2	0	1	0	0	0	0	0	7
Salmonella Infantis	77	34	5	15	106	57	11	5	0	3	0	0	0	313
Salmonella Isangi	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Javiana	15	22	1	5	52	17	4	0	1	0	0	1	0	118
Salmonella Johannesburg	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Kambole	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Kano	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Kedougou	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Kentucky	4	4	1	0	24	2	0	0	0	0	0	0	0	35
Salmonella Kiambu	5	0	0	0	6	1	0	1	0	2	0	0	0	15
Salmonella Kintambo	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Kisarawe	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Kokomlemle	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Kottbus	0	1	0	0	1	0	0	0	0	0	0	0	0	2
Salmonella Lexington	1	0	0	0	0	1	0	0	0	0	0	0	0	2
Salmonella Litchfield	2	0	0	0	15	6	0	0	0	0	0	0	0	23
Salmonella Liverpool	0	1	0	0	1	0	0	0	0	0	0	0	0	2
Salmonella Livingstone	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Salmonella Lomalinda	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Lome	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Salmonella London	3	0	0	0	4	0	1	0	0	0	0	0	0	8
Salmonella Manhattan	0	0	0	0	6	3	0	1	0	1	0	0	0	11
Salmonella Maracaibo	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Matopeni	1	0	0	1	1	0	0	0	0	0	0	0	0	3
Salmonella Mbandaka	6	4	1	0	11	6	1	0	0	0	0	0	0	29
Salmonella Meleagridis	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Miami	0	1	0	0	6	1	0	0	0	0	0	0	0	8
Salmonella Michigan	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Salmonella Minnesota	2	2	0	0	2	0	0	0	0	0	0	0	0	6
Salmonella Mishmarhaemek	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Mississippi	0	2	0	0	27	2	1	0	0	0	0	0	0	32
Salmonella Montevideo	7	4	6	1	17	6	1	2	1	0	0	0	0	45
Salmonella Muenchen	6	8	2	1	23	10	0	0	1	2	0	0	0	53
Salmonella Muenster	2	0	1	3	4	1	0	0	0	0	0	0	0	11
Salmonella Napoli	0	0	0	0	0	1	0	0	0	0	0	0	0	1

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	ΥT	NT	NU	TOTAL
Salmonella Nessziona	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Newport	27	34	4	7	72	44	1	1	1	1	0	0	0	192
Salmonella Niloese	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Norwich	0	0	0	0	2	3	0	0	0	0	0	0	0	5
Salmonella Nottingham	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Offa	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Ohio	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Salmonella Okatie	0	0	0	0	0	2	0	0	0	0	0	0	0	2
Salmonella Onireke	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Salmonella Oranienburg	7	8	0	4	66	26	0	1	0	1	0	0	0	113
Salmonella Orientalis	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Oslo	0	0	0	0	3	0	0	0	0	0	0	0	0	3
Salmonella Othmarschen	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Ouakam	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Panama	3	1	1	0	12	6	1	0	0	0	0	0	0	24
Salmonella Paratyphi A	20	8	0	0	25	3	0	0	0	0	0	0	0	56
Salmonella Paratyphi B	3	0	0	3	0	4	0	0	0	0	1	0	0	11
Salmonella Paratyphi B var. Java	18	16	1	0	16	13	0	0	0	0	0	0	0	64
Salmonella Paratyphi C	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Pensacola	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Pomona	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Poona	4	4	0	1	4	7	0	0	0	0	0	0	0	20
Salmonella Potsdam	1	0	0	0	2	0	0	0	0	0	0	0	0	3
Salmonella Praha	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Salmonella Presov	0	0	0	0	0	2	0	0	0	0	0	0	0	2
Salmonella Putten	1	0	0	2	0	0	0	0	0	0	0	0	0	3
Salmonella Reading	14	14	2	12	6	2	0	0	0	0	0	1	0	51
Salmonella Richmond	1	0	0	1	1	1	0	0	0	0	0	0	0	4
Salmonella Riggil	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Rissen	4	0	2	0	4	1	0	0	0	0	0	0	0	11
Salmonella Rubislaw	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Saintpaul	15	16	2	2	35	12	1	3	1	0	0	0	0	87
Salmonella Salford	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Sandiego	7	6	0	0	7	17	1	1	0	0	0	0	0	39
Salmonella Schwarzengrund	2	6	2	1	8	0	0	0	0	0	0	0	0	19
Salmonella Senftenberg	3	4	0	1	4	3	0	0	0	0	0	0	0	15
Salmonella Shubra	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Singapore	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Stanley	19	13	3	3	25	35	0	3	0	0	0	0	0	101
Salmonella Stanleyville	0	1	0	0	0	0	0	0	0	0	0	0	0	1

Salmonella Sterrenbos       0       0       0       0       0       1       0	0         0         0         0         0         0         1           0         0         0         0         0         0         2           0         0         0         0         0         0         1           0         0         0         0         0         0         1           0         0         0         0         0         0         1           0         0         0         0         0         0         8           1         1         0         0         0         0         148           0         0         0         0         0         1         148           0         0         0         0         0         1         18           11         2         2         0         0         198         1           11         2         2         0         0         44         1           0         0         0         0         0         1         1           1         0         0         0         0         0         27           0         0 <t< th=""></t<>
Salmonella Takoradi       0       2       0	0         0         0         0         0         0         0         2           0         0         0         0         0         0         1         1           0         0         0         0         0         0         0         1           0         0         0         0         0         0         0         1           1         1         0         0         0         0         148           0         0         0         0         0         0         148           0         0         0         0         0         11         148           0         0         0         0         0         0         11           1         2         2         0         0         0         198           11         2         2         0         0         0         44           0         0         0         0         0         1         5           0         0         0         0         0         1         1           1         0         0         0         0         0         <
Salmonella Telelkebir       0       0       0       0       1       0	0         0         0         0         0         0         1           0         0         0         0         0         0         8           1         1         0         0         0         0         148           0         0         0         0         0         148           0         0         0         0         0         148           0         0         0         0         0         1           0         0         0         0         0         198           11         2         2         0         0         0         551           0         0         0         0         0         44           0         0         0         0         0         5           0         0         0         0         0         1           1         0         0         0         0         0         27           0         0         0         0         0         0         1
Salmonella Tennessee       1       0       0       0       7       0	0         0         0         0         0         0         1         8           1         1         0         0         0         0         148           0         0         0         0         0         0         148           0         0         0         0         0         0         1           0         0         0         0         0         0         198           11         2         2         0         0         0         551           0         0         0         0         0         44           0         0         0         0         0         5           0         0         0         0         0         1           1         0         0         0         0         27           0         0         0         0         0         1         1
Salmonella Thompson       6       2       1       1       73       56       7       1       1       0	1       1       0       0       0       0       148         0       0       0       0       0       0       1         0       0       0       0       0       0       198         11       2       2       0       0       0       551         0       0       0       0       0       0       44         0       0       0       0       0       0       55         0       0       0       0       0       0       1         1       0       0       0       0       0       1         1       0       0       0       0       0       27         0       0       0       0       0       0       1
Salmonella Tornow         0         1         0	0         0         0         0         0         0         1           0         0         0         0         0         0         198           11         2         2         0         0         0         551           0         0         0         0         0         44           0         0         0         0         0         55           0         0         0         0         0         5           0         0         0         0         0         1           1         0         0         0         0         0         27           0         0         0         0         0         0         1
Salmonella Typhi         43         23         2         10         104         16         0	0         0         0         0         0         0         198           11         2         2         0         0         0         551           0         0         0         0         0         0         44           0         0         0         0         0         0         55           0         0         0         0         0         0         55           0         0         0         0         0         1         1           1         0         0         0         0         0         27           0         0         0         0         0         0         1
	11       2       2       0       0       0       551         0       0       0       0       0       0       44         0       0       0       0       0       0       551         0       0       0       0       0       0       551         0       0       0       0       0       0       551         0       0       0       0       0       0       5         0       0       0       0       0       1       1         1       0       0       0       0       0       27         0       0       0       0       0       0       1
Salmonella Typhimurium         58         62         25         16         220         139         16         11         2         2         0         0         0	0       0       0       0       0       44         0       0       0       0       0       5         0       0       0       0       0       1         1       0       0       0       0       0       27         0       0       0       0       0       0       1
Salmonella Uganda         10         9         0         7         10         8         0	0       0       0       0       0       5         0       0       0       0       0       1         1       0       0       0       0       0       27         0       0       0       0       0       0       1
Salmonella Urbana         1         2         0         0         2         0	0         0         0         0         0         1           1         0         0         0         0         0         27           0         0         0         0         0         0         1
Salmonella Victoria         0         0         0         1         0	1         0         0         0         0         0         27           0         0         0         0         0         0         1
Salmonella Virchow         5         2         1         1         13         4         0         1         0	0 0 0 0 0 0 1
Salmonella Wandsworth         0         0         0         1         0	
Salmonella Wedding         0         0         0         1         0	0 0 0 0 0 0 0 1
Salmonella Weltevreden         9         3         1         0         18         6         1         0         1         0	0 1 0 0 0 0 39
Salmonella Worthington         0         0         0         1         1         0	0 0 0 0 0 0 3
Salmonella sp         5         0         0         1         0         2         8         0         0         63         0         0         0         0	0 0 63 0 0 0 79
Salmonella ssp I         7         0         0         5         0         1         0         0         3         2         0         0         0         0	0 3 2 0 0 0 18
Salmonella ssp I -:HNM         0         0         0         0         1         0	0 0 0 0 0 0 1
Salmonella ssp I 11:i:-         1         0	0 0 0 0 0 0 0 1
Salmonella ssp I 13,23:-:-         0         0         0         0         1         0 </td <td>0 0 0 0 0 0 1</td>	0 0 0 0 0 0 1
Salmonella ssp I 13,23:a:-         0         0         0         0         1         0 </td <td>0 0 0 0 0 0 0 1</td>	0 0 0 0 0 0 0 1
Salmonella ssp I 16:I,v:-         0         0         0         0         1         2         0 <td>0 0 0 0 0 0 3</td>	0 0 0 0 0 0 3
Salmonella ssp I 3,10:r:-         1         0 <td>0 0 0 0 0 0 0 1</td>	0 0 0 0 0 0 0 1
Salmonella ssp I 4,[5],12,27:-:-         0         0         0         0         0         0         0         1         0         0         0	0 0 1 0 0 0 1
Salmonella ssp I 4,[5],12,27:-:1,2         0         1         0	0 0 0 0 0 0 0 1
Salmonella ssp I 4,[5],12:         1         0         0         0         7         0	0 0 0 0 0 0 8
Salmonella ssp I 4,[5],12:-:1,2         0         0         0         3         3         0 <t< td=""><td>0 0 0 0 0 0 0 6</td></t<>	0 0 0 0 0 0 0 6
Salmonella ssp I 4,[5],12:b:-         4         7         0         0         29         13         0 <t< td=""><td>0 0 0 0 0 0 0 53</td></t<>	0 0 0 0 0 0 0 53
Salmonella ssp I 4,[5],12:d:-         0         0         0         0         1         0	0 0 0 0 0 0 0 1
Salmonella ssp I 4,[5],12:e,h:-         0         0         0         0         1         0 <t< td=""><td>0 0 0 0 0 0 0 1</td></t<>	0 0 0 0 0 0 0 1
Salmonella ssp I 4,[5],12:i:-         38         22         7         5         103         80         6         1         0         0         1         0         0         1         0         0         1         0	1 0 0 0 1 0 263
Salmonella ssp I 42:g,z51:-         0         1         0<	0 0 0 0 0 0 1
Salmonella ssp 1 47:z4,z23:-         0         0         0         0         1         0	0 0 0 0 0 0 0 1
Salmonella ssp I 6,14:r:1,5         0         0         0         0         1         0<	0 0 0 0 0 0 1
Salmonella ssp I 6,7,[14]:r:-         0         2         0	0 0 0 0 0 0 0 2
Salmonella ssp I 6,7:-:-         0         0         0         0         1         1         0 <td>0 0 0 0 0 0 2</td>	0 0 0 0 0 0 2
Salmonella ssp 1 6,7:-:1,5         0         0         1         0 </td <td>0 0 0 0 0 0 0 1</td>	0 0 0 0 0 0 0 1
Salmonella ssp I 6,7:c:-         0         0         0         0         1         0 <td>0 0 0 0 0 0 1</td>	0 0 0 0 0 0 1
Salmonella ssp I 6,7:e,h:-         0         0         0         0         1         0 </td <td>0 0 0 0 0 0 1</td>	0 0 0 0 0 0 1

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	TOTAL
Salmonella ssp I 6,7:r:-	0	0	0	0	4	0	0	0	0	0	0	0	0	4
Salmonella ssp I 6,8,[20]:-:z6	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Salmonella ssp I 6,8,[20]:i:-	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp I 6,8:e,h:-	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp I 9,12:-:-	2	0	0	0	2	0	0	0	0	0	0	0	0	4
Salmonella ssp l 9,12:-:1,5	1	0	0	0	0	3	0	1	0	0	0	0	0	5
Salmonella ssp I 9:-1,5	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella ssp I Rough-O:-:-	0	0	0	0	1	0	1	0	0	0	0	0	0	2
Salmonella ssp I Rough-O:HNM	4	0	0	0	3	1	1	0	0	0	0	0	0	9
Salmonella ssp I Rough-O:a:-	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp I Rough-O:a:e,n,z15	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Salmonella ssp I Rough-O:b:-	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp I Rough-O:e,h:1,5	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp I Rough-O:g,m:-	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella ssp I Rough-O:g,s,t:-	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp I Rough-O:i:-	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella ssp I Rough-O:i:1,2	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp I Rough-O:l,v:1,2	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella ssp I Rough-O:l,v:e,n,z15	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp I Rough-O:r:1,2	0	0	0	0	0	1	1	0	0	0	0	0	0	2
Salmonella ssp I Rough-O:r:1,5	0	0	0	0	1	1	0	0	0	0	0	0	0	2
Salmonella ssp II 1,9,12:a:e,n,x	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella ssp II 16:m,t:-	0	1	0	0	1	0	0	0	0	0	0	0	0	2
Salmonella ssp II 3,10:e,n,x:1,7	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp II 45:z:1,5	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp II 48:d:z6	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp II 58:I,z13,z28:z6	1	0	0	0	1	0	0	0	0	0	0	0	0	2
Salmonella ssp II 9,12:d:e,n,x	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Salmonella ssp II Rough-O:c:z6	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp Illa 41:z4,z23:-	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp Illa 48:z4,z24:-	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp Illa 53:z4,z23:-	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella ssp IIIb	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Salmonella ssp IIIb 17:I,v:e,n,x,z15	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Salmonella ssp IIIb 17:z10:e,n,x,z15	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp IIIb 38:k:-	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp IIIb 47:k:z53	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp IIIb 50:k:z	1	0	0	0	1	0	0	0	0	0	0	0	0	2
Salmonella ssp IIIb 50:I,v:z35	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp IIIb 50:z:z52	0	0	0	0	0	1	0	0	0	0	0	0	0	1

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	ΥT	NT	NU	TOTAL
Salmonella ssp IIIb 53:z10:-	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp IIIb 60:r:z	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp IIIb 61:-:-	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp IIIb 61:k:1,5	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella ssp IIIb 61:I,v:1,5,7	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp IIIb 61:r:z	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella ssp IIIb 61:r:z53:[z47],[z50	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp IIIb 61:z52:z53	0	1	0	0	1	0	0	1	0	0	0	0	0	3
Salmonella ssp IV 43:z4,z23:-	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp IV 48:g,z51:-	1	0	0	0	0	1	0	0	0	0	0	0	0	2
Salmonella ssp IV 50:g,z51:-	1	1	0	0	0	0	0	0	0	0	0	0	0	2
Salmonella ssp IV 50:z4,z23:-	1	0	0	0	1	1	0	0	0	0	0	0	0	3
Total Salmonella	1052	908	192	265	2782	1554	194	185	32	121	2	13	0	7300
Shigella														
Shigella	0	0	0	0	0	0	1	0	0	1	0	0	0	2
Shigella boydii 1	1	0	0	0	2	0	0	0	0	0	0	0	0	3
Shigella boydii 10	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Shigella boydii 12	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Shigella boydii 18	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Shigella boydii 19	1	0	0	0	1	0	0	0	0	0	0	0	0	2
Shigella boydii 2	2	0	0	0	5	3	0	0	0	0	0	0	0	10
Shigella boydii 20	0	0	0	0	2	1	0	0	0	0	0	0	0	3
Shigella boydii 4	1	0	0	0	1	1	0	0	0	0	0	0	0	3
Shigella boydii 8	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Shigella dysenteriae 2	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Shigella dysenteriae 3	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Shigella dysenteriae 4	0	0	0	0	2	1	0	0	0	0	0	0	0	3
Shigella dysenteriae	1	0	0	0	0	1	0	0	0	1	0	0	0	3
Shigella dysenteriae Prov. SH-111	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Shigella flexneri 1	3	0	0	0	17	0	0	0	0	0	0	0	0	20
Shigella flexneri 1a	0	1	0	0	5	0	0	0	0	0	0	0	0	6
Shigella flexneri 1b	2	2	0	0	24	31	0	0	0	0	0	0	0	59
Shigella flexneri 2	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Shigella flexneri 2a	21	9	0	1	48	45	0	0	0	0	0	0	0	124
Shigella flexneri 2b	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Shigella flexneri 3a	5	2	0	0	10	3	0	0	0	0	0	0	0	20
Shigella flexneri 3b	2	1	0	0	2	2	0	0	0	0	0	0	0	7
Shigella flexneri 4	2	0	0	0	0	2	0	0	0	0	0	0	0	4
Shigella flexneri 4a	1	0	0	0	1	0	0	0	0	0	0	0	0	2

Shipella flexment 4b01000		BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	TOTAL						
Single flexments120043000000011Single flexment100<	Shigella flexneri 4b	0	1	0	0	0	0	0	0	0	0	0	0	0	1						
Single Banneri100<	Shigella flexneri 6	4	2	0	0	4	3	0	0	0	0	0	0	0	13						
Sheele flexmen brow. SH-10400 </td <td>Shigella flexneri</td> <td>1</td> <td>0</td> <td>6</td> <td>6</td> <td>0</td> <td>2</td> <td>2</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>19</td>	Shigella flexneri	1	0	6	6	0	2	2	1	1	0	0	0	0	19						
Shigelle flexment var. Y1000<	Shigella flexneri Prov. SH-104	0	0	0	0	1	0	0	0	0	0	0	0	0	1						
Shigelia sonnei6246521417062000101017Total Nigelia156411930029931201007VibrioVibrio alginolyticus0110100001001000	Shigella flexneri var. Y	1	0	0	0	5	4	0	0	0	0	0	0	0	10						
Total Shigalfa11s6411930026993120107744Vertice of the second	Shigella sonnei	62	46	5	2	164	170	6	2	0	0	0	1	0	458						
Vibria <th <v<="" colspan="6" td=""><td>Total Shigella</td><td>115</td><td>64</td><td>11</td><td>9</td><td>300</td><td>269</td><td>9</td><td>3</td><td>1</td><td>2</td><td>0</td><td>1</td><td>0</td><td>784</td></th>	<td>Total Shigella</td> <td>115</td> <td>64</td> <td>11</td> <td>9</td> <td>300</td> <td>269</td> <td>9</td> <td>3</td> <td>1</td> <td>2</td> <td>0</td> <td>1</td> <td>0</td> <td>784</td>						Total Shigella	115	64	11	9	300	269	9	3	1	2	0	1	0	784
VibrioVibrio anguilarium001100 <td></td>																					
Vibro alginolylicus0110100<	Vibrio																				
Vibro anguillarum     1     0 </td <td>Vibrio alginolyticus</td> <td>0</td> <td>1</td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>5</td>	Vibrio alginolyticus	0	1	1	0	1	0	0	1	1	0	0	0	0	5						
Vibrio cholerae     0 <td>Vibrio anguillarum</td> <td>1</td> <td>0</td> <td>1</td>	Vibrio anguillarum	1	0	0	0	0	0	0	0	0	0	0	0	0	1						
Vibio cholerae O1     1     0 </td <td>Vibrio cholerae</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>3</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>3</td>	Vibrio cholerae	0	0	0	0	0	0	3	0	0	0	0	0	0	3						
Wibrio cholerae O1 bio E1 Tor sero       0       0       0       1       0	Vibrio cholerae O1	1	0	0	0	0	0	0	0	0	0	0	0	0	1						
Vibrio cholerae non-O1/O139     4     6     1     1     1     3     0     0     0     0     0     0     0       Vibrio fluvialis     0     1     0     0     0     0     3     0	Vibrio cholerae O1 bio El Tor sero	0	0	0	0	1	0	0	0	0	0	0	0	0	1						
Vibrio fluvialis       0       1       0       0       0       3       0	Vibrio cholerae non-O1/O139	4	6	1	1	1	3	0	0	0	0	0	0	0	16						
Vibrio parahaemolyticus       18       8       0       0       3       0       2       3       0 </td <td>Vibrio fluvialis</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>3</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>4</td>	Vibrio fluvialis	0	1	0	0	0	0	3	0	0	0	0	0	0	4						
Wibrio vulnificus1100000000000000000000067Total Vibrio251621639410000067YersiniaYersinia bercovieri1100 <t< td=""><td>Vibrio parahaemolyticus</td><td>18</td><td>8</td><td>0</td><td>0</td><td>3</td><td>0</td><td>2</td><td>3</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>34</td></t<>	Vibrio parahaemolyticus	18	8	0	0	3	0	2	3	0	0	0	0	0	34						
Total Vibrio251621639410000067VersiniaYersinia bercovieri100 <td< td=""><td>Vibrio vulnificus</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>2</td></td<>	Vibrio vulnificus	1	0	0	0	0	0	1	0	0	0	0	0	0	2						
Yersinia         Yersinia bercovieri         1         0 </td <td>Total Vibrio</td> <td>25</td> <td>16</td> <td>2</td> <td>1</td> <td>6</td> <td>3</td> <td>9</td> <td>4</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>67</td>	Total Vibrio	25	16	2	1	6	3	9	4	1	0	0	0	0	67						
Yersinia       Yersinia bercovieri       1       0																					
Yersinia bercovieri       1       0	Yersinia																				
Yersinia enterocolitica53451321803802010000334Yersinia frederiksenii24101000 <t< td=""><td>Yersinia bercovieri</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></t<>	Yersinia bercovieri	1	0	0	0	0	0	0	0	0	0	0	0	0	1						
Yersinia frederiksenii24101000<	Yersinia enterocolitica	53	45	13	2	180	38	0	2	0	1	0	0	0	334						
Yersinia intermedia1260000000100119Yersinia kristensenii12000	Yersinia frederiksenii	24	10	1	0	0	0	0	0	0	0	0	0	0	35						
Yersinia kristensenii1200	Yersinia intermedia	12	6	0	0	0	0	0	0	0	0	1	0	0	19						
Yersinia pseudotuberculosis42001000 <td>Yersinia kristensenii</td> <td>1</td> <td>2</td> <td>0</td> <td>3</td>	Yersinia kristensenii	1	2	0	0	0	0	0	0	0	0	0	0	0	3						
Yersinia rohdei0300000000000003Yersinia sp000000000000000002Total Yersinia956814218139120110000404Total Yersinia95681421813912011000404ParasitesCryptosporidium283142123443433151020004461Cyclospora283142123443433151020004461Giardia283142123443433151020004461Cyclospora283142123443433151020004461Giardia149712511715914400070001675Total Parasites245157796678263114107223622001675 </td <td>Yersinia pseudotuberculosis</td> <td>4</td> <td>2</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>7</td>	Yersinia pseudotuberculosis	4	2	0	0	1	0	0	0	0	0	0	0	0	7						
Yersinia sp000001100000002Total Yersinia9568142181391201100000404Total YersiniaPersinia9568142181391201100000404PersiniaPersinia9568142181391201100000404PersiniaPersinia9568142181391201100000404PersiniaPersinia28314212344343315102000466Cryptosporidium28314212344343315102000466Cryptospora2114360021014360000461Cryptospora2451577966782631141072236211000011675 <t< td=""><td>Yersinia rohdei</td><td>0</td><td>3</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>3</td></t<>	Yersinia rohdei	0	3	0	0	0	0	0	0	0	0	0	0	0	3						
Total Yersinia9568142181391201100404ParasitesCryptosporidium28314212344343315102000398Cyclospora2114360020000461Entamoeba histolytica/dispar14971251171591400700461Giardia664506629110079687261300770Total Parasites245157796678263114107223622001675VirusesAdenovirus95030660060800124	Yersinia sp	0	0	0	0	0	1	1	0	0	0	0	0	0	2						
Parasites           Cryptosporidium         28         3         14         21         234         4         34         33         15         10         2         0         0         398           Cyclospora         2         1         1         4         36         0         2         0         0         0         0         46           Entamoeba histolytica/dispar         149         7         12         5         117         159         1         4         0         0         0         0         461           Giardia         66         4         50         66         291         100         79         68         7         26         13         0         0         770           Total Parasites         245         15         77         96         678         263         14         107         22         36         22         0         0         0         770           Total Parasites         245         15         77         96         678         263         114         107         22         36         22         0         0         0         1675           Viruses	Total Yersinia	95	68	14	2	181	39	1	2	0	1	1	0	0	404						
Parasites         Cryptosporidium       28       3       14       21       234       4       34       33       15       10       2       0       0       398         Cyclospora       2       1       1       4       36       0       0       2       0       0       0       0       46         Entamoeba histolytica/dispar       149       7       12       5       117       159       1       4       0       0       7       0       0       461         Giardia       66       4       50       66       291       100       79       68       7       26       13       0       0       0       167       167         Total Parasites       245       15       77       96       678       263       114       107       22       36       22       0       0       0       1675         Viruses																					
Cryptosporidium       28       3       14       21       234       4       34       33       15       10       2       0       0       398         Cyclospora       2       1       1       4       36       0       0       2       0       0       0       46         Entamoeba histolytica/dispar       149       7       12       5       117       159       1       4       0       0       7       0       0       461         Giardia       66       4       50       66       291       100       79       68       7       26       13       0       0       770         Total Parasites       245       15       77       96       678       263       114       107       22       36       22       0       0       1675         Viruses       Viruses       Viruses       Viruses       Viruses       0       0       66       0       0       66       0       0       8       0       0       0       124	Parasites																				
Cyclospora       2       1       1       4       36       0       2       0       0       0       0       0       46         Entamoeba histolytica/dispar       149       7       12       5       117       159       1       4       0       0       0       7       0       0       461         Giardia       66       4       50       66       291       100       79       68       7       26       133       00       0       0       770         Total Parasites       245       15       77       96       678       263       114       107       22       36       22       0       0       0       0       1675         Viruses       2       100       79       68       71       20       36       22       0       0       0       1675         Viruses       2       100       79       68       0       0       8       0       0       0       1675         Adenovirus       9       5       0       30       66       0       0       6       0       8       0       0       0       124 </td <td>Cryptosporidium</td> <td>28</td> <td>3</td> <td>14</td> <td>21</td> <td>234</td> <td>4</td> <td>34</td> <td>33</td> <td>15</td> <td>10</td> <td>2</td> <td>0</td> <td>0</td> <td>398</td>	Cryptosporidium	28	3	14	21	234	4	34	33	15	10	2	0	0	398						
Entamoeba histolytica/dispar       149       7       12       5       117       159       1       4       0       0       7       0       0       461         Giardia       66       4       50       66       291       100       79       68       7       26       13       0       0       770         Total Parasites       245       15       77       96       678       263       114       107       22       36       22       0       0       0       1675         Viruses       Viruses         Adenovirus       9       5       0       30       66       0       0       6       0       0       12       36       22       0       0       1675	Cyclospora	2	1	1	4	36	0	0	2	0	0	0	0	0	46						
Giardia       66       4       50       66       291       100       79       68       7       26       13       0       0       770         Total Parasites       245       15       77       96       678       263       114       107       22       36       22       0       0       1675         Viruses         Adenovirus       9       5       0       30       66       0       0       68       7       26       13       0       0       0       1675	Entamoeba histolytica/dispar	149	7	12	5	117	159	1	4	0	0	7	0	0	461						
Total Parasites       245       15       77       96       678       263       114       107       22       36       22       0       0       1675         Viruses         Adenovirus       9       5       0       30       66       0       0       6       0       8       0       0       0       124	Giardia	66	4	50	66	291	100	79	68	7	26	13	0	0	770						
Viruses         9         5         0         30         66         0         0         6         0         8         0         0         0         124	Total Parasites	245	15	77	96	678	263	114	107	22	36	22	0	0	1675						
Viruses         9         5         0         30         66         0         0         6         0         8         0         0         0         124																					
Adenovirus         9         5         0         30         66         0         0         6         0         8         0         0         0         124	Viruses																				
	Adenovirus	9	5	0	30	66	0	0	6	0	8	0	0	0	124						

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	TOTAL
Astrovirus	6	2	0	0	2	0	0	0	0	4	0	0	0	14
Enterovirus	0	0	0	17	0	0	0	0	0	0	0	0	0	17
Hepatitis A	29	56	18	7	198	59	0	4	0	31	0	0	0	402
Norovirus	183	192	68	76	639	0	60	98	58	52	6	0	0	1432
Rotavirus	16	2	11	32	93	0	77	0	31	27	0	0	0	289
Sapovirus	17	5	0	0	0	0	0	0	0	3	0	0	0	25
Total Viruses	260	262	97	162	998	59	137	108	89	125	6	0	0	2303