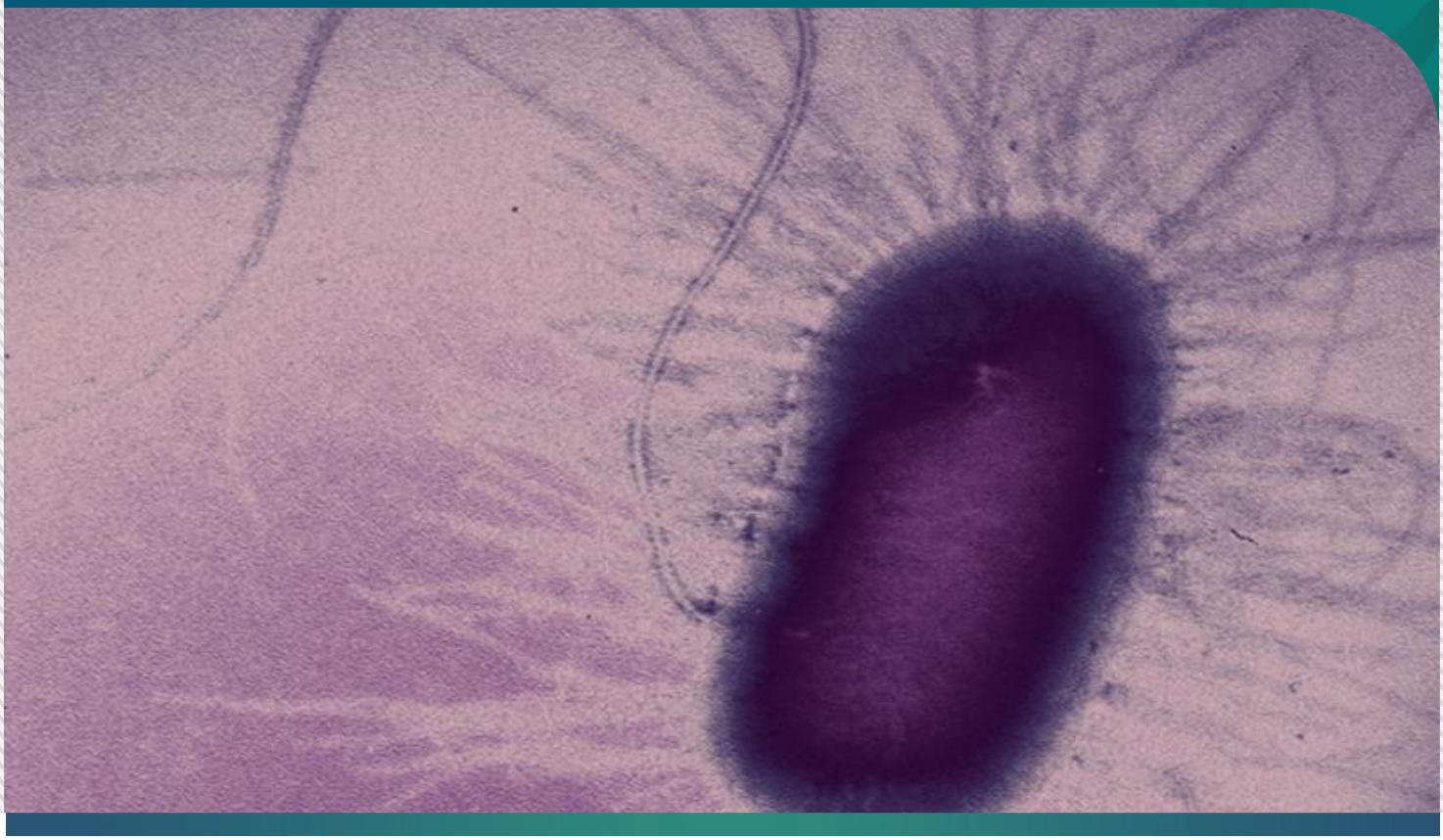
National Enteric Surveillance Program (NESP)

Annual Summary 2024



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National Enteric Surveillance Program (NESP)

Annual Summary 2024

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Centre for Foodborne, Environmental and Zoonotic Infectious Diseases (CFEZID),
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&

Provincial Public Health Laboratories

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Overview

The National Enteric Surveillance Program (NESP) is a collaboration between the Public Health Agency of Canada (PHAC) and the provincial public health laboratories. Through NESP, weekly analysis and reporting is conducted for 18 different organisms causing enteric illness, including 10 organisms that are nationally notifiable. The data and information derived from this surveillance system contributes to the assessment of multi-provincial clusters and outbreak detection, guides public health interventions, and are designed to integrate with national and international efforts to limit the transmission of enteric diseases.

In 2024, a total of 17,345 isolate results were reported to NESP; higher than the average number of notifications reported in the previous five years (12,457). This number is also higher than the 2015 to 2019 (pre-COVID-19 pandemic) five-year average number of notifications (15,313). *Salmonella* spp. continues to be the most common organism identified with 6,560 notifications provided in 2024, representing 38% of all isolates reported to NESP. As in previous years, *Salmonella* Enteritidis (2,635 isolates; 40% of all *Salmonella*), *S.* Typhimurium (411 isolates; 6% of all *Salmonella*), and *S.* ssp I 4,[5],12:i:- (317 isolates; 5% of all *Salmonella*) represent the top three serotypes among all *Salmonella* reported in 2024. Collectively, these three serotypes represent 51% of all *Salmonella* serotypes identified.

The 2024 incidence rate of Shiga toxin-producing *Escherichia coli* (STEC) O157 (0.66 cases per 100,000 population) is similar to rates observed prior to 2023, which was elevated due to a large outbreak. This is similar to rates seen from 2020 to 2022 (between 0.62 to 0.77 cases per 100,000) during the pandemic and lower than the relatively stable rate seen from 2010 to 2019 (between 0.95 to 1.40 cases per 100,000 population). The incidence rate of non-O157 STEC isolates continued to increase in 2024 (1.94 cases per 100,000 population) and exceeded the previous all-time high of 1.74 cases per 100,000 population reported to NESP in 2023. This is the eighth consecutive year where more non-O157 STEC isolates were reported to NESP than O157 STEC isolates.

Likely due to an outbreak, the incidence rate of invasive listeriosis in 2024 (0.57 cases per 100,000 population) is higher than rates previously reported since *Listeria* was added to NESP in 2010. In contrast to the recent years of 2020 to 2023 where *Shigella flexneri* represented the majority of *Shigella* species reported, *Shigella sonnei* was the most reported *Shigella* species in 2024 and represented over 50% of all *Shigella*. In 2024, the incidence rate of *Shigella sonnei* (1.77 cases per 100,000 population) increased compared to 2023 and the incidence rate of *Shigella flexneri* (1.39 cases per 100,000 population) decreased compared to 2023. Trends for all other *Shigella* species in 2024 were relatively unchanged compared to previous years. The incidence rate of Hepatitis A decreased in 2024 (0.81 cases per 100,000 population) compared to 2023 (0.99 cases per 100,000 population) and is lower than the highest incidence reported in 2019 (1.30 cases per 100,000 population).

Table of Contents

Tables

Figures

Appendices

Information to the reader about the National Enteric Surveillance Program (NESP)

In Canada, the national surveillance of human enteric diseases is conducted through NESP and the Canadian Notifiable Diseases Surveillance System (CNDSS)[a]. 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 by the provincial public health laboratories has been conducted through NESP.

NESP provides the most timely data (at a level of characterization that is primarily species and serotype) that are critical to, and integrated with other surveillance programs. Monitoring these aggregated data allows for the rapid evaluation and response to enteric illness outbreaks. In addition, these data allow 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, which is forwarded to provincial/territorial health authorities and collated by PHAC's 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 used to support 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 data are more current and responsive to trends. A comparison of national case counts and incidence rates for enteric diseases is included in Appendix A.

NESP is also highly complementary to another laboratory-based surveillance system, PulseNet Canada[b]. Also administered by PHAC, PulseNet Canada collects high resolution (i.e., whole genome sequence) data in real-time on cases of enteric diseases for the purpose of outbreak detection and response. Due to the additional testing performed (genomic subtyping, whole genome sequencing), there are differences in turnaround time compared to weekly NESP data. Further, PulseNet Canada surveillance is conducted only for a subset of the organisms that are tracked by NESP.

Data Collection

Isolates (or specimens)[c] are submitted to provincial public health laboratories for testing and/or confirmation of the enteric pathogen. On a weekly basis, each provincial public health laboratory summarizes the number

[a] Canadian Notifiable Diseases Surveillance System, Public Health Agency of Canada: https://diseases.canada.ca/notifiable/
[b] PulseNet Canada, National Microbiology Laboratory, Public Health Agency of Canada: https://www.canada.ca/en/public-health/programs/pulsenet-canada.html
[c] The term "isolates" is used to describe human clinical isolations of bacteria, parasites and enteric viruses (excluding Hepatitis A) in NESP. For Hepatitis A, "cases" is used instead of isolates.

of enteric microorganisms isolated from human patients. The information details the genus, species, pathotype (where appropriate) 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, except for in Alberta, where it is based on the date received. Data are submitted to NML either directly (through email), 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* spp.) 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 indicates that one "*Salmonella* spp." 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 public health laboratories attempt to identify multiple, repeat, or follow-up specimens from the same individual. For example, when multiple isolates are collected from a single patient, the laboratories would consider this as a single case if all identical isolates are collected over a reasonable time period (typically three months).

Enhanced subtype data collected for surveillance purposes are primarily generated using whole genome sequencing (WGS) *in silico* predictions instead of by classical microbiological methods. This includes *in silico* predictions of species identification and serotype (where applicable). Use of WGS data for NESP analyses helps ensure this system will remain compatible with surveillance in the genomics era. Since 2018, the majority of the data collected and analyzed by NESP have been generated via WG*S.*

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 public health 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, although, 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 NESP Weekly Reports, partners can perform real-time data analysis, examine trends and display their respective jurisdictions' data within the webNESP application. PulseNet Canada uses these data in conjunction with whole genome sequencing based subtyping data and other molecular/genomic data to detect disease clusters and outbreaks. The resulting data analyses are also shared on CNPHI with provincial public health laboratories, the Canadian Food Inspection Agency (CFIA), Health Canada (HC), PHAC and provincial/territorial epidemiologists. The coordinated assessment of laboratory evidence collected through these complementary laboratory surveillance networks allows for the interpretation of clinical microbiological evidence during multi-jurisdictional epidemiologic investigations, as described in the Foodborne Illness Outbreak Response Protocol (FIORP)[d].

For this annual summary, initial 2024 data validation activities were performed in collaboration with the provinces and territories. Once the final dataset was validated and closed, summary statistics using SAS software[e] were conducted for the 18 different organisms causing enteric illness that are reported to NESP.

Limitations

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 public health or central reference laboratories for further testing beyond genus/species characterizations, and are therefore greatly under-represented in NESP. By contrast, *Salmonella* and O157 STEC 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 provincial public health laboratories and therefore any interpretation should be considered with caution.

In March of 2020, the COVID-19 pandemic was declared[f] and global public health action was taken to address it. Across Canada and within specific provinces/territories and regions, various public health measures were put in place. These public health measures and the adaptations Canadians made to combat COVID-19 not only helped to reduce the transmission of COVID-19, but have also impacted other reported

[d] Foodborne Illness Outbreak Response Protocol (FIORP) 2017: To guide a multi-jurisdictional response. Public Health Agency of Canada: https://www.canada.ca/en/public-health/services/publications/health-risks-safety/canadas-foodborne-illness-outbreak-response-protocol-fiorp-guide-multi-jurisdictional-enteric-outbreak-response.html
[e] SAS software, Version 9.4 of the SAS System for Windows. Copyright © 2016 SAS Institute Inc.
[f] https://www.who.int/news-room/speeches/item/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020 (accessed October 17, 2025)

infectious diseases to varying degrees in various ways. While the data and findings in the 2020, 2021 and 2022 NESP Annual Summaries were interpreted with caution, as the public health measures invoked to help limit the spread of COVID-19 likely impacted disease incidence, laboratory services, data collection and reporting to NESP, the 2023 NESP Annual Summary indicated an initial return to pre-pandemic levels for many pathogens (Appendix D).

In the 2024 NESP Annual Summary, it appears that overall counts and counts for most pathogens in 2024 have either returned to, or in some cases surpassed pre-pandemic rates. For this reason, referent periods found in this report may vary (previous years, the previous five-year 2019-2023 average, the pre-pandemic 2015-2019 five-year average, or the pandemic-affected 2020-2023 four-year average). It will continue to be important to watch enteric disease trends carefully as they continue to stabilize in a post-pandemic reality.

Questions and correspondence may be forwarded via email to:

nesp-pnsme@phac-aspc.gc.ca

Laboratory-confirmed Isolate Counts & Incidence Rates

In 2024, provincial public health laboratories reported 17,344 cases of illness caused by enteric pathogens to NESP, higher than the average number of notifications reported in the previous five years (12,457). This is also higher than the 2015 to 2019 (pre-COVID-19 pandemic) five-year average number of notifications (15,313). The most frequently reported enteric pathogen group was *Salmonella*, followed by enteric viruses (Norovirus, Hepatitis A, Rotavirus, Adenovirus, Astrovirus, Sapovirus and Enterovirus) and *Campylobacter* (Table 1). Organism isolate counts reported by province and territory in 2024 can be found in Appendix B.

Table 1. Number of isolates reported to NESP by major organism group per province or territory, 2024

Group[4]	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total	% of total isolates reported
Salmonella	946	767	194	229	2,816	1,219	162	109	15	89	11	3	0	6,560	37.82
Viruses[1]	203	1,202	271	295	979	59	161	54	37	416	3	5	3	3,688	21.26
Campylobacter[1]	9	934	180	136	43	214	209	115	45	174	2	2	0	2,063	11.89
E. coli[2]	292	422	59	158	151	145	30	4	0	458	4	1	0	1,724	9.94
Parasites[1]	85	126	120	71	619	NR[3]	101	102	9	103	13	5	0	1,354	7.81
Shigella	462	326	15	30	242	244	8	3	1	18	0	1	0	1,350	7.78
Yersinia	51	47	5	44	137	11	4	1	0	4	13	0	0	317	1.83
Listeria	22	13	2	3	114	61	12	3	1	3	0	0	0	234	1.35
Vibrio	17	6	3	0	13	2	9	2	2	0	0	1	0	55	0.32
Total	**2,087**	**3,843**	**849**	**966**	**5,114**	**1,955**	**696**	**393**	**110**	**1,265**	**46**	**18**	**3**	**17,345**	**100.00**

[1] *Campylobacter* isolates, parasitic detections (*Giardia, Cryptosporidium, Entamoeba histolytica/dispar* and *Cyclospora*), and viral detections (Norovirus, Rotavirus, Adenovirus, Astrovirus, Sapovirus and Enterovirus) are not routinely forwarded to the provincial public health or central reference laboratories and are greatly under-represented in NESP.
[2] *E. coli* includes O157 STEC serotypes (272 isolates), non-O157 STEC serotypes (799 isolates), CIDT positive for STX/STEC, culture status unknown (139 detections), non-typed STEC (76 isolates), and other non-STEC pathotypes (438 detections).
[3] NR stands for Not Reported. In 2024 no parasites were reported from Quebec.
[4] Cases visiting a different province or territory are captured in the total count for the province or territory where the case was detected.

Annual national incidence rates for the groups of enteric pathogens reported to NESP between 2019 and 2024 are shown in Table 2 and Appendix A. Isolates of O157 STEC, non-O157 STEC, *Listeria monocytogenes, Salmonella* spp., *Shigella* spp., and *Vibrio cholerae* are routinely forwarded to provincial public health laboratories, while isolates of *Campylobacter* spp., non-*cholerae Vibrio, Yersinia* spp., enteric parasites (*Giardia* spp., *Cryptosporidium* spp., *Entamoeba histolytica/dispar* and *Cyclospora cayetanensis*) and enteric viruses (Norovirus, Rotavirus, Adenovirus, Astrovirus, Sapovirus and Enterovirus) are not

routinely forwarded to the provincial public health or central reference laboratories. As such, NESP incidence rates are only considered to be reflective of the true incidence rate for those pathogens that are routinely reported, enabling the calculation of provincial and territorial incidence rates as shown in Table 3.

Table 2. Annual national totals and rates[1] (per 100,000 population) for enteric pathogens and organism groups reported to NESP, 2019 to 2024

Group	2019		2020		2021		2022		2023		2024	
	Total	Rate[1]	Total	Rate[1]	Total	Rate[1]	Total	Rate[1]	Total	Rate[1]	Total	Rate[1]
O157 STEC	397	1.06	237	0.62	260	0.68	299	0.77	616	1.54	272	0.66
Non-O157 STEC[2]	595	1.58	320	0.84	373	0.98	513	1.32	696	1.74	799	1.94
Listeria	174	0.46	158	0.42	154	0.40	183	0.47	171	0.43	234	0.57
Salmonella	6,350	16.88	4,919	12.93	3,360	8.79	4,826	12.39	6,281	15.68	6,560	15.90
Shigella	828	2.20	393	1.03	416	1.09	978	2.51	1,065	2.66	1,350	3.27
Campylobacter	1,664	4.42	1,289	3.39	1,255	3.28	1,088	2.79	1,188	2.97	2,063	5.00
Vibrio	52	0.14	44	0.12	51	0.13	68	0.17	56	0.14	55	0.13
Yersinia	318	0.85	283	0.74	298	0.78	233	0.60	278	0.69	317	0.77
Parasites	1,639	4.36	1,017	3.45[3]	1,020	3.44[3]	1,030	3.40[3]	1,176	3.77[3]	1,354	4.20[3]
Viruses	2,564	6.82	1,035	2.72	938	2.45	2,789	7.16	4,016	10.03	3,688	8.94

[1] Rates calculated using the population estimates on July 1st as reported by Statistics Canada – Table 17-10-0005-01. Accessed October 17, 2025. https://doi.org/10.25318/1710000501-eng
[2] Unless otherwise indicated, it is assumed that all *E. coli* samples reported to NESP from the provinces and territories are Shiga toxin-producing *Escherichia coli* (STEC). This value does not include any non-typed *E. coli.*
[3] In 2020, 2021, 2022, 2023 and 2024, Québec did not report parasitic detections. Québec's population is removed from the incidence rate calculations for these years.

Table 3. Annual rates[1] (per 100,000 population) of infection per province and territory for select groups of pathogens routinely reported to NESP, 2024

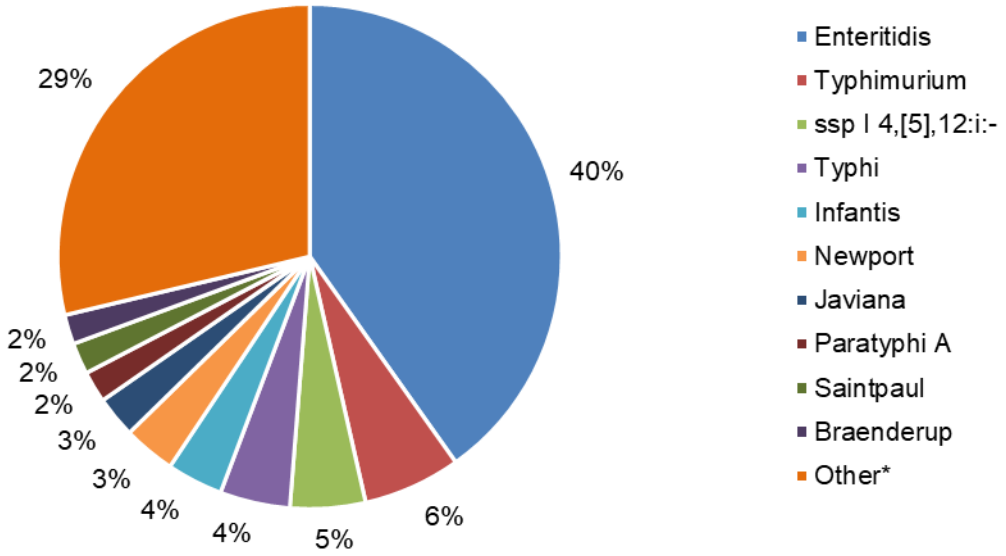
Group[2]	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU
O157 STEC	0.62	1.89	0.40	0.87	0.49	0.41	0.47	0.18	0.00	0.37	4.20	0.00	0.00
Non-O157 STEC	3.39	6.70	4.33	4.36	0.45	0.57	2.33	0.00	0.00	2.56	2.10	2.21	0.00
Listeria	0.39	0.26	0.16	0.20	0.71	0.68	1.40	0.28	0.56	0.55	0.00	0.00	0.00
Salmonella	16.68	15.62	15.55	15.35	17.44	13.55	18.87	10.07	8.35	16.27	23.11	6.63	0.00
Shigella	8.15	6.64	1.20	2.01	1.50	2.71	0.93	0.28	0.56	3.29	0.00	2.21	0.00

[1] Rates calculated using the population estimates on July 1st as reported by Statistics Canada – Table 17-10-0005-01. Accessed October 17, 2025. https://doi.org/10.25318/1710000501-eng
[2] Cases visiting a different province or territory are counted in the province or territory where the case was detected.

Salmonella

A total of 6,560 *Salmonella* isolates representing 221 serotypes were reported to NESP in 2024. *Salmonella* Enteritidis accounted for 40% of all human salmonellosis, and together with the nine remaining most common serotypes (Figure 1), they made up 71% of all *Salmonella* infections reported. National, provincial and territorial case counts for *Salmonella* reported in 2024 are shown in Table 4 and Appendix B.

Figure 1. Proportion of Salmonella serotypes causing human illness as reported to NESP, 2024 (n = 6,560)



*Other serotypes (1,885 isolates) were divided among 211 serotypes or incomplete antigenic profiles, and 59 isolates were reported as unspecified *Salmonella* species.

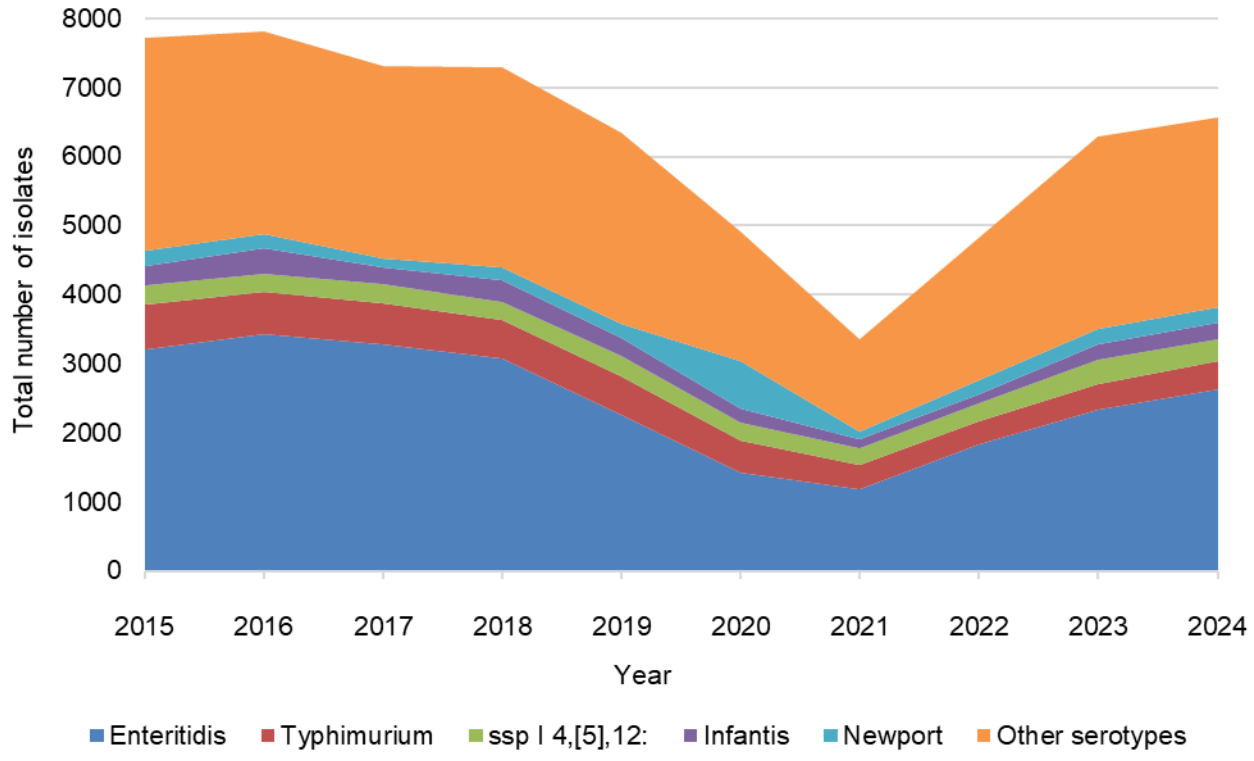
Compared to the average number of *Salmonella* notifications received from 2019 through 2023 (5,147 cases), there was a 27% increase observed in 2024 (6,560 cases). However, this was a 10% decrease compared to the average number of *Salmonella* notifications received from 2015 through 2019 (7,299 cases). The national incidence rate of *Salmonella* (15.90 cases per 100,000 population) increased in comparison to 2023 (15.67 cases per 100,000 population), but remained lower than rates seen pre-pandemic (16.88 cases per 100,000 population in 2019). Although trends are not clear due to the impacts of the COVID-19 pandemic, this is likely in part due to the continued impact of the CFIA policy[g] implemented in April 2019 to address *Salmonella* in raw frozen breaded chicken products (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).

[g] Salmonella control options in frozen raw breaded chicken products. Canadian Food Inspection Agency: https://inspection.canada.ca/preventive-controls/meat/salmonella-in-frozen-raw-breaded-chicken/eng/1531254524193/1531254524999 (accessed October 17, 2025)

Table 4. Number of isolates reported to NESP per province and territory for the ten most commonly reported *Salmonella* serotypes, 2024

Serotype	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total	% of total *Salmonella* (n = 6560)
Enteritidis	408	281	73	85	1,097	506	88	54	4	34	5	0	0	2,635	40.17%
Typhimurium	47	77	14	35	151	73	7	3	1	2	1	0	0	411	6.27%
ssp I 4,[5],12:i:-	33	30	8	8	139	83	7	0	0	8	0	1	0	317	4.83%
Typhi	63	43	8	9	144	19	2	6	1	0	0	0	0	295	4.50%
Infantis	26	34	6	11	97	51	4	5	1	1	0	0	0	236	3.60%
Newport	27	32	10	15	87	34	8	3	1	1	1	0	0	219	3.34%
Javiana	17	11	4	1	85	46	4	1	0	5	0	0	0	174	2.65%
Paratyphi A	25	26	3	4	64	6	1	3	0	0	0	0	0	132	2.01%
Saintpaul	18	24	8	4	50	23	3	1	0	1	0	0	0	132	2.01%
Braenderup	18	7	6	4	57	25	2	1	**0**	3	**0**	1	**0**	124	1.89%
Total	**682**	**565**	**140**	**176**	**1,971**	**866**	**126**	**77**	**8**	**55**	**7**	**2**	**0**	**4,675**	**71.27%**

Figure 2. Annual counts between 2015 to 2024 for the top five non-typhoidal *Salmonella* serotypes reported to NESP in 2024



In 2024, five provinces/territories reported incidence rates of *Salmonella* higher than the national reported incidence rate: British Columbia (16.68 cases per 100,000 population), Ontario (17.44 cases per 100,000 population), New Brunswick (18.87 cases per 100,000 population), Newfoundland and Labrador (16.27 cases per 100,000 population), and Yukon (23.11 cases per 100,000 population) (Table 3).

Table 5. National total counts (overall rank) for the ten most commonly reported *Salmonella* serotypes to NESP, 2019 to 2024

Serotype	2019	2020	2021	2022	2023	2024	Average no. of isolates (2019-2023)
Enteritidis	2,254 (1)	1,422 (1)	1,172 (1)	1,840 (1)	2,325 (1)	2,635 (1)	1,803
Typhimurium	557 (2)	468 (3)	370 (2)	319 (2)	386 (2)	411 (2)	420
ssp I 4,[5],12:i:-	294 (3)	256 (4)	231 (3)	265 (3)	343 (3)	317 (3)	278
Typhi	232 (6)	113 (8)	57 (8)	248 (4)	259 (5)	295 (4)	182
Infantis	264 (5)	198 (6)	138 (4)	130 (6)	218 (7)	236 (5)	190
Newport	200 (7)	693 (2)	99 (5)	202 (5)	229 (6)	219 (6)	285
Javiana	143 (8)	50	49	92 (8)	115 (10)	174 (7)	90
Paratyphi A	116 (9)	59	19	115 (7)	156 (9)	132 (8)	93
Saintpaul	99	42	30	73	82	132 (9)	65
Braenderup	102	81 (9)	42	73	263 (4)	124 (10)	112
Oranienburg	104 (10)	71 (10)	55 (10)	56	53	76	68
Thompson	98	126 (7)	95 (7)	85	91	75	99
Muenchen	80	55	56 (9)	44	55	58	58
Stanley	87	29	31	87 (10)	47	53	56
Sundsvall	1	0	0	0	168 (8)	47	34
Heidelberg	267 (4)	207 (5)	97 (6)	88 (9)	44	40	141
Montevideo	36	71 (10)	31	33	18	29	38

Salmonella Enteritidis

In 2024, 2,635 isolates of *S.* Enteritidis, 40.17% of all *Salmonella* submissions, were reported to NESP. Relative to the 2015-2019 baseline period (8.35 cases per 100,000 population) there was a 24% decrease in the incidence rate observed in 2024 (6.39 cases per 100,000 population). A general decrease in incidence can be seen from 2018-2021, and a general increase from 2021 to 2024. The rate observed in 2024 was higher than the rate observed in 2019 (5.99 cases per 100,000 population), but remained lower than the 5-year pre-pandemic average from 2015 to 2019 (8.35 cases per 100,000). This suggests cases have returned to pre-pandemic levels following the impacts of COVID-19 (Figure 3). Trends will continue to be monitored in the post-COVID-19 pandemic period to determine the ongoing impacts of CFIA policy changes for frozen raw breaded chicken products implemented in 2019.

Salmonella Typhimurium

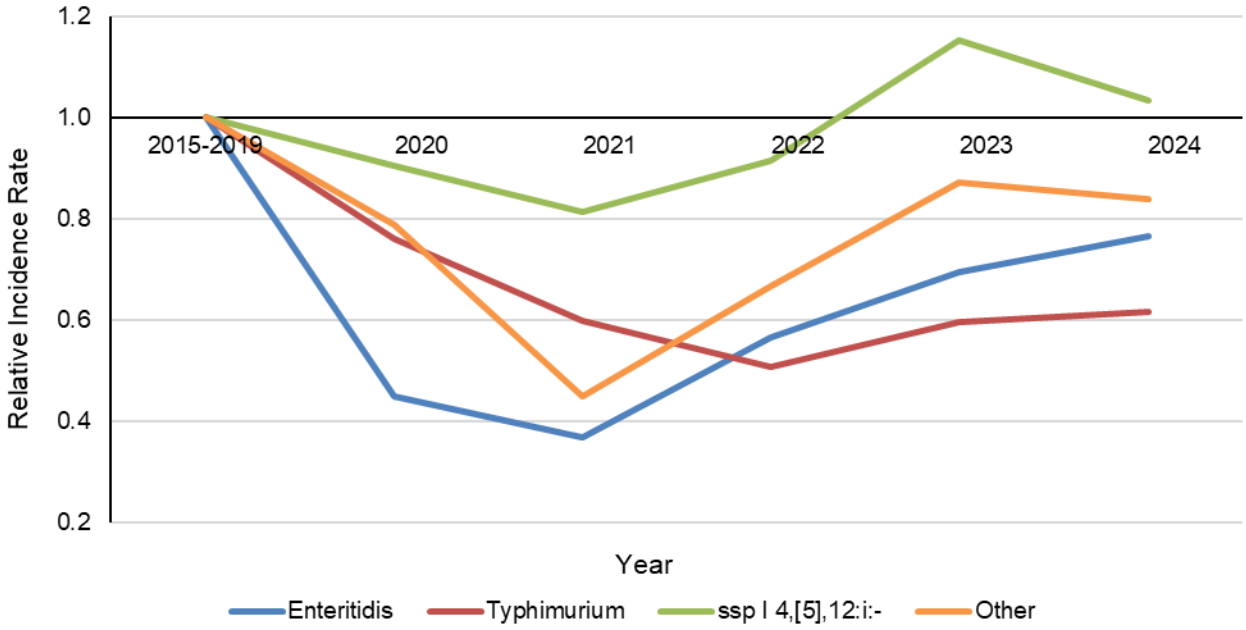
Compared to the 2015-2019 baseline period (1.62 cases per 100,000 population), a 38% decrease in the incidence of *S.* Typhimurium cases was noted in 2024 (1.00 cases per 100,000 population). From 2019-2022, a slight decreasing trend can be seen in the incidence of *S.* Typhimurium and a general increase from 2022 to 2024 (Figure 3). This increasing trend during the period from 2022 to 2024 may be related to an outbreak of *Salmonella* associated with snakes and feeder rodents, which continued into 2024 from previous years and included both *S.* Typhimurium and *S.* ssp I 4,[5],12:i:-[h]. Although *S.* Typhimurium continues to rank among the top 3 most common serotypes causing human salmonellosis in Canada, it represents only 6.27% of all *Salmonella* isolates reported to NESP in 2024 (Figure 1 and Table 5).

Salmonella ssp I 4,[5],12:i:-

Salmonella ssp I 4,[5],12:i:-, for the fifth time since NESP was launched in 1997 (also in 2019, 2021, 2022 and 2023), was the third most common serotype in Canada, representing 4.83% of all human *Salmonella* isolates reported to NESP in 2024. The 2024 overall incidence (0.77 cases per 100,000 population) shows a 3% increase compared to the 2015-2019 baseline period (0.74 cases per 100,000 population). As noted above, an outbreak of *S.* Typhimurium and *S.* ssp I 4,[5],12:i:- associated with snakes and feeder rodents continued into 2024, which may have contributed to increased cases of this serovar[g].

[h] Public Health Agency of Canada. Public Health Notice: Outbreak of Salmonella infections linked to snakes and rodents. May 14, 2024. https://www.canada.ca/en/public-health/services/public-health-notices/2023/outbreak-salmonella-infections-linked-snakes-rodents.html

Figure 3. Relative incidence rates[1,2] (per 100,000 population) of *S.* Enteritidis, *S.* Typhimurium, *S.* ssp I 4,[5],12:i:-, and other *Salmonella* serotypes reported to NESP by year, 2020 to 2024, compared to the 2015 to 2019 baseline period



[1] Rates are compared to the 2015 to 2019 baseline period.
[2] Rates calculated using the population estimates on July 1st as reported by Statistics Canada – Table 17-10-0005-01. Accessed October 17, 2025. https://doi.org/10.25318/1710000501-eng

Escherichia coli

Unless otherwise indicated, it is assumed that all *E. coli* cases reported to NESP are Shiga toxin-producing *Escherichia coli* (STEC). The 2024 rate of O157 STEC (0.66 cases per 100,000 population) is much lower than the rate seen in 2023 (1.54 cases per 100,000) which was elevated due to a large outbreak of O157:H7 STEC in Alberta[i]. The 2024 rate is lower than the rate observed in 2022 (0.77 cases per 100,000) and similar to rates in 2020 (0.62 cases per 100,000) and 2021 (0.68 cases per 100,000), a period when COVID-19 substantially impacted enteric diseases. Prior to 2020, rates were seen as relatively stable between 2010 to 2019 (Figure 4). In 2024, two provinces and one territory reported incidence rates of O157 STEC higher than the national incidence rate: Alberta (1.89 cases per 100,000 population), Manitoba (0.87 cases per 100,000 population), and Yukon (4.20 cases per 100,000 population) (Table 3).

The incidence rate of non-O157 STEC increased in 2024 (1.94 cases per 100,000 population), resulting in the highest incidence rate of non-O157 STEC ever reported to NESP. Rates of non-O157 STEC were lower in 2020, 2021 and 2022 in comparison to 2019 (1.58 cases per 100,000 population) likely due to the impacts of the pandemic (Figure 4). Data from 2024 represents the eighth consecutive year where the proportion of non-O157 STEC reported has exceeded the proportion of O157 STEC isolates. It is possible that improvements to laboratory testing methods have led to the increased detection of non-O157 STEC and contributed to the rates in 2023 and 2024, which exceed pre-pandemic rates. Therefore, any changes observed over time may also be a reflection of advancements in testing practices by some provincial public health laboratories[j].

Further, 139 *E. coli* cases reported to NESP by four provinces were identified using culture-independent diagnostic tests (CIDT), and were not later updated with results from reflex culture, as seen in Appendix B. Three provinces reported a total of 438 cases of non-STEC *E. coli*. CIDTs can detect a specific antigen or genetic sequence of an organism, without isolating or culturing the living organism[k]. Reflex culture of a CIDT-positive sample can help obtain an isolate for further sub-typing, which would be updated in NESP. According to national guidance[l], reflex cultures are to be obtained from CIDT-positive samples for public health and clinical management. However, organisms may not grow upon reflex culture.

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[i] Alberta Health Services. Shiga Toxin-Producing Escherichia coli (STEC) Outbreak in Calgary Zone Childcare Facilities Linked to a Central Kitchen: Outbreak Investigation Report. June 28, 2024. https://www.albertahealthservices.ca/assets/info/ppih/if-ppih-ecoli-stec-outbreak-investigation-report.pdf

[j] Public Health Agency of Canada. CPHLN recommendations for the laboratory detection of Shiga toxin-producing *Escherichia coli* (O157 and non-O157). *Can Commun Dis Rep* 2018;44(11):304-7. https://doi.org/10.14745/ccdr.v44i11a06

[k] Centers for Disease Control and Prevention (CDC). Foodborne illness and culture-independent diagnostic tests (CIDTs). September 10, 2024. Available from: https://www.cdc.gov/foodnet/reports/cidt.html.

[l] Public Health Agency of Canada. National case definition: Shiga toxin-producing *Escherichia coil* (STEC) infection. December 2023. Available from: https://www.canada.ca/en/public-health/services/diseases/e-coli/health-professionals-e-coli/national-case-definition.html.

Among non-O157 STEC isolates identified in 2024, 42% of these were represented by five O-antigen serogroups: O26, O103, O111, O121, and O151/O118 (Figure 5). In 2024, 21% of non-O157 STEC did not have additional serotype information.

Of the top five serogroups from the broader list of the non-O157 STEC isolates where a serotype result was available, O103 and O151/O118 showed an increased rate per 100,000 population in 2024 compared to 2023, and are the highest rates ever reported in NESP for these serogroups. O26, O111, and O121 showed a decreased rate in 2024 compared to 2023. In comparison to 2019, prior to the COVID-19 pandemic, rates of O26 and O111 have decreased and the rate of O121 has increased slightly (Figure 6). All *E. coli* serotypes, including confirmed non-O157 STEC, and any other reported pathotypes are summarized in Appendix B.

Figure 4. Incidence rates (per 100,000 population) of O157 STEC, non-O157 STEC, and other non-typed *E. coli* reported to NESP, 1997 to 2024

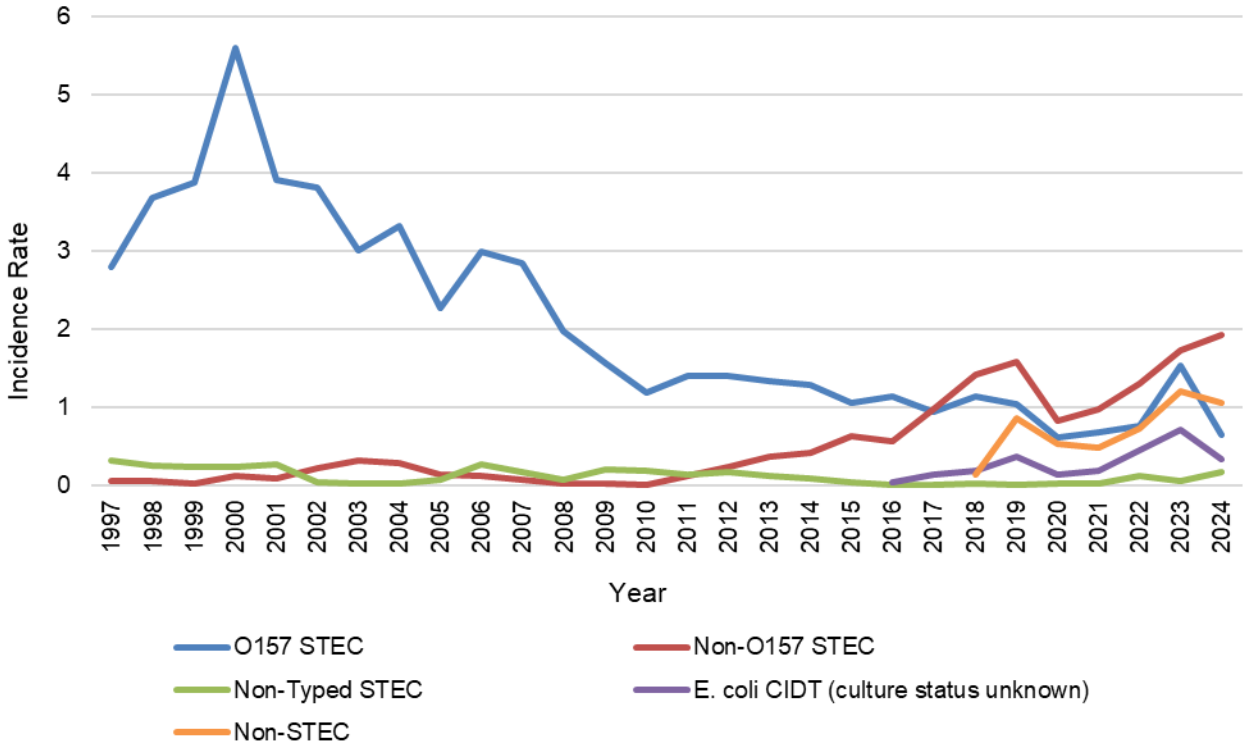
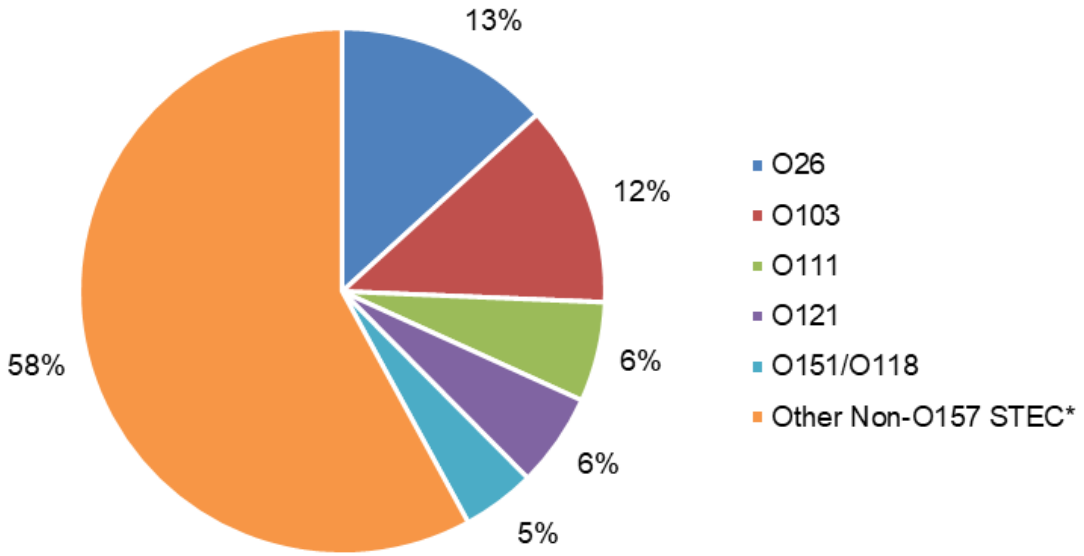
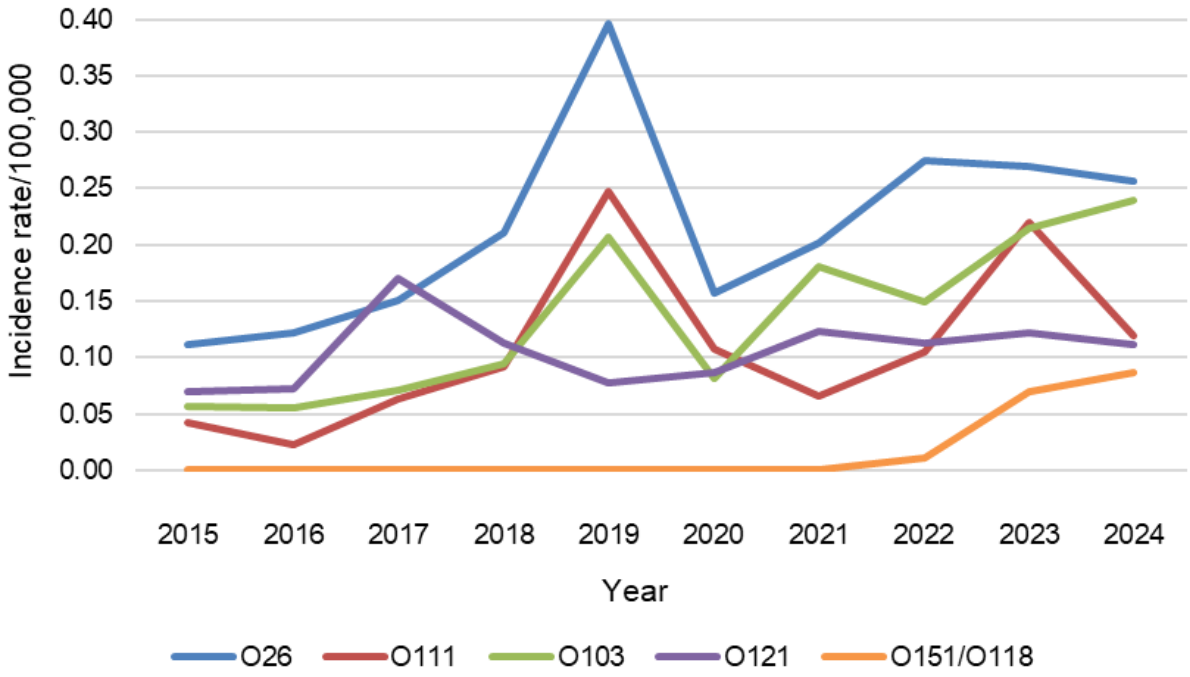


Figure 5. Distribution of non-O157 STEC serogroups reported to NESP in 2024 (n = 799)



*Other serotypes (459 isolates) were divided among 74 serogroups and 170 isolates were reported as unspecified non-O157 STEC.

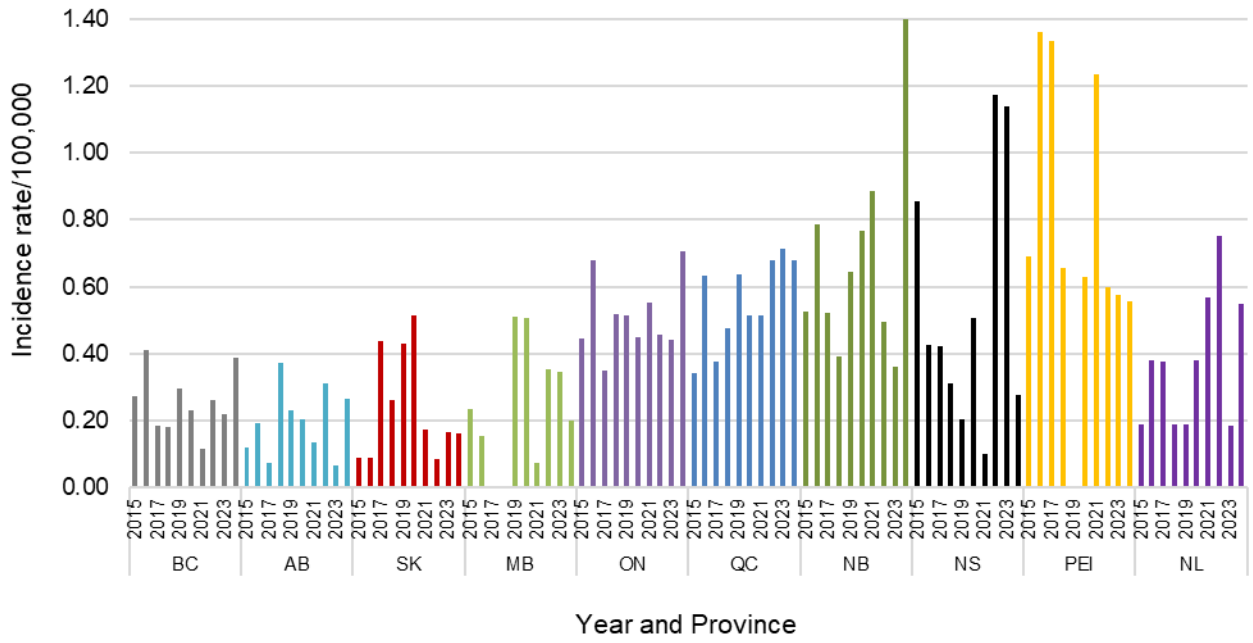
Figure 6. Incidence rate (per 100,000 population) of the top five serotyped non-O157 STEC serogroups reported to NESP, 2015 to 2024



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. The national incidence rate of *Listeria monocytogenes* increased in 2024 (0.57 cases per 100,000 population) and is the highest *Listeria monocytogenes* incidence rate ever reported in NESP. The 2024 rate can be attributed, in part, to an outbreak linked to plant-based refrigerated beverages[m]. 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 remain wide differences in the incidence rate of invasive listeriosis across Canada, with some provinces reporting an incidence rate more than eight times that of others. In 2024, three provinces reported incidence rates of *Listeria monocytogenes* higher than the national reported incidence rate: Ontario (0.71 cases per 100,000 population), Québec (0.68 cases per 100,000 population) and New Brunswick (1.40 cases per 100,000 population) (Table 3).

Figure 7. Incidence rate (per 100,000 population) of invasive listeriosis reported to NESP by province, 2015 to 2024[1]



[1]There were no cases of invasive listeriosis reported in 2024 by Yukon, Northwest Territories, and Nunavut.

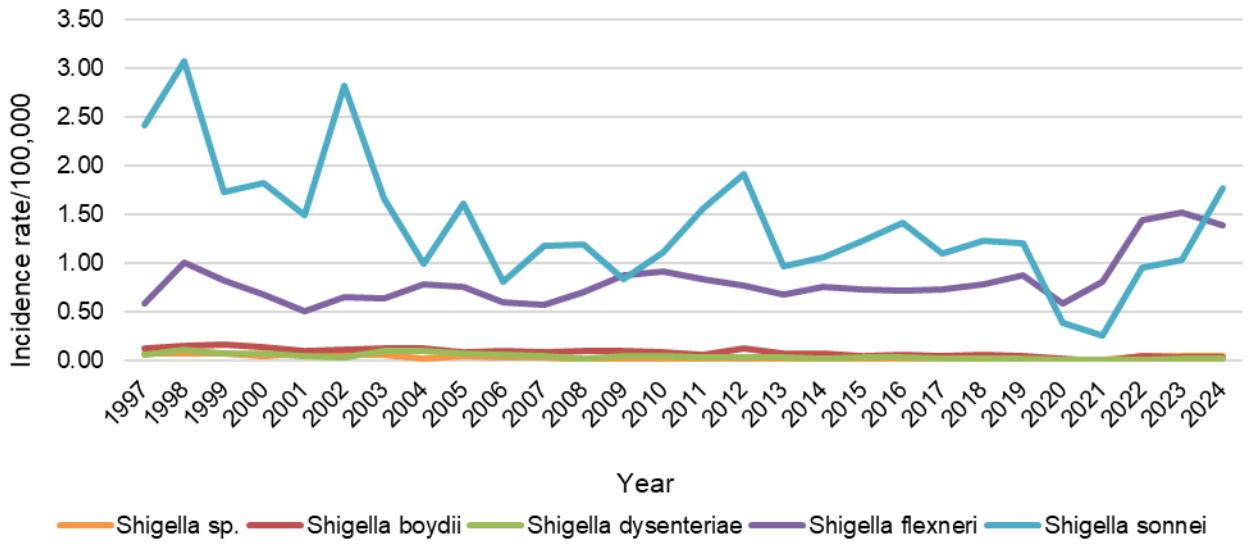
[m] Public Health Agency of Canada. Public Health Notice: Outbreak of Listeria infections linked to recalled plant-based refrigerated beverages. October 11, 2024. https://www.canada.ca/en/public-health/services/public-health-notices/2024/outbreak-listeria-infections-recalled-refrigerated-plant-based-beverages.html

Shigella

There were 1,350 isolates of *Shigella* reported in 2024, representing a rate of 3.27 cases per 100,000 population which is higher than the 2023 rate of 2.66 cases per 100,000 population. This rate is also higher than the average of 2.11 cases per 100,000 population reported between 2015 and 2019 (Figure 8). In 2024, three provinces reported an incidence rate of *Shigella* higher than the national reported incidence rate: British Columbia with 8.15 cases per 100,000 population, Alberta with 6.64 cases per 100,000 population, and Newfoundland and Labrador with 3.29 cases per 100,000 population.

Isolates of *Shigella sonnei* and *Shigella flexneri* comprised 54% and 42% of total *Shigella* notifications, respectively. In 2024, the incidence rate of *S. sonnei* (1.77 cases per 100,000) exceeded the incidence rate of *S. flexneri* (1.39 cases per 100,000) for the first year since 2019. Overall trends for *Shigella* have historically been driven by the incidence of *S. sonnei*, however, between 2020 and 2023, the rate of *S. flexneri* surpassed that of *S. sonnei* (Figure 8). A recent study of hospital records in Vancouver, British Columbia identified an emerging multi-drug resistant clone of *S. sonnei* in 2021 and 2022, which may be contributing to this trend[n]. Among the other *Shigella* species, incidence trends over time have remained relatively unchanged with an incidence of 0.03 cases per 100,000 population for *Shigella boydii* and 0.03 cases per 100,000 population for *Shigella dysenteriae* observed in 2024. Compared to 2023, rates of *S. boydii* and *S. flexneri* decreased, while rates of *S. dysenteriae* and *S. sonnei* increased (Figure 8).

Figure 8. Incidence rate (per 100,000 population) of *Shigella* species reported to NESP, 1997 to 2024

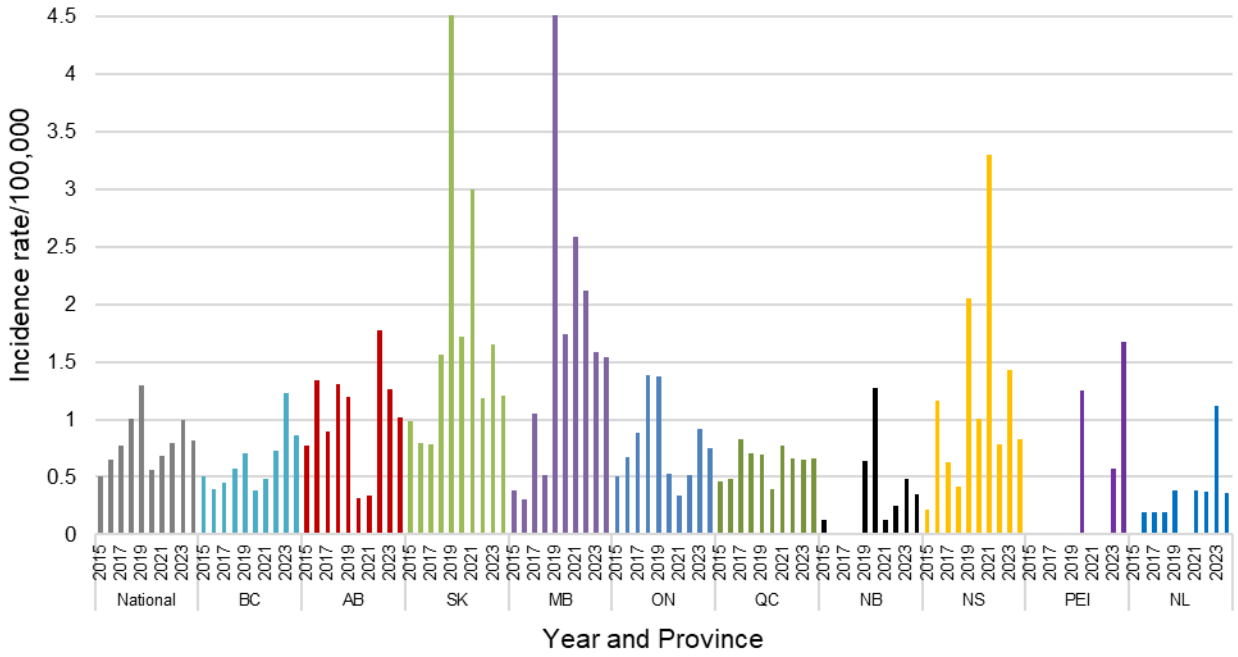


[n] Stefanovic, A., Alam, M. E., Matic, N., Larnder, A., Ritchie, G., Gowland, L., Chorlton, S. D., Lloyd-Smith, E., Payne, M., Dawar, M., Vijh, R., Leung, V., Hull, M., Baker, K. S., Lowe, C. F., & Romney, M. G. (2025). Increased Severity of Multidrug-Resistant Shigella sonnei Infections in People Experiencing Homelessness. *Clinical infectious diseases*, 80(2), 339–346. https://doi.org/10.1093/cid/ciae575

Hepatitis A

The national incidence rate for Hepatitis A in 2024 (0.81 cases per 100,000 population) was lower than in 2023 (0.99 cases per 100,000) and remains lower than the peak rate in 2019, prior to the COVID-19 pandemic (1.30 cases per 100,000 population) (Figure 9). In 2024, six provinces reported incidence rates of Hepatitis A higher than the national reported incidence rate: British Columbia (0.86 cases per 100,000 population), Alberta (1.02 cases per 100,000 population), Saskatchewan (1.20 cases per 100,000 population), Manitoba (1.54 cases per 100,000 population), Nova Scotia (0.83 cases per 100,000 population), and Prince Edward Island (1.67 cases per 100,000 population) (Figure 9). Each provincial laboratory determines whether to report a case based solely on laboratory IgM testing, without public health follow-up. Considering that IgM testing can result in false positive results or indicate recent immunization, positive results are further investigated by local public health to determine if the case meets the definition of a "confirmed case". If the case does not meet this definition upon follow-up, the data are not always communicated back to the laboratory. Therefore, Hepatitis A data reported through NESP would not be corrected in this scenario and may result in over-reporting of confirmed cases for this virus. Conversely, as not all specimens 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, 2015 to 2024



Appendix A. Canadian Notifiable Disease Surveillance System (CNDSS) and the National Enteric Surveillance Program (NESP)

Table 6. Comparison of national totals, incidence per 100,000 population and proportion captured between CNDSS and NESP for enteric diseases, 2023[1]

Enteric, Food and Waterborne Diseases	Canadian Notifiable Disease Surveillance System (CNDSS)		National Enteric Surveillance Program (NESP)		% of CNDSS cases captured in NESP (NESP isolations / CNDSS cases[6])
2023	N	Rate per 100,000 population	N	Rate per 100,000 population	
Botulism	6	0.02	-	-	N/A
Campylobacteriosis[2]	7,648	19.80	1,188	-	16%
Cholera[3]	3	0.01	3	0.01	100%
Cryptosporidiosis[2]	1,238	3.20	275	-	22%
Cyclosporiasis[2]	879	2.28	127	-	14%
Giardiasis[2]	3,141	8.13	570	-	18%
Hepatitis A	347	0.90	397	0.99	114%[6]
Invasive Listeriosis	175	0.45	171	0.43	98%
Norovirus[2,4]	556	11.55	2,169	-	N/A
Paralytic Shellfish Poisoning	0	0.00	-	-	N/A
Salmonellosis	5,815	15.05	6,022	15.04	104%[6]
Shigellosis	1,164	3.01	1,065	2.66	91%
Typhoid[5]	243	0.63	259	0.65	107%
Shiga toxigenic *Escherichia coli* Infection	1,574	4.07	1,312[7]	3.28	83%

[1] CNDSS data for 2024 was not available at the time this summary was produced.
[2] *Campylobacter*, parasites (*Cryptosporidium*, *Cyclospora* and *Giardia*) and Norovirus are not routinely reported to provincial public health or central reference laboratories and are greatly under-represented in NESP; therefore, no rate was calculated for NESP.
[3] Includes *Vibrio cholerae* serotype O1 or O139.
[4] For Norovirus some provinces/territories report only on aggregated outbreak related data; these data are not included here.
[5] Typhoid includes lab confirmation of *Salmonella* Typhi; *Salmonella* Paratyphi A, B and C are reported under salmonellosis.
[6] 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.
[7] Unless otherwise indicated, it is assumed that all the samples reported to NESP from the provinces and territories are Shiga toxigenic *Escherichia coli* (STEC). This value does not include any non-typed *E. coli*.

Appendix B. Species and serotype data reported to NESP by province and territory, 2024

Cases visiting a different province or territory are captured in the total count for the province or territory where the case was detected.

Table 7. *Campylobacter*

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total
Campylobacter coli	0	65	11	9	9	22	3	8	4	0	0	0	0	131
Campylobacter curvus	0	4	0	0	0	0	0	0	0	0	0	0	0	4
Campylobacter fetus	1	1	0	0	4	9	0	0	0	0	0	0	0	15
Campylobacter gracilis	0	0	0	0	0	1	0	1	0	0	0	0	0	2
Campylobacter hyointestinalis	0	1	0	0	1	0	0	0	0	0	0	0	0	2
Campylobacter jejuni	5	849	167	127	14	156	162	102	36	2	2	2	0	1,624
Campylobacter lari	0	1	0	0	8	9	1	1	1	0	0	0	0	21
Campylobacter rectus	0	4	0	0	0	0	0	0	0	0	0	0	0	4
Campylobacter sp	0	0	0	0	0	0	35	1	0	172	0	0	0	208
Campylobacter upsaliensis	2	1	0	0	6	17	8	2	4	0	0	0	0	40
Campylobacter ureolyticus	1	8	2	0	0	0	0	0	0	0	0	0	0	11
Campylobacter volucris	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Total *Campylobacter*	9	934	180	136	43	214	209	115	45	174	2	2	0	2,063

Table 8. *E. coli**

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total
E. coli CIDT Positive for STX/STEC	0	0	0	80	0	57	0	1	0	0	1	0	0	139
E. coli Non-O157 STEC	0	0	54	65	0	51	0	0	0	0	0	0	0	170
E. coli Non-Typed EAEC	0	0	0	0	0	0	0	0	0	121	0	0	0	121
E. coli Non-Typed EPEC	0	0	0	0	0	0	1	1	0	263	0	0	0	265
E. coli Non-Typed ETEC	0	0	0	0	0	0	0	0	0	52	0	0	0	52
E. coli Non-Typed STEC	65	0	0	0	0	0	5	0	0	6	0	0	0	76
E. coli O undetermined:H2	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O undetermined:H21	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O undetermined:H6	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O-Rough:H6	0	0	0	0	0	0	1	0	0	0	0	0	0	1
E. coli O1:H7	0	2	0	0	0	0	1	0	0	0	0	0	0	3
E. coli O100:H20	1	0	0	0	1	0	1	0	0	0	0	0	0	3
E. coli O100:HNM	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O103:H11	2	5	0	0	0	0	1	0	0	1	0	0	0	9
E. coli O103:H2	21	37	0	0	11	0	9	0	0	2	0	0	0	80
E. coli O103:H25	1	5	0	0	4	0	0	0	0	0	0	0	0	10
E. coli O104:H7	1	0	0	0	0	0	0	0	0	0	0	0	0	1

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total
E. coli O108:H19	1	1	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O108:H21	0	2	0	0	1	0	0	0	0	0	0	0	0	3
E. coli O108:H25	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O109:H5	0	2	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O111:H2	0	0	0	0	1	0	0	0	0	0	0	0	0	1
E. coli O111:H8	15	26	0	0	7	0	0	0	0	0	0	0	0	48
E. coli O112:H21	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O112:H8	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O113:H21	2	0	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O113:H4	3	1	0	0	0	0	0	0	0	0	0	0	0	4
E. coli O116:H49	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O117/O107:H7	15	4	0	0	0	0	0	0	0	0	0	0	0	19
E. coli O117:H7	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O118:H2	0	2	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O119:H2	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O119:H4	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O121:H19	12	27	0	0	4	0	3	0	0	0	0	0	0	46
E. coli O123/O186:H11	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O123/O186:H2	4	3	0	0	11	0	0	0	0	0	0	0	0	18
E. coli O128:H2	5	4	0	0	0	0	0	0	0	0	0	0	0	9
E. coli O130:H11	2	0	0	0	1	0	0	0	0	0	0	0	0	3
E. coli O133:H16	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O133:H5	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O136:H12	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O136:H25	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O139:H11	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O145:H undetermined	0	0	0	0	0	0	1	0	0	0	0	0	0	1
E. coli O145:H untypeable	3	0	0	0	0	0	0	0	0	1	0	0	0	4
E. coli O145:H12	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O145:HNM	2	7	0	0	0	0	0	0	0	5	0	0	0	14
E. coli O146:H21	5	3	0	0	0	0	0	0	0	0	1	0	0	9
E. coli O146:H28	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O15:H27	1	1	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O151/O118:H16	1	5	0	0	2	0	0	0	0	0	0	0	0	8
E. coli O151/O118:H2	5	13	0	0	5	0	1	0	0	4	0	0	0	28
E. coli O153/O178:H19	0	2	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O153/O178:H7	2	0	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O153:H19	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O153:H2	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O156:H1	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O156:H25	2	2	0	0	0	0	0	0	0	0	0	0	0	4
E. coli O156:H7	0	1	0	0	0	0	0	0	0	0	0	0	0	1

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total
E. coli O157	0	0	0	13	0	0	0	1	0	0	0	0	0	14
E. coli O157:H12	0	0	0	0	1	0	0	0	0	0	0	0	0	1
E. coli O157:H7	35	93	5	0	77	37	4	1	0	2	2	0	0	256
E. coli O157:HNM	0	0	0	0	1	0	0	0	0	0	0	0	0	1
E. coli O159:H19	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O16:H5	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O163:H19	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O166:H15	0	4	0	0	0	0	0	0	0	0	0	0	0	4
E. coli O168:H8	0	0	0	0	0	0	0	0	0	0	0	1	0	1
E. coli O17/O73:H45	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O17:H45	2	3	0	0	1	0	0	0	0	0	0	0	0	6
E. coli O171:H25	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O172:H25	0	2	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O173:H10	0	0	0	0	0	0	1	0	0	0	0	0	0	1
E. coli O174:H21	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O174:H8	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O175:H5	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O177:H11	0	0	0	0	2	0	0	0	0	0	0	0	0	2
E. coli O177:H25	4	4	0	0	0	0	0	0	0	0	0	0	0	8
E. coli O179:H8	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O181:H49	1	1	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O182:H25	0	2	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O187:H52	0	0	0	0	1	0	0	0	0	0	0	0	0	1
E. coli O2:H25	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O20/O137:H41	2	0	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O22:H8	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O23:H15	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O24:H4	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O25:H1	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O26:H11	22	78	0	0	5	0	0	0	0	1	0	0	0	106
E. coli O36:H42	0	3	0	0	0	0	0	0	0	0	0	0	0	3
E. coli O38:H21	2	0	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O38:H26	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O4:H2	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O41:H26	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O42/O28:H25	1	1	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O43:H2	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O45:H2	0	1	0	0	1	0	0	0	0	0	0	0	0	2
E. coli O49:H10	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O5:H19	0	2	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O5:H9	2	12	0	0	1	0	0	0	0	0	0	0	0	15
E. coli O51:H14	0	1	0	0	0	0	0	0	0	0	0	0	0	1

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total
E. coli O51:H41	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O52:H45	0	0	0	0	2	0	0	0	0	0	0	0	0	2
E. coli O6:H34	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O66:H25	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O66:H45	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O69:H11	5	2	0	0	1	0	0	0	0	0	0	0	0	8
E. coli O7:H2	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O71:H11	3	2	0	0	1	0	0	0	0	0	0	0	0	6
E. coli O71:H2	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O71:H8	3	2	0	0	0	0	0	0	0	0	0	0	0	5
E. coli O74:H25	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O76:H19	3	5	0	0	1	0	0	0	0	0	0	0	0	9
E. coli O77/O17/O44/O106/O73:H18	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O8:H19	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O8:H25	0	0	0	0	1	0	0	0	0	0	0	0	0	1
E. coli O8:H28	0	2	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O8:H51	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O8:H7	2	1	0	0	1	0	0	0	0	0	0	0	0	4
E. coli O8:H8	3	0	0	0	0	0	0	0	0	0	0	0	0	3
E. coli O8:H9	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O80:H42	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O83:H1	0	1	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O84:H2	1	4	0	0	0	0	0	0	0	0	0	0	0	5
E. coli O87:H16	0	0	0	0	1	0	0	0	0	0	0	0	0	1
E. coli O9:H7	0	2	0	0	0	0	0	0	0	0	0	0	0	2
E. coli O9:H9	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O91:H14	7	6	0	0	2	0	0	0	0	0	0	0	0	15
E. coli O92:H33	0	1	0	0	1	0	0	0	0	0	0	0	0	2
E. coli O92:H9	0	0	0	0	1	0	0	0	0	0	0	0	0	1
E. coli O96:H19	1	0	0	0	0	0	0	0	0	0	0	0	0	1
E. coli O96:H7	0	0	0	0	1	0	0	0	0	0	0	0	0	1
E. coli O99:H10	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Total *E. coli*	292	422	59	158	151	145	30	4	0	458	4	1	0	1,724

*Unless otherwise indicated, it is assumed that all *E. coli* samples reported to NESP from the provinces and territories are Shiga toxin-producing *Escherichia coli* (STEC).

Table 9. *Listeria monocytogenes*

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total
Listeria monocytogenes	22	13	2	3	114	61	12	3	1	3	0	0	0	234
Total *Listeria*	22	13	2	3	114	61	12	3	1	3	0	0	0	234

Table 10. Parasites

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total
Cryptosporidium	27	8	33	24	238	0	22	20	4	19	0	0	0	395
Cyclospora	2	7	0	1	73	0	0	2	0	7	1	0	0	93
Entamoeba histolytica/dispar	30	35	6	3	100	0	0	4	0	3	2	2	0	185
Giardia	26	76	81	43	208	0	79	76	5	74	10	3	0	681
Total Parasites	85	126	120	71	619	0	101	102	9	103	13	5	0	1,354

Table 11. *Salmonella*

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total
Salmonella Aba	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Aberdeen	3	0	0	0	5	0	0	0	0	0	0	0	0	8
Salmonella Abony	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Adelaide	2	1	1	0	6	1	0	0	0	0	0	0	0	11
Salmonella Agama	0	0	1	0	1	0	0	0	0	0	0	0	0	2
Salmonella Agbeni	3	0	1	0	8	0	1	1	0	0	0	0	0	14
Salmonella Ago	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Agona	17	10	2	1	37	16	2	2	0	6	0	0	0	93
Salmonella Alachua	2	1	0	0	0	2	0	1	0	0	0	0	0	6
Salmonella Albany	0	0	0	0	4	1	0	0	0	0	0	0	0	5
Salmonella Altona	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Salmonella Amager	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Amina	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Anatum	5	6	0	2	12	4	1	0	0	0	1	0	0	31
Salmonella Arechavaleta	0	1	0	0	3	1	0	0	0	0	0	0	0	5
Salmonella Baildon	0	0	0	0	2	1	0	0	0	0	0	0	0	3
Salmonella Bareilly	6	5	0	3	22	2	0	2	0	0	0	0	0	40
Salmonella Berta	1	0	0	0	5	0	0	1	0	0	0	0	0	7
Salmonella Blockley	0	0	0	0	1	1	0	0	0	0	0	0	0	2
Salmonella Bochum	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Boecker	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Salmonella Bonariensis	1	2	0	0	3	1	0	0	0	0	0	0	0	7
Salmonella Bovismorbificans	3	0	0	0	6	2	0	0	1	0	0	0	0	12
Salmonella Braenderup	18	7	6	4	57	25	2	1	0	3	0	1	0	124
Salmonella Brandenburg	2	6	4	3	28	9	3	3	0	1	0	0	0	59
Salmonella Bredeney	1	1	0	0	1	1	0	0	0	0	0	0	0	4
Salmonella Carno	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Carrau	0	0	0	1	1	0	0	0	0	0	0	0	0	2
Salmonella Cerro	0	0	0	0	4	0	0	0	0	0	0	0	0	4
Salmonella Chailey	1	0	0	0	1	0	0	0	0	0	0	0	0	2

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total
Salmonella Chester	6	3	0	0	5	7	0	0	0	0	0	0	0	21
Salmonella Chicago	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Choleraesuis	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Salmonella Coeln	1	2	0	0	3	1	0	0	0	0	0	0	0	7
Salmonella Coleypark	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Colindale	0	0	0	0	5	0	0	0	0	0	0	0	0	5
Salmonella Concord	1	0	0	0	3	0	0	0	0	0	0	0	0	4
Salmonella Corvallis	0	3	0	0	6	4	0	1	0	0	0	0	0	14
Salmonella Cotham	0	0	0	0	1	2	0	0	0	0	0	0	0	3
Salmonella Cubana	0	0	0	0	2	7	0	0	0	0	0	0	0	9
Salmonella Curacao	0	2	0	0	1	0	0	0	0	0	0	0	0	3
Salmonella Daytona	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Denver	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Derby	0	1	0	1	3	3	3	0	0	0	0	0	0	11
Salmonella Dublin	2	3	1	0	6	15	1	0	0	0	0	0	0	28
Salmonella Duesseldorf	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Duisburg	0	0	0	0	1	1	0	0	0	0	0	0	0	2
Salmonella Durban	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Eastbourne	0	0	1	0	4	0	0	0	0	0	0	0	0	5
Salmonella Ebrie/Monschaui	0	0	2	0	3	0	0	0	0	0	0	0	0	5
Salmonella Edinburg	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Elizabethville	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Emek	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Enteritidis	408	281	73	85	1,097	506	88	54	4	34	5	0	0	2,635
Salmonella Epalinges	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Gaminara	0	0	0	0	0	2	0	0	0	0	0	0	0	2
Salmonella Gateshead	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Gatuni	1	0	0	0	4	4	0	0	0	0	1	0	0	10
Salmonella Give	1	1	1	4	2	2	0	0	0	0	0	0	0	11
Salmonella Glostrup	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Goldcoast	4	1	0	0	2	0	0	0	0	0	0	0	0	7
Salmonella Gueuletapee	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Hadar	4	12	2	0	15	9	0	0	0	0	0	0	0	42
Salmonella Haduna	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Haifa	1	0	0	1	2	0	1	1	0	0	0	0	0	6
Salmonella Hannover	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Hartford	0	0	0	0	5	4	0	0	0	0	0	0	0	9
Salmonella Havana	1	2	0	1	11	1	0	0	0	0	0	0	0	16
Salmonella Heidelberg	7	3	1	0	7	19	2	0	0	1	0	0	0	40
Salmonella Herston	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Holcomb	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Hvittingfoss	5	0	1	0	6	2	0	0	0	0	0	0	0	14

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total
Salmonella Ibadan	0	2	0	0	1	3	0	0	0	0	0	0	0	6
Salmonella Idikan	1	0	0	0	2	0	0	0	0	0	0	0	0	3
Salmonella Indiana	1	1	0	0	0	1	0	0	0	0	0	0	0	3
Salmonella Infantis	26	34	6	11	97	51	4	5	1	1	0	0	0	236
Salmonella Inverness	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Irumu	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Salmonella Isangi	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Ituri	1	0	0	0	2	1	0	0	0	0	0	0	0	4
Salmonella Javiana	17	11	4	1	85	46	4	1	0	5	0	0	0	174
Salmonella Johannesburg	0	0	0	0	1	2	0	0	0	0	0	0	0	3
Salmonella Jukestown	0	0	0	0	1	0	1	0	0	0	0	0	0	2
Salmonella Kandla	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Salmonella Kedougou	0	2	0	0	2	0	0	1	0	0	0	0	0	5
Salmonella Kentucky	10	4	1	0	14	5	0	0	0	0	0	0	0	34
Salmonella Kenya	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Kiambu	2	2	1	0	15	2	0	0	0	1	0	0	0	23
Salmonella Kingston	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Kintambo	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Kisii	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Koketime	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Kottbus	1	1	0	0	27	3	1	0	0	0	0	0	0	33
Salmonella Kouka/Cannstatt	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Lagos	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Salmonella Larochelle	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Lattenkamp	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Laval	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Leeuwarden	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Salmonella Legon	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Lehrte	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Leiden	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Salmonella Lille	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Linton	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Litchfield	2	3	0	1	1	1	0	0	0	0	0	0	0	8
Salmonella Liverpool	3	3	0	0	6	1	0	0	0	0	0	0	0	13
Salmonella Livingstone	0	0	0	0	10	0	0	0	0	0	0	0	0	10
Salmonella Lome	2	2	0	0	9	3	0	0	0	0	0	0	0	16
Salmonella London	5	2	0	0	1	0	0	0	0	0	0	0	0	8
Salmonella Luckenwalde	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Manhattan	0	0	0	0	7	6	0	0	1	0	0	0	0	14
Salmonella Masembe	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Mbandaka	1	5	2	1	10	2	0	1	0	1	0	0	0	23
Salmonella Meleagridis	0	0	0	0	3	0	0	0	0	0	0	0	0	3

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total
Salmonella Mgulani	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Miami	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Michigan	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Minnesota	1	0	1	0	1	1	0	0	0	0	0	0	0	4
Salmonella Mississippi	1	1	0	0	17	0	0	1	0	0	0	0	0	20
Salmonella Mokola	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Salmonella Molade	1	0	0	0	0	1	0	0	0	0	0	0	0	2
Salmonella Montevideo	3	2	0	0	15	8	1	0	0	0	0	0	0	29
Salmonella Muenchen	8	10	1	4	23	9	1	0	0	2	0	0	0	58
Salmonella Muenster	1	0	0	1	9	2	0	0	0	0	0	0	0	13
Salmonella Napoli	0	1	0	0	0	1	0	0	0	0	0	0	0	2
Salmonella Nessziona	0	0	0	0	3	3	0	0	1	0	0	0	0	7
Salmonella Newport	27	32	10	15	87	34	8	3	1	1	1	0	0	219
Salmonella Nima	0	0	0	0	3	0	0	0	0	0	0	0	0	3
Salmonella Nottingham	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Oakland	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Ohio	1	1	0	0	6	0	1	0	0	0	0	0	0	9
Salmonella Okatie	0	0	0	0	4	1	0	0	0	0	0	0	0	5
Salmonella Oranienburg	11	9	3	0	30	19	1	3	0	0	0	0	0	76
Salmonella Ordonez	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Oslo	2	1	0	0	7	1	0	0	0	0	0	0	0	11
Salmonella Oudwijk	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Panama	2	5	0	0	24	17	0	0	0	0	0	0	0	48
Salmonella Paratyphi A	25	26	3	4	64	6	1	3	0	0	0	0	0	132
Salmonella Paratyphi B	3	0	0	1	5	2	0	0	0	0	0	0	0	11
Salmonella Paratyphi B var. Java	13	9	1	0	15	8	0	0	0	0	0	1	0	47
Salmonella Pomona	0	0	0	0	8	3	0	0	0	0	0	0	0	11
Salmonella Poona	2	4	3	0	12	7	1	1	0	0	0	0	0	30
Salmonella Portland	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Potsdam	0	0	0	1	0	1	0	0	0	0	0	0	0	2
Salmonella Praha	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Reading	7	4	4	2	10	2	0	0	0	1	0	0	0	30
Salmonella Richmond	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Rissen	2	1	0	0	6	1	0	0	0	0	0	0	0	10
Salmonella Rubislaw	0	0	0	0	4	0	0	0	0	0	0	0	0	4
Salmonella Saintpaul	18	24	8	4	50	23	3	1	0	1	0	0	0	132
Salmonella Salford	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Sandiego	7	7	3	1	11	3	1	1	0	0	0	0	0	34
Salmonella Sangera	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Schwarzengrund	6	6	0	1	13	1	0	0	0	0	0	0	0	27
Salmonella Senftenberg	5	7	0	0	33	1	3	1	0	1	0	0	0	51
Salmonella Singapore	0	1	0	0	0	0	0	0	0	0	0	0	0	1

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total
Salmonella Stanley	14	10	9	0	13	4	1	2	0	0	0	0	0	53
Salmonella Stanleyville	1	0	0	0	1	5	0	0	1	0	0	0	0	8
Salmonella Strathcona	0	0	0	0	3	1	0	0	0	0	0	0	0	4
Salmonella Sundsvall	6	2	1	0	3	31	2	2	0	0	0	0	0	47
Salmonella Takoradi	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Telelkebir	0	1	0	0	2	1	0	0	0	0	0	0	0	4
Salmonella Telhashomer	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Tennessee	2	0	1	0	7	3	0	0	0	0	0	0	0	13
Salmonella Thompson	4	5	1	1	43	17	0	1	0	3	0	0	0	75
Salmonella Tokoin	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Typhi	63	43	8	9	144	19	2	6	1	0	0	0	0	295
Salmonella Typhimurium	47	77	14	35	151	73	7	3	1	2	1	0	0	411
Salmonella Uganda	1	5	0	1	13	2	0	1	0	1	0	0	0	24
Salmonella Umbilo	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella Urbana	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Utah	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella Virchow	5	2	0	1	12	4	1	0	0	0	0	0	0	25
Salmonella Vitkin	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Salmonella Wandsworth	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Salmonella Waral	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Warnow	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Weltevreden	9	2	0	0	23	2	0	0	0	0	0	0	0	36
Salmonella Wien	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Salmonella Wilhelmsburg	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella Worthington	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Salmonella sp	1	0	0	18	0	13	6	4	0	16	1	0	0	59
Salmonella ssp I	0	0	0	0	0	0	0	0	3	0	0	0	0	3
Salmonella ssp I 1,3,19:l,z13:-	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella ssp I 39:a:1,5	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp I 4,[5],12:b:-	8	1	0	0	35	9	1	0	0	0	0	0	0	54
Salmonella ssp I 4,[5],12:d:-:e,h	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Salmonella ssp I 4,[5],12:i:-	33	30	8	8	139	83	7	0	0	8	0	1	0	317
Salmonella ssp I 4,[5],12:k:1,2	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp I 47:z4,z23:-	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp I 6,14:y:-	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp I 6,14:z10:z6	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp I 6,7,[14]:d:z35	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp I 6,7:r:-	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:-:-	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp I 9,12:HNM	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp I Rough-O:-:1,7	0	0	0	0	1	0	0	0	0	0	0	0	0	1

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total
Salmonella ssp I Rough-O:H undetermined	0	0	0	0	1	1	0	0	0	0	0	0	0	2
Salmonella ssp I Rough-O:d:e,n,z15	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp I Rough-O:g:-	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp I Rough-O:r:1,5	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp I Rough-O:y:1,5	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp II 16:m,t:-	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp II 21:g,t:-	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp IIIa 18:z4,z23:-	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp IIIa 41:z4,z23:-	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp IIIa Rough-O:HNM	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp IIIb 48:i:z	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Salmonella ssp IIIb 48:i:z:[z72]	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp IIIb 50:k:z	0	1	0	0	1	0	0	0	0	0	0	0	0	2
Salmonella ssp IIIb 60:r:e,n,x,z15	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp IIIb 61:c:1,5,7	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp IIIb 61:c:z35	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Salmonella ssp IIIb 61:k:1,5,[7]	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Salmonella ssp IIIb 61:l,v:1,5,7	4	1	0	0	0	0	0	0	0	0	0	0	0	5
Salmonella ssp IIIb 61:z52:z53	0	1	0	0	0	1	0	0	0	0	0	0	0	2
Salmonella ssp IIIb O undetermined:k:z3	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp IV	0	1	0	0	0	1	0	0	0	0	0	0	0	2
Salmonella ssp IV 45:g,z51:-	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella ssp IV 48:g,z51:-	1	2	0	0	0	1	0	0	0	0	0	0	0	4
Salmonella ssp IV Rough-O:z4,z32:-	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Total *Salmonella*	946	767	194	229	2,816	1,219	162	109	15	89	11	3	0	6,560

Table 12. *Shigella*

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total
Shigella	2	0	0	0	0	0	3	0	0	17	0	0	0	22
Shigella boydii 1	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Shigella boydii 14	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Shigella boydii 18	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Shigella boydii 2	1	1	0	0	1	0	0	0	0	0	0	0	0	3
Shigella boydii 20	3	0	0	0	1	0	0	0	0	0	0	0	0	4
Shigella boydii 9	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Shigella boydii	0	0	1	0	0	1	0	0	0	0	0	0	0	2
Shigella dysenteriae 12	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Shigella dysenteriae 16	2	0	0	0	1	0	0	0	0	0	0	0	0	3
Shigella dysenteriae 2	0	1	0	0	2	0	0	0	0	0	0	0	0	3
Shigella dysenteriae 3	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Shigella dysenteriae 4	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Shigella dysenteriae	0	0	0	0	0	1	0	0	0	0	0	0	0	1

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total
Shigella dysenteriae Prov. SH-111	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Shigella flexneri 1	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Shigella flexneri 1a	1	2	0	0	1	4	0	0	0	0	0	0	0	8
Shigella flexneri 1b	36	10	0	0	13	31	0	0	0	0	0	1	0	91
Shigella flexneri 2a	69	6	0	0	46	37	0	0	0	0	0	0	0	158
Shigella flexneri 2b	1	1	0	0	0	3	0	0	0	0	0	0	0	5
Shigella flexneri 3a	12	126	0	0	13	7	0	0	0	0	0	0	0	158
Shigella flexneri 3b	3	2	0	0	3	2	0	0	0	0	0	0	0	10
Shigella flexneri 4	2	0	0	0	1	2	0	0	0	0	0	0	0	5
Shigella flexneri 4a	0	1	0	0	1	0	0	0	0	0	0	0	0	2
Shigella flexneri 6	3	2	0	0	5	1	0	0	0	0	0	0	0	11
Shigella flexneri	0	0	4	26	0	15	3	3	1	1	0	0	0	53
Shigella flexneri Prov. SH-104	19	20	0	0	17	0	0	0	0	0	0	0	0	56
Shigella flexneri var. X	0	7	0	0	0	0	0	0	0	0	0	0	0	7
Shigella flexneri var. Y	2	2	0	0	1	3	0	0	0	0	0	0	0	8
Shigella sonnei	301	145	10	4	133	135	2	0	0	0	0	0	0	730
Total *Shigella*	462	326	15	30	242	244	8	3	1	18	0	1	0	1,350

Table 13. *Vibrio*

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total
Vibrio alginolyticus	1	3	0	0	4	0	2	0	0	0	0	0	0	10
Vibrio cholerae	1	0	0	0	0	0	0	1	0	0	0	0	0	2
Vibrio cholerae O1	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Vibrio cholerae non-O1/O139	4	3	3	0	1	2	2	1	0	0	0	1	0	17
Vibrio harveyi	0	0	0	0	3	0	1	0	0	0	0	0	0	4
Vibrio mimicus	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Vibrio parahaemolyticus	8	0	0	0	4	0	3	0	2	0	0	0	0	17
Vibrio sp	1	0	0	0	0	0	1	0	0	0	0	0	0	2
Total *Vibrio*	17	6	3	0	13	2	9	2	2	0	0	1	0	55

Table 14. Viruses

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total
Adenovirus	0	217	0	17	95	0	1	1	0	68	0	1	1	401
Astrovirus	3	55	0	23	0	0	0	0	0	52	0	0	0	133
Enterovirus	0	0	0	16	0	0	0	0	0	0	0	0	0	16
Hepatitis A	49	50	15	23	122	59	3	9	3	2	0	0	0	335
Norovirus	144	665	191	130	684	0	141	44	32	195	3	4	1	2,234
Rotavirus	1	88	65	65	78	0	16	0	2	8	0	0	1	324
Sapovirus	6	127	0	21	0	0	0	0	0	91	0	0	0	245
Total Virus	203	1,202	271	295	979	59	161	54	37	416	3	5	3	3,688

Table 15. *Yersinia*

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Total
Yersinia aleksiciae	0	0	0	0	0	0	0	0	0	0	2	0	0	2
Yersinia enterocolitica	41	36	5	44	137	11	3	1	0	3	6	0	0	287
Yersinia frederiksenii	1	1	0	0	0	0	0	0	0	0	1	0	0	3
Yersinia intermedia	0	8	0	0	0	0	0	0	0	1	0	0	0	9
Yersinia kristensenii	1	2	0	0	0	0	0	0	0	0	0	0	0	3
Yersinia massiliensis	1	0	0	0	0	0	0	0	0	0	1	0	0	2
Yersinia pseudotuberculosis	4	0	0	0	0	0	0	0	0	0	0	0	0	4
Yersinia sp	3	0	0	0	0	0	1	0	0	0	3	0	0	7
Total *Yersinia*	51	47	5	44	137	11	4	1	0	4	13	0	0	317

Appendix C. NESP support for outbreak investigations

NESP data supported 11 out of 13 national Outbreak Investigation Coordinating Committees (OICCs) that were activated in 2024. More information about the OICCs that NESP supported can be seen below in Table 16.

Table 16. Multi-jurisdictional outbreak investigations in 2024

Multi-jurisdictional Outbreak Investigations	Outbreak Source	Number of cases-final (Canada only)	Date of first case onset	Date of last case onset	Provinces and Territories with Cases
Outbreak of *Salmonella* Enteritidis [January 2024 – February 2024]	Unconfirmed	19	2023-09-30	2023-12-23	BC=3, AB=3, ON=10, QC=1, NL=1, NB=1
Outbreak of *Salmonella* Braenderup [January 2024 – March 2024]	Unconfirmed	17	2023-11-30	2024-02-07 (specimen collection date)	ON=11, QC=3, NL=2, NB=1
Outbreak of *Salmonella* Lome [March 2024 – May 2024]	Geckos	36	2020-03-25 (specimen collection date)	2024-03-17	BC=2, AB=2, SK=2, MB=2, ON=19, QC=8, NB=1
Outbreak of *E. coli* O157:H7 [April 2024 – April 2024]	Unconfirmed	10	2024-02-10	2024-02-26	BC=2, AB=8
Outbreak of *Salmonella* Sandiego [May 2024 – July 2024]	Unconfirmed	7	2024-04-17	2024-04-28	AB=5, SK=2
Outbreak of *E. coli* O157 [June 2024 – November 2024]	Unconfirmed	34	2019-09-24	2024-08-16	BC=8, AB=2, ON=21, QC=3
Outbreak of *Listeria monocytogenes* [July 2024 – October 2024]	Plant-based refrigerated beverages	20	2023-08-11	2024-07-15	AB=1, ON=13, QC=5, NS=1
Outbreak of *Listeria monocytogenes* [August 2024 – January 2025]	Unconfirmed	11	2023-07-23 (isolation date)	2024-10-03	ON=3, QC=2, NS=2, NB=3, PE=1
Outbreak of *Salmonella* Muenchen [September 2024 – October 2024]	Geckos	25	2020-08-12	2024-09-07	BC=1, AB=2, MB=1, ON=13, QC=2, NL=3, NS=3,
Outbreak of *E. coli* O121 [November 2024 – November 2024]	Unconfirmed	5	2024-10-02	2024-10-05	BC=3, AB=2
Outbreak of *Salmonella* Enteritidis [December 2024 – March 2025]	Imported pastries	79	2024-09-27	2024-02-14	BC=4, AB=5, ON=26, QC=43, NB=1

Appendix D. Impacts of COVID-19: Comparison of NESP weekly isolate counts from 2024, to the 2015 to 2019 (pre-pandemic) and 2020 to 2023 (pandemic-affected) historical averages[o] for select pathogens

In March of 2020, the COVID-19 pandemic was declared[p] and global public health action was taken to address it. Across Canada and within specific provinces/territories and regions, various public health measures were put in place. These included international[q] and domestic travel restrictions, closing of non-essential businesses and activities (including restaurants, gyms, salons, places of worship, etc.), closing of in-person schools and initiating virtual learning, and mandating of face coverings in public and indoor spaces. Additionally, increased public health messaging related to hand washing and cough and sneeze etiquette, reminders about staying home if you were feeling unwell and to get tested for COVID-19 were implemented. These public health measures and the adaptations Canadians made to combat COVID-19 not only helped to reduce the transmission of COVID-19 but have also impacted other reported infectious diseases to varying degrees in various ways. These measures were first implemented in 2020, and many remained in place or were re-instated in 2021 and 2022. The data and findings in the 2020 to 2023 NESP Annual Summaries were interpreted with caution, as the public health measures invoked to help limit the spread of COVID-19 likely impacted disease incidence as well as data collection and reporting to NESP. In 2024, international travel recovered to nearly pre-pandemic levels[r] and the residual impacts of public health measures in prior years are likely to have resolved. In the current 2024 NESP Annual Summary, overall and for most pathogens it appears counts have either returned to or surpassed the rates that were seen pre-pandemic. It will be important to continue to watch these enteric disease trends carefully as we move forward into a post-pandemic world. Figures 10-16 compare the 2024 NESP data with the pre-pandemic period five-year (2015-2019) average as well as the pandemic-affected four-year (2020-2023) average for select pathogens.

The impact that the public health measures for COVID-19 had on the pathogens reported through NESP was variable. For all *Salmonella* serotypes reported to NESP in 2024, the 2024 NESP counts remain slightly lower than the 2015 to 2019 historical average throughout most of the year (Figure 10). Generally, counts appear higher in 2024 than in the years impacted by the pandemic (2020 to 2023 average).

Focusing on certain *Salmonella* serotypes and groupings, the magnitude of the difference between the 2024 NESP data and the pre-pandemic historical average is greater for *Salmonella* Enteritidis (Figure 12) compared to all other

[o] The historical averages are based on cases reported to NESP during the current week, the two weeks before, and the two weeks after, for each year from 2015 to 2019 and 2020 to 2023, respectfully.
[p] https://www.who.int/news-room/speeches/item/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020 (accessed October 17, 2025).
[q] https://pm.gc.ca/en/news/news-releases/2020/03/16/prime-minister-announces-new-actions-under-canadas-covid-19-response (accessed October 17, 2025).
[r] Statistics Canada. Travel between Canada and other countries, December 2024. February 21, 2025. https://www150.statcan.gc.ca/n1/daily-quotidien/250221/dq250221b-eng.htm

Salmonella serotypes excluding *S.* Enteritidis (Figure 11). In 2024, *Salmonella* Enteritidis case counts increased in comparison to 2020 to 2023, but still remain lower than the 2015 to 2019 historical average. The decrease in *S.* Enteritidis counts is likely related to the continued positive impact related to the Canadian Food Inspection Agency's policy implemented in April 2019 to address *Salmonella* in raw frozen breaded chicken products[s].

Regarding O157 STEC (Figure 13) case counts appear slightly lower than the pre-pandemic period. The notable increase in the 2020-2023 average during weeks 35 - 40 is in relation to a large outbreak in 2023[t]. The 2024 case counts of non-O157 STEC (Figure 14) are higher than the pre-pandemic (2015 to 2019) and pandemic-affected (2020 to 2023) averages. The divergence of trends in O157 STEC and non-O157 STEC over this period may be related to laboratory testing methods leading to increased detection of non-O157 STEC in recent years (Figure 4).

Trends in data for *Listeria monocytogenes* reported to NESP in 2024 (Figure 15) show a slight increase overall and in general are comparable to trends observed in 2020-2023 and to the pre-pandemic historical average for 2015-2019. This suggests that the impact of the public health measures put in place to combat COVID-19 may have had less of an effect on *L. monocytogenes.* Possible explanations for this are that *L. monocytogenes* is generally less associated with travel-acquired infection (i.e. less travel in the pandemic period) and considering the severe illness this organism often causes – reporting of cases may have been less affected than other organisms that often cause less-severe illness[u].

For *Shigella*, the number of cases reported in 2024 exceeds both the pandemic-affected period (2020-2023) and the pre-pandemic period (2015-2019) (Figure 16). This is likely due to *Shigella* outbreaks occurring in a number of provinces and territories in 2024, particularly environmental transmission in unhoused populations and sexual transmission among communities of gay, bisexual and other men who have sex with men[v]. Shigellosis is frequently travel-related and is often transmitted through person-to-person contact, and thus the impact of COVID-19 public health measures in place likely played a role in the lower levels of *Shigella* observed in 2020 and 2021.

In general, compared to pre-pandemic counts, larger decreases were seen in 2022, 2021 and 2020 for pathogens that typically are more often associated with travel, are typically milder symptom-wise or less invasive, or are more frequently transmitted via person-to-person contact. Therefore, these pathogens may have also seen larger increases in 2023 back to or surpassing pre-pandemic counts as pandemic restrictions were eased and lifted in 2023. This trend has continued into 2024 where most pathogens appear to have returned to or surpassed pre-

[s] Salmonella control options in frozen raw breaded chicken products. Canadian Food Inspection Agency: https://inspection.canada.ca/preventive-controls/meat/salmonella-in-frozen-raw-breaded-chicken/eng/1531254524193/1531254524999 (accessed October 17, 2025).
[t] Alberta Health Services. Shiga Toxin-Producing Escherichia coli (STEC) Outbreak in Calgary Zone Childcare Facilities Linked to a Central Kitchen: Outbreak Investigation Report. June 28, 2024. https://www.albertahealthservices.ca/assets/info/ppih/if-ppih-ecoli-stec-outbreak-investigation-report.pdf
[u] Dougherty et al., 2023. Impact of the COVID-19 Pandemic on the Reported Incidence of Select Bacterial Enteric Diseases in Canada, 2020. DOI:10.1089/fpd.2022.0064.
[v] Public Health Agency of Canada. Canadian Antimicrobial Resistance Surveillance System: 2025 key findings. December 3, 2025. https://www.canada.ca/en/public-health/services/publications/drugs-health-products/canadian-antimicrobial-resistance-surveillance-system-2025-key-findings.html

pandemic levels. As we look to the future in a post-pandemic reality we will continue to monitor surveillance trends and explore the impacts of public health actions and interventions.

Figure 10. All *Salmonella* reported to NESP in 2024, compared to the 2015 to 2019 and 2020 to 2023 historical averages

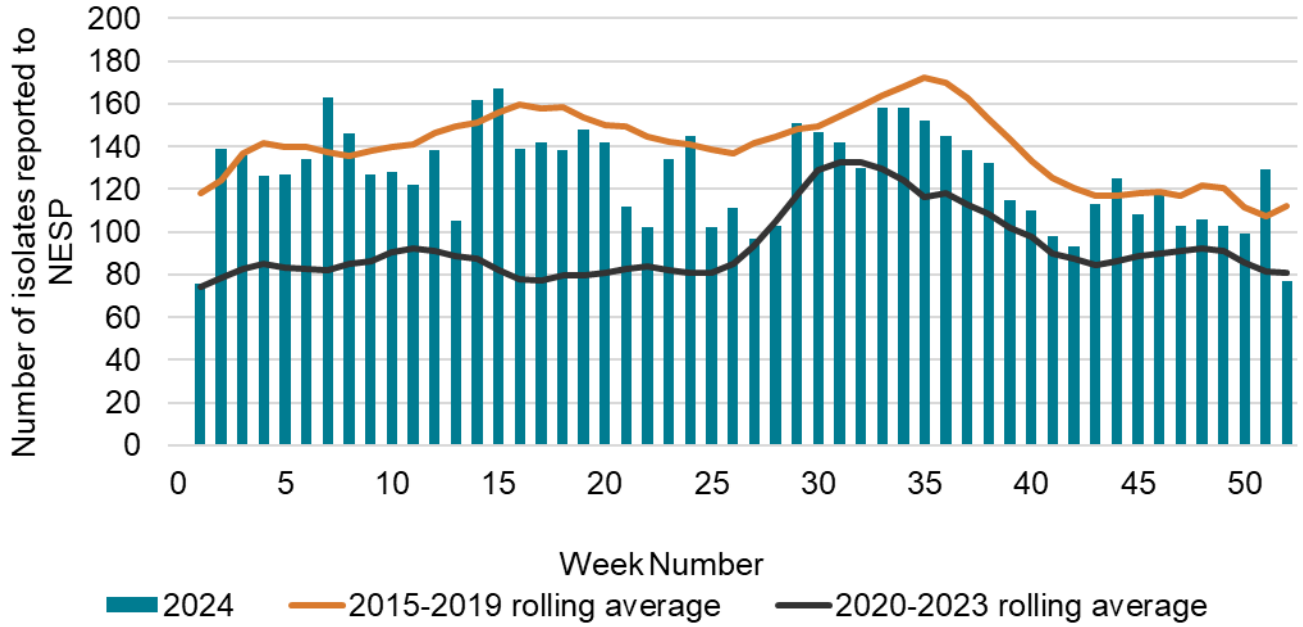


Figure 11. All *Salmonella* reported to NESP excluding *Salmonella* Enteritidis reported to NESP in 2024 compared to the 2015 to 2019 and 2020 to 2023 historical averages

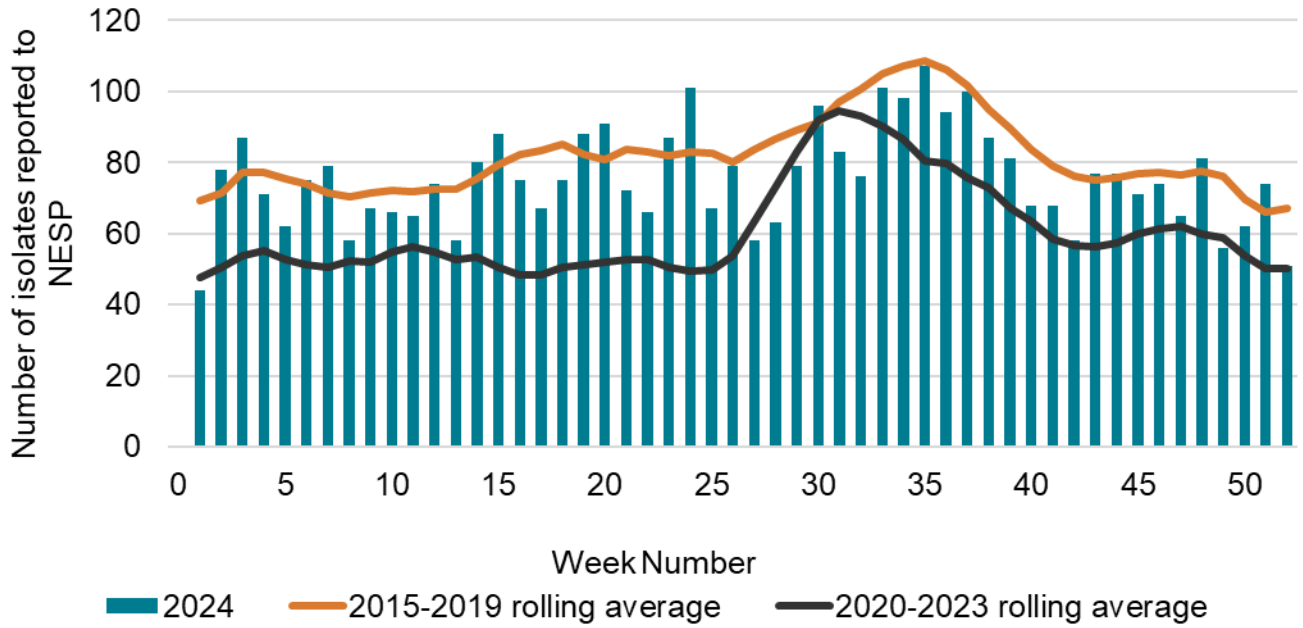


Figure 12. *Salmonella* Enteritidis reported to NESP in 2024 compared to the 2015 to 2019 and 2020 to 2023 historical averages

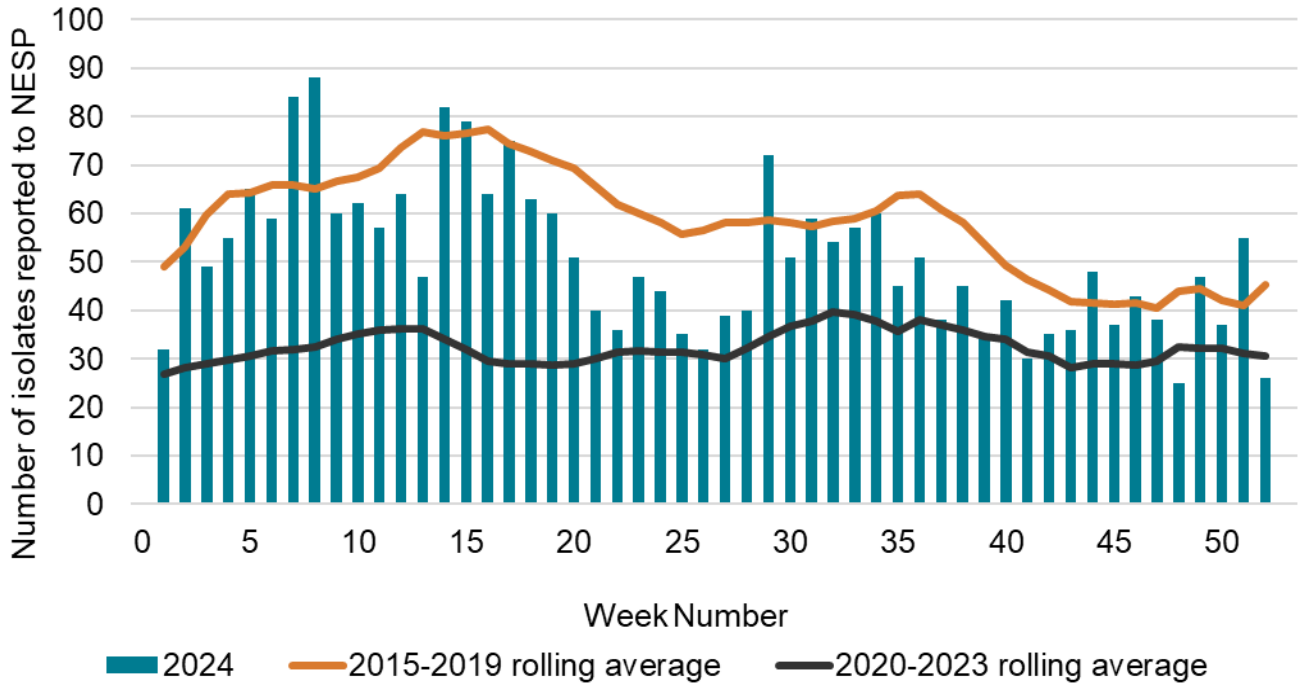


Figure 13. O157 STEC reported to NESP in 2024 compared to the 2015 to 2019 and 2020 to 2023 historical averages

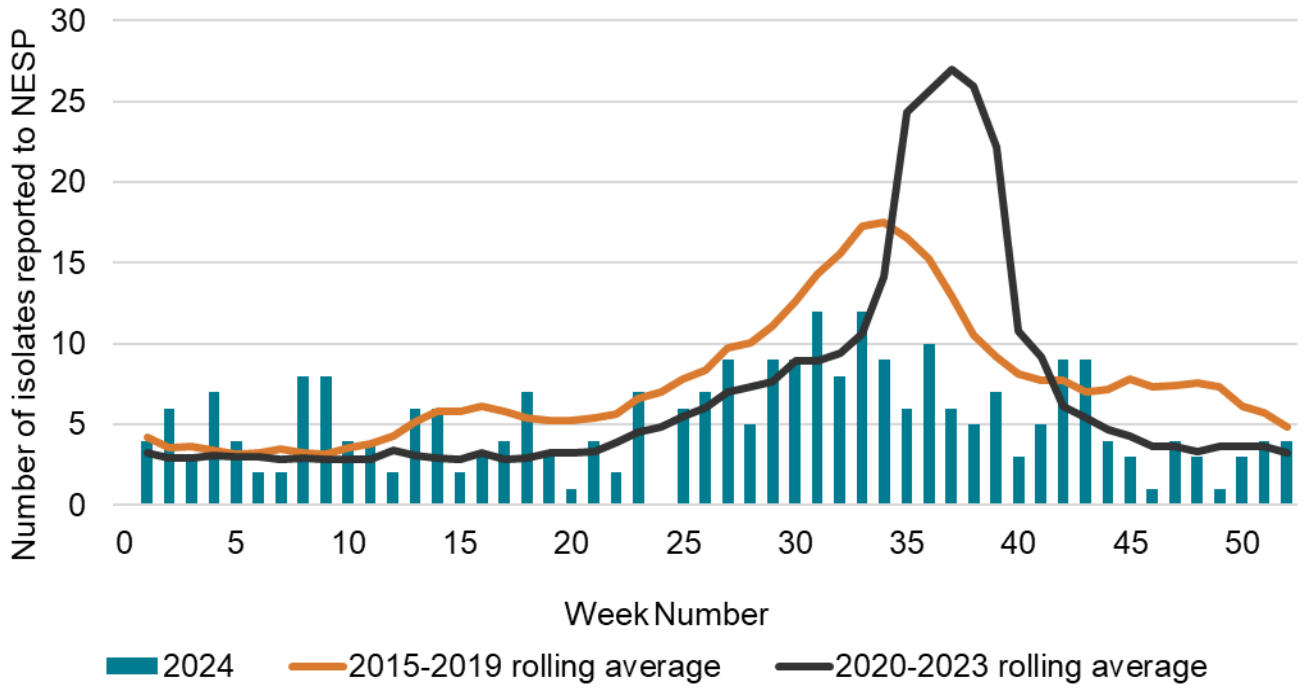


Figure 14. Non-O157 STEC reported to NESP in 2024 compared to the 2015 to 2019 and 2020 to 2023 historical averages

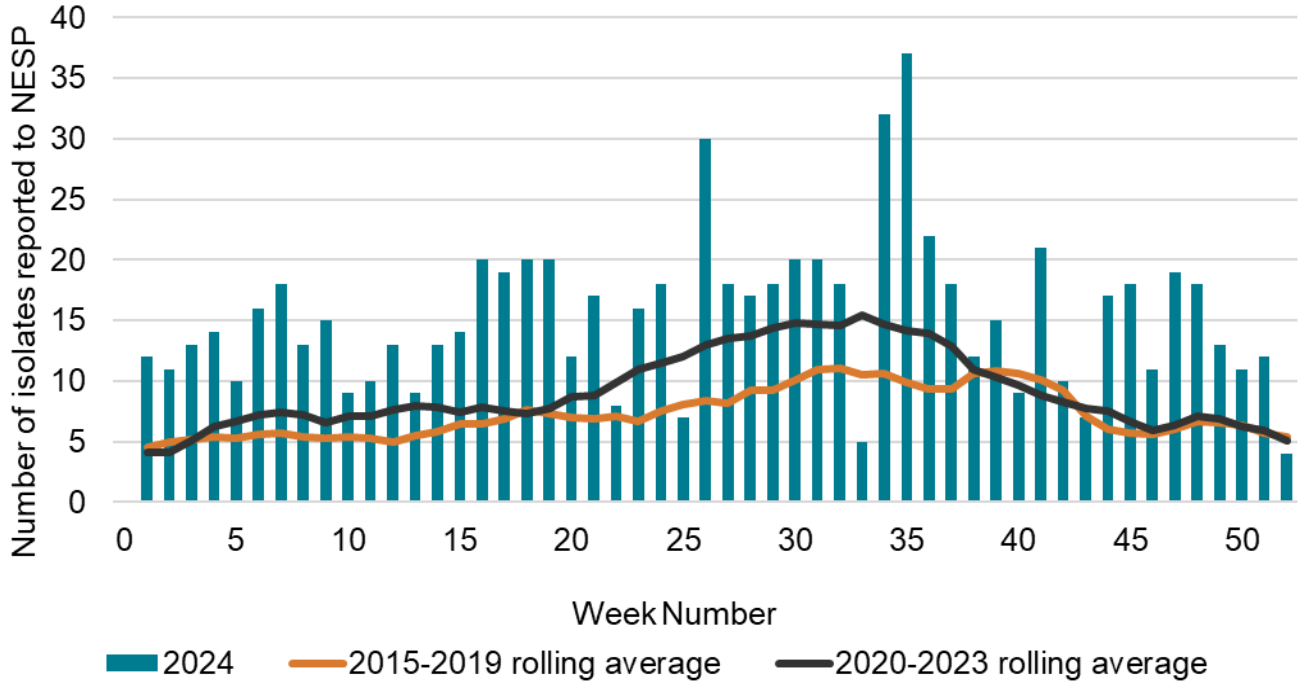


Figure 15. *Listeria monocytogenes* reported to NESP in 2024 compared to the 2015 to 2019 and 2020 to 2023 historical averages

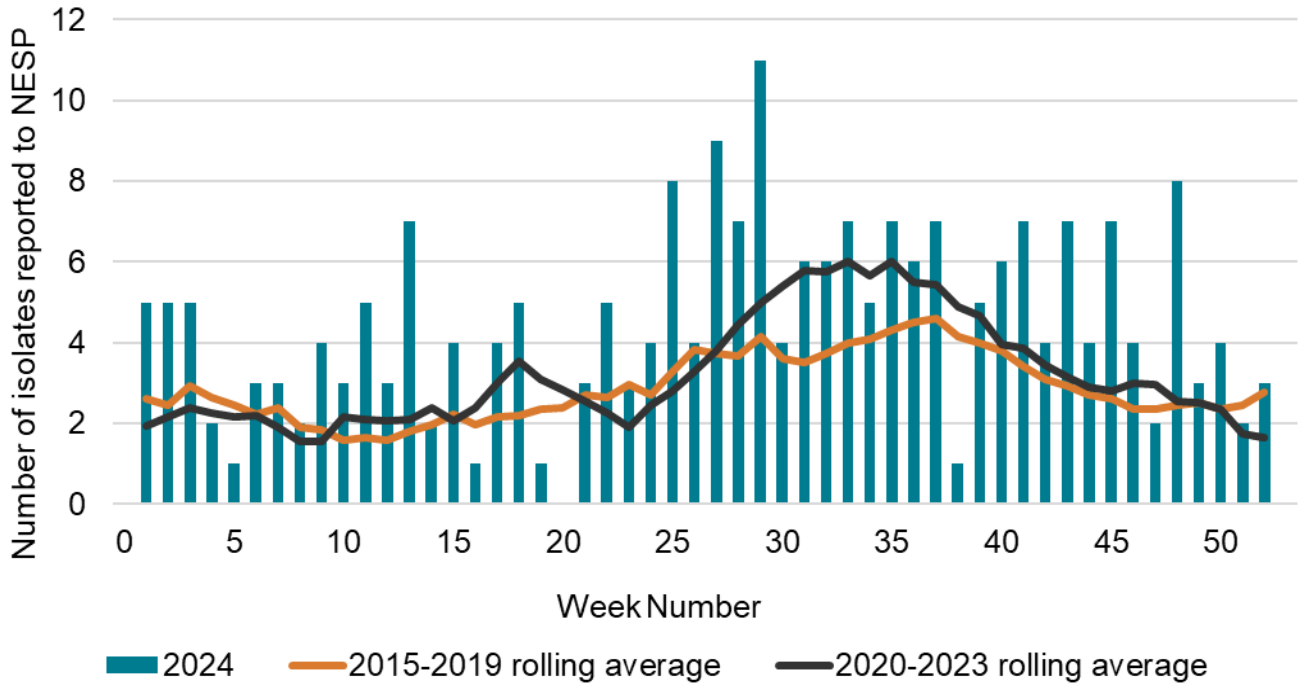


Figure 16. *Shigella* reported to NESP in 2024 compared to the 2015 to 2019 and 2020 to 2023 historical averages