

# **National Enteric Surveillance Program (NESP)**

## **ANNUAL SUMMARY 2009**

**Including Serotype and Phage Types Tables for  
2007-2009, NESP and NML**

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

**And**

**Provincial Public Health Microbiology Laboratories**



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## Executive Summary

The National Enteric Surveillance Program (NESP) is designed to provide weekly analysis and reporting for laboratory-confirmed isolations of enteric pathogens in Canada, including bacterial, viral and parasitic pathogens. This is an annual summary of data submitted to NESP by provincial/territorial microbiology laboratories in 2009. In addition, provincial serotype and phage type data from 2007 and 2008 are included in the appendices.

*Salmonella* was the most frequently reported bacterial pathogen to NESP in 2009, with *S. Enteritidis* being the most frequently reported serovar of *Salmonella*. The incidence of serovar *S. Heidelberg* also remains high, and the number reported in 2009 exceeds those reported in 2008 and 2007. No specific outbreaks had been reported to entirely account for this increase. Reported cases of verotoxigenic *E. coli* infection in 2009 were the lowest number ever recorded through the NESP. *Shigella flexneri* identifications have increased over the last few years, and in 2009 *Shigella flexneri* surpassed the number of *Shigella sonnei* infections for the first time in NESP history.

This report summarizes the extra-intestinal isolation sites, and travel-acquired infections reported to NESP. In addition to the continued prevalence of *S. Enteritidis*, NESP detected increases above expected for *S. Carrau* and *S. Cubana* that each resulted in multi-provincial outbreak investigations in connection with PulseNet Canada. Concerning site of isolation, faecal isolates predominated as expected; however blood and urine isolates represented a significant proportion for select *Salmonella*, *Campylobacter*, *E. coli* and *Shigella* species or serotypes. Although travel history is largely under-reported, 38 different countries were identified among enteric cases reportedly acquired outside of Canada in 2009. Asia was the most common geographic region identified with cases among people who had recently immigrated from, or travelled to this area. *Salmonella* infections accounted for the largest proportion of reported travel-acquired illnesses, with *S. Enteritidis* comprises a third of those travel cases.

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## Introduction

The National Enteric Surveillance Program (NESP) is designed to provide timely analysis and reporting for laboratory-confirmed isolations of enteric pathogens in Canada, including bacterial, viral and parasitic pathogens. In collaboration with related programs like PulseNet Canada, NESP supports the real-time detection and response to emerging and priority diseases, and is integrated with international efforts to monitor and limit the spread of pathogenic micro-organisms.

NESP is based on the collection of weekly aggregate laboratory data from across Canada, as submitted by the Provincial public health microbiology laboratories to the Public Health Agency of Canada (PHAC). Data are submitted to the National Microbiology Laboratory (NML) either directly or using the web-based Canadian Network for Public Health Intelligence (CNPHI) and laboratory characterizations that are submitted often include genus, species and serotype information. Compilation and analysis of these weekly data is then conducted jointly between the NML and the Centre for Food-borne, Environmental and Zoonotic Infectious Diseases (CFEZID). These weekly reports help provide PHAC and the NESP provincial/territorial partners with the first triggers that a significant food-borne disease trend is emerging. PulseNet Canada<sup>1</sup> then utilizes these data in conjunction with laboratory DNA fingerprinting testing to detect outbreaks at the earliest possible stage, and to serve as a primary data sharing and communications link between all provincial public health microbiology laboratories, the Canadian Food Inspection Agency, Health Canada, and PHAC. Notably, these two complementary laboratory surveillance networks lead to information sharing and coordinated assessment of the laboratory evidence during multi-jurisdictional epidemiologic investigations, as prescribed in the *Food-borne Illness Outbreak Response Protocol (FIORP)*<sup>2</sup>. To also support communication of laboratory surveillance findings, the on-line WebNESP application of CNPHI allows partners to perform real-time data analysis, trending and display of their data.

This annual report is a summary of the weekly data from provincial public health microbiology laboratories only, and is being produced in order to provide longer term national trends on the incidence of enteric pathogens. It is therefore only **a subset of laboratory isolations within each province and may not reflect the incidence of disease either provincially or nationally**. However, within each disease group, the data may indicate event-related changes in reporting trends. The Canadian Notifiable Diseases Surveillance System (CNDSS) receives data that are collected on a mandatory basis by local health units, forwarded to provincial/territorial health authorities and collated by the Surveillance and Risk Assessment Division, Centre for Communicable Diseases and Infection Control, PHAC. This data may be more reliable for total number of illnesses. These surveillance systems are complimentary in providing both epidemiological and laboratory results, however discrepancies between them do exist.

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<sup>1</sup>PulseNet Canada, National Microbiology Laboratory, Public Health Agency of Canada: <http://www.nml-lnm.gc.ca/Pulsenet/index-eng.htm>

<sup>2</sup>Food-borne Illness Outbreak Response Protocol (FIORP) 2010: To guide a multi-jurisdictional response. Public Health Agency of Canada: <http://www.phac-aspc.gc.ca/zoono/fiorp-prtioa/index-eng.php>

This year, the report also includes serotype and phage type appendices that span data from 2007-2009 to cover the data that has not been released since 2006. The appendices include data submitted to the NESP and data from the NML. Data supplied by the NML are primarily from the provincial public health and reference laboratories as well as from work performed at the NML. Local and regional laboratories forward some enteric pathogen isolates to provincial laboratories for confirmation and identification and some isolates from the provincial laboratories are sent to NML for reference services, such as confirmation and further strain characterizations.

#### **Data Collection and Analysis:**

Provincial Public Health Laboratories receive isolates (or specimens) and submission forms. Laboratory personnel at each provincial laboratory perform appropriate tests to confirm the identification or subtyping of the agent. Weekly results are summarized onto an NESP Report form. The 'report week' for NESP is Sunday to Saturday and is based on the date the laboratory test was completed. All data sent to NESP are aggregate and anonymous. NESP partners endeavour to include only the number of isolates from new cases identified at the laboratory that week or updates to previously reported numbers. The provincial laboratory will attempt to identify multiple, repeat or follow-up on specimens from the same individual and will consider all identical isolates from the same patient that are collected over a 3-month period a single case. The completed NESP report form is faxed or e-mailed to the NML 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 submitted. 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. Anatum*). This updated information is included on the next weekly NESP Report form.

With respect to data analysis, the NESP uses an algorithm to determine whether case counts are significantly 'higher than expected' based on a 5-year moving average. A Poisson regression and p-value are used to determine statistical significance.

The NESP News is sent to all provincial laboratories, at least one provincial epidemiologist or Medical Officer of Health in each province, and multiple stakeholders at the federal level. The reports may be shared with other public health professionals within their respective provinces or organizations, but are not for public distribution. There is no required response by public health professionals to the events or statistical elevations noted in the reports.

#### **Limitations:**

It should be noted that there are some inherent limitations of the data. Not all specimens/isolates are referred from the regional and local laboratories to the provincial public health laboratories and therefore the provincial reports and NESP data may be an under-representation of the true incidence of disease in Canada. 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. However, *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. Information regarding extra-intestinal isolation sites, foreign travel, and outbreaks and clusters are not routinely or consistently reported to the NESP from all laboratories and therefore any interpretation should be taken with caution. Outbreaks and clusters reported to the NESP do not represent all enteric illness outbreaks identified nationally nor is the case count representative of the actual final number of cases that may have been associated with the outbreaks and clusters reported to the NESP. Therefore, details regarding outbreaks and case clusters are not included in this report and these are more accurately tracked within the PulseNet Canada system.

## Isolates Reported by Major Organism Group

In 2009, the National Enteric Surveillance Program (NESP) completed its twelfth full year of data collection. A total of 14,262 cases of enteric-associated infections were recorded. The number of cases reported to the NESP in 2009 as well as the incidence per 100,000 population for each of the major organism groups are included in Tables 1 and 2. Relative incidence rates for *Salmonella*, *E. coli* and *Shigella* since 2001 are compared to the baseline years 1998-2000 in Fig. 1.

*Salmonella* was the organism most frequently reported to NESP with 6,084 isolates reported in 2009 (42.7%). Notably, *Salmonella* serovar Enteritidis still accounts for the highest number of total *Salmonella* isolations across Canada, whereas *S. Typhimurium* counts were the lowest ever recorded via the NESP (Tables 3 and 4). *S. Heidelberg* was the serovar with the greatest increase in 2009 (Table 5). Reported cases of verotoxigenic *E. coli* infection dropped to 606 (1.82 per 100,000 population) in 2009, the lowest number ever recorded through the NESP. *Shigella* infections overall decreased in 2009, while *Shigella flexneri* identifications increased and outnumbered *Shigella sonnei* infections for the first time since the NESP was established, with 294 and 281 isolations in 2009 respectively. Although *Campylobacter* is the most commonly reported enteric organism in Canada, isolates are not routinely forwarded to provincial or central reference laboratories and are therefore greatly under-represented in the NESP. Data from the National Notifiable Disease program is more reflective of the status of this pathogen in Canada than NESP.

Parasitic and viral infections are not routinely reported to the provincial or central reference laboratories and are also greatly under-represented in the NESP. Fewer parasites were reported to NESP this year compared to 2008. Approximately 100 fewer *Cryptosporidium* isolates were reported compared to last year (159 reported in 2009 and 270 in 2008). The number of norovirus infections reported were similar to that of 2008 and norovirus-related outbreaks accounted for more than 90% of all outbreaks and clusters reported to the NESP in 2009 (Table 6).

The full list of genus, species and serotype classifications reported to NESP and phage typing data from isolates submitted to the NML in 2009 are presented in Appendix 1 and 2. **These data for the years 2008 and 2007 can be found in Appendices 3-6.**

**Table 1.** Number of cases of Major Organism Groups by Province/Territory

Organism	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	NT	NU	YK	Total	%
<b>Salmonella</b>	1015	756	204	276	2464	1096	110	101	16	31	7	7	1	<b>6084</b>	42.7
<b>Campylobacter*</b>	499	321	151	144	244	95	175	55	33	33	-	-	1	<b>1751</b>	12.3
<b>Shigella</b>	175	76	7	26	248	76	9	12	-	2	-	-	-	<b>631</b>	4.4
<b>E. coli †</b>	165	99	16	45	154	107	13	3	9	-	1	-	1	<b>613</b>	4.3
<b>Vibrio</b>	22	7	0	1	6	1	8	1	1	-	-	-	-	<b>47</b>	0.3
<b>Yersinia</b>	36	55	20	6	241	17	4	2	-	-	-	1	-	<b>382</b>	2.7
<b>Parasites</b>	224	52	143	131	447	332	112	73	23	30	-	1	3	<b>1570</b>	11.0
<b>Viruses‡</b>	579	327	808	199	-	472	237	358	66	135	-	-	3	<b>3184</b>	22.3
<b>Total</b>	<b>2715</b>	<b>1693</b>	<b>1349</b>	<b>828</b>	<b>3804</b>	<b>2196</b>	<b>668</b>	<b>605</b>	<b>148</b>	<b>231</b>	<b>8</b>	<b>8</b>	<b>9</b>	<b>14262</b>	

\*Although *Campylobacter* is the most commonly reported enteric organism in Canada, isolates are not routinely forwarded to provincial or central reference laboratories and are therefore greatly under-represented in the NESP.

†*E. coli* group includes verotoxigenic (606 cases) and non-verotoxigenic (7 cases from MB) organisms.

‡Parasitic (*Giardia*, *Cryptosporidium*, *Entamoeba Histolytica/Dispar* and *Cyclospora*) and viral infections (Norovirus, Rotavirus and Adenovirus) are not routinely reported to the provincial or central reference laboratories and are greatly under-represented in the NESP.

**Table 2.** Rates (per 100,000) for Major Organism Groups - NESP 2009\*

Organism	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	NT	NU	YK	National
<b>Salmonella</b>	22.78	20.34	19.80	22.59	18.85	14.00	14.68	10.77	11.35	6.09	16.11	21.75	2.97	<b>18.03</b>
<b>Campylobacter†</b>	11.20	8.70	14.66	11.78	1.87	1.21	23.35	5.86	23.41	6.48	-	-	2.97	<b>5.19</b>
<b>Shigella</b>	3.93	2.68	0.68	2.13	1.90	0.97	1.20	1.28	-	0.39	-	-	-	<b>1.87</b>
<b>E. coli‡</b>	3.70	4.47	1.55	3.68	1.18	1.37	1.73	0.32	6.38	0.00	-	-	2.97	<b>1.82</b>
<b>Vibrio</b>	0.49	0.16	0.00	0.08	0.05	0.01	1.07	0.11	0.71	-	-	-	-	<b>0.14</b>
<b>Yersinia</b>	0.81	1.46	1.94	0.49	1.84	0.22	0.53	0.21	-	-	2.30	-	-	<b>1.13</b>
<b>Parasites</b>	5.03	1.41	13.88	10.47	4.87	4.24	14.94	7.78	16.31	5.89	-	3.11	8.91	<b>4.65</b>
<b>Viruses</b>	13.00	8.87	78.44	16.29	-	6.03	31.62	38.16	46.81	26.53	-	-	8.91	<b>9.44</b>

\*Rates calculated using updated postcensal population estimates for Canada, the provinces and the territories as of July 1, 2009 from Statistics Canada.

†Although *Campylobacter* is the most commonly reported enteric organism in Canada, isolates are not routinely forwarded to provincial or central reference laboratories and are therefore greatly under-represented in the NESP.

‡Only verotoxigenic *E. coli* cases (n= 606) included in this table.

**Table 3. Annual National Totals and Rates (per 100,000) for Major Organism Groups as Reported to the NESP from 2004 to 2009\***

Organism	2004		2005		2006		2007		2008		2009	
	No.	Rate										
<i>Salmonella</i>	5378	16.83	6096	18.89	5724	17.54	6419	19.47	6351	19.07	6084	18.03
<i>Campylobacter</i> †	1306	4.09	1411	4.37	1958	6.00	1959	5.94	1614	4.85	1751	5.19
<i>Shigella</i>	649	2.03	837	2.59	526	1.64	636	1.93	680	2.04	631	1.87
<i>E. coli</i> ‡	1130	3.54	796	2.47	1086	3.41	1006	3.05	695	2.09	606	1.80
<i>Vibrio</i>	27	0.08	30	0.09	43	0.13	37	0.11	39	0.12	47	0.14
<i>Yersinia</i>	495	1.55	553	1.71	578	1.77	488	1.48	414	1.24	382	1.13
Parasites§	1787	5.59	1743	5.40	1705	5.23	1678	5.09	1783	5.35	1570	4.65
Viruses	2622	8.21	2277	7.06	4057	12.43	4657	14.12	3248	9.75	3184	9.44
Totals	13394		13743		15677		16880		14824		14255	

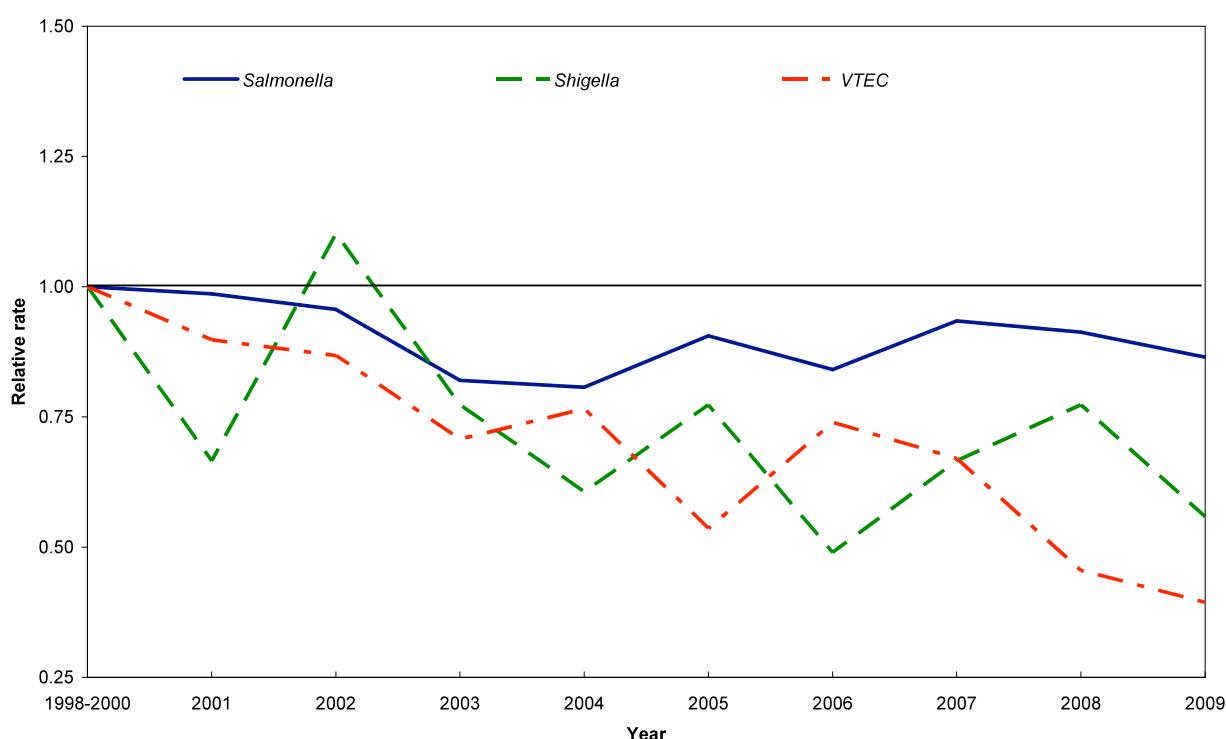
\*Rates calculated using the population estimates for Canada as of July 1 for years 2004 to 2009 as reported by Statistics Canada.

†Although *Campylobacter* is the most commonly reported enteric organism in Canada, isolates are not routinely forwarded to provincial or central reference laboratories and are therefore greatly under-represented in the NESP.

‡Only verotoxigenic *E. coli* cases are included in this table.

§Parasitic (*Giardia*, *Cryptosporidium*, *Entamoeba Histolytica/Dispar* and *Cyclospora*) and viral infections (Norovirus, Rotavirus and Adenovirus) are not routinely reported to the provincial or central reference laboratories and are greatly under-represented in the NESP.

**Figure 1. Relative rates of lab-confirmed cases of *Salmonella*, *Shigella* and VTEC, by year, (compared to the 1998-2000 baseline period) - NESP**



## The Top Ten *Salmonella* Serovars

The top 10 *Salmonella* serovars accounted for 72.4% of the 6,084 *Salmonella* infections reported to NESP in 2009. The numbers of cases identified in each province of the top 10 *Salmonella* are recorded in Table 3 while a full list of *Salmonella* serotype classifications reported to NESP in 2009 are presented in Appendix 1. The ranking among the top three serovars remained unchanged from the previous four years, with *S. Enteritidis* being the most frequently reported, followed by *S. Typhimurium* and then *S. Heidelberg* (Table 4 and Appendix 5). There were 1955 *S. Enteritidis* isolations reported in 2009, down from the record high total of 2,239 cases reported in 2008. Fewer *S. Typhimurium* infections were reported in 2009, the 777 isolates being the lowest ever recorded via the NESP. There were 665 cases of *S. Heidelberg* recorded in 2009, up from its lowest ever total of only 456 identifications reported in 2008 (Table 5).

**Table 4. Top Ten *Salmonella* Serovars Reported in 2009 (Total *Salmonella* = 6084)**

Serovar	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	NT	NU	YK	Total	% of all <i>Salmonella</i>
<b>Enteritidis</b>	456	209	71	90	707	329	39	36	5	10	-	2	1	<b>1955</b>	<b>32.1</b>
<b>Typhimurium</b>	96	86	26	23	373	134	10	13	5	6	3	2	-	<b>777</b>	<b>12.8</b>
<b>Heidelberg</b>	39	85	15	45	223	206	25	17	3	7	-	-	-	<b>665</b>	<b>10.9</b>
<b>ssp I 4,[5],12:i:-</b>	41	62	29	28	72	33	4	-	-	-	1	1	-	<b>271</b>	<b>4.5</b>
<b>Typhi</b>	41	13	1	6	88	14	-	-	-	-	-	-	-	<b>164</b>	<b>2.7</b>
<b>Newport</b>	17	10	6	11	61	22	2	2	-	1	1	-	-	<b>133</b>	<b>2.2</b>
<b>Saintpaul</b>	20	23	-	3	60	19	1	2	-			2	-	<b>130</b>	<b>2.1</b>
<b>Infantis</b>	9	19	8	2	53	18	-	1	-	-	-	-	-	<b>110</b>	<b>1.8</b>
<b>Javiana</b>	8	11	-	1	<b>28</b>	<b>50</b>	<b>3</b>	<b>1</b>	-	-	-	-	-	<b>103</b>	<b>1.7</b>
<b>Hadar</b>	12	7	3	1	64	8	2	3	-	-	-	-	-	<b>100</b>	<b>1.6</b>
<b>Top Ten Total</b>	<b>739</b>	<b>525</b>	<b>159</b>	<b>211</b>	<b>1729</b>	<b>833</b>	<b>86</b>	<b>75</b>	<b>13</b>	<b>24</b>	<b>5</b>	<b>7</b>	<b>1</b>	<b>4407</b>	<b>72.4*</b>

\*201 other serovars with cumulative total = 1615 (26.6%); *Salmonella* unspecified total = 62 (1.0%)

There were three notable changes observed among the remaining top ten *Salmonella* serovar categories (Table 5). The number of *S. ssp I 4, [5],12, i:-* infections increased to 271 cases to rank as the 4<sup>th</sup> most prevalent serovar reported in 2009, up from 6<sup>th</sup> in 2008. Reported cases of *S. Saintpaul* (130) and *S. Javiana* (102) infection also increased in 2009 to rank 7<sup>th</sup> and 9<sup>th</sup>, respectively, while in 2008, they were not listed among the top 10 *Salmonella* serovars. Much of the increase in number of reports of *S. Javiana* was due to a community outbreak in Québec in June. There were also fewer cases of *S. Thompson* infection recorded (99 cases) than in any previous year and for the first time it did not rank among the top ten *Salmonella* serovars reported to the NESP.

*S. Carrau* and *S. Cubana* were not listed in the top 10, however, multi-provincial outbreaks of these serovars were detected in NESP (Appendix 1). *S. Carrau* (35 cases) occurred in February and March with cases identified in eight provinces and several U.S. states. Melons were the suspect source of these infections. An outbreak of *S. Cubana* in July involved 20 cases between four provinces (Alberta, British Columbia, Ontario and Nova Scotia); the suspect source of infection was bean sprouts.

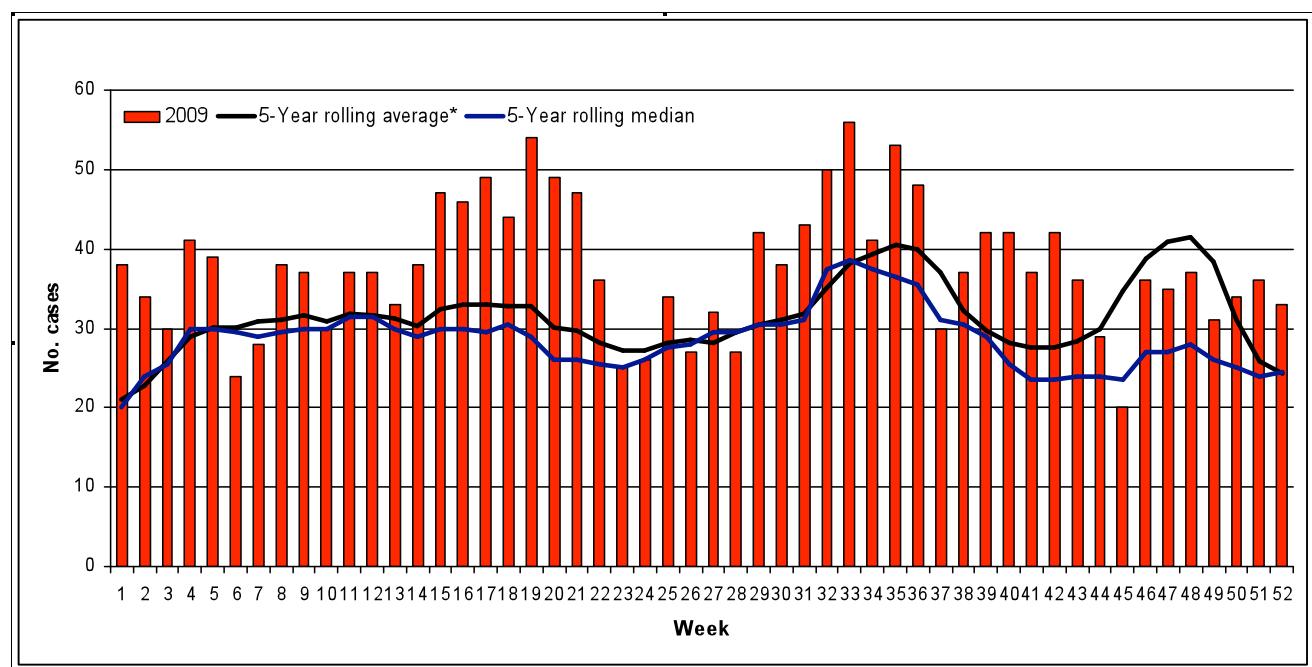
**Table 5. National Totals (Overall Rank) for the Top Ten *Salmonella* Serovars as Reported to the NESP between 2004 and 2009 (additional serovars are included to show historical serovars that did not rank in the top ten list in 2009)**

Serovar	2004	2005	2006	2007	2008	2009
<b>Enteritidis</b>	991 (2)	1750 (1)	1338 (1)	1661 (1)	2239 (1)	1955 (1)
<b>Typhimurium</b>	1107 (1)	1058 (2)	998 (2)	1341 (2)	914 (2)	777 (2)
<b>Heidelberg</b>	942 (3)	714 (3)	696 (3)	560 (3)	456 (3)	665 (3)
<b>ssp I 4,[5],12:i:-</b>	92 (10)	103	109 (9)	184 (4)	180 (6)	271 (4)
<b>Typhi</b>	129 (7)	123 (8)	177 (4)	158 (6)	192 (4)	164 (5)
<b>Newport</b>	149 (5)	145 (6)	145 (7)	142 (9)	185 (5)	133 (6)
<b>Saintpaul</b>	91	115 (9)	166 (6)	123	92	130 (7)
<b>Infantis</b>	102 (9)	131 (7)	81	131 (10)	119 (8)	110 (8)
<b>Javiana</b>	70	47	49	49	66	102 (9)
<b>Hadar</b>	149 (5)	168 (5)	107 (10)	144 (8)	113 (9)	100 (10)
<b>Thompson</b>	153 (4)	235 (4)	171 (5)	173 (5)	130 (7)	99
<b>Paratyphi A</b>	84	108 (10)	132 (8)	94	109 (10)	92
<b>Agona</b>	116 (8)	85	87	109	107	70
<b>Oranienburg</b>	55	47	67	145 (7)	45	53

## Continued Prevalence of *S. Enteritidis*

Although fewer *S. Enteritidis* isolations were reported in 2009, it is the most prevalent cause of human salmonellosis in Canada representing approximately 33% of all human *Salmonella* isolates reported in 2009. Nationally, higher than expected cases were reported for most weeks throughout the year (Figure 2) and important increases in rates of *S. Enteritidis* infection in numerous provinces in 2009 have resulted in ongoing investigations with difficulties in establishing epidemiological linkages between contaminated source and human disease.

**Figure 2.** Cases of *S. Enteritidis* Reported to the NESP in 2009 vs. 5-Year Moving Average/Median



\*Includes a 2005 large outbreak of *S. Enteritidis* during weeks 45 to 50, which affects the 5-year rolling average.

## Isolates Collected from Extra-intestinal Isolation Sites

The number of isolates collected from extra-intestinal sites (i.e. non-faecal specimens) reported to the NESP in 2009, is shown in Table 6. Although information regarding extra-intestinal isolation sites is collected by the NESP, these data are not consistently reported to provincial or central reference labs. Isolation of an organism from a sterile site may reflect more severe illness and an increased likelihood to seek treatment and be tested. *Salmonella* accounted for the majority of isolations from non-faecal sources. *S. Typhi*, *S. Paratyphi A*, *S. Cubana* and *C. fetus* ssp. *fetus* had the highest proportion of submission from extra-intestinal sites.

**Table 6. Total Isolates Collected from Extra-intestinal Isolation Sites as Reported to the NESP in 2009**

Organism	Blood	Urine	Other *	Total/ Overall	Percent (%)
<b><i>Salmonella</i></b>	<b>262</b>	<b>119</b>	<b>29</b>	<b>410/6084</b>	<b>6.7</b>
Enteritidis	53	25	6	84/1955	4.2
Heidelberg	54	16	9	79/665	11.9
Typhi	49	2	0	51/164	31.3
Paratyphi A	26	0	0	26/92	28.3
Typhimurium	8	5	5	18/777	2.3
Newport	2	8	0	10/133	7.5
Saintpaul	5	4	0	9/130	6.9
Cubana	1	5	1	7/23	30.4
ssp. I 4,[5],12:i:-	4	2	1	7/271	2.6
Poona	4	2	0	6/46	13.0
Oranienburg	2	4	0	6/53	11.3
Agona	1	3	1	5/70	7.1
Paratyphi B var. Java	3	2	0	5/63	7.9
Thompson	1	3	0	4/99	4.0
Brandenburg	3	1	0	4/16	25.0
Javiana	2	2	0	4/102	4.0
ssp. I 4,[5],12:b:-	4	0	0	4/75	5.3
Infantis	1	2	0	3/110	2.7
Derby	0	3	0	3/30	10.0
Carrau	2	1	0	3/41	7.3
Kiambu	1	2	0	3/12	25.0
Montevideo	1	2	0	3/51	5.9
Virchow	3	0	0	3/29	10.3
Other (51 serovars)	26	21	6	63/1046	5.1
<b><i>Campylobacter</i></b>	<b>9</b>	<b>0</b>	<b>1</b>	<b>10/1751</b>	<b>0.6</b>
<i>C. fetus</i> ssp. <i>fetus</i>	6	0	1	7/24	29.2
<i>C. jejuni</i>	2	0	0	2/1346	0.1
<i>C. upsaliensis</i>	1	0	0	1/44	2.3
<b><i>Vibrio</i> sp.</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1/47</b>	<b>2.1</b>
<b><i>Shigella</i> sp.</b>	<b>5</b>	<b>2</b>	<b>0</b>	<b>7/631</b>	<b>1.1</b>
<b><i>E. coli</i> O157 VTEC</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1/606</b>	<b>0.2</b>
<b><i>Yersinia enterocolitica</i></b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>4/326</b>	<b>1.2</b>
<b>Norovirus</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1/2311</b>	<b>0.0</b>
<b>Total</b>	<b>279</b>	<b>121</b>	<b>34</b>	<b>434/14262</b>	<b>3.0</b>

\*Abscess / Wound / Pus: 1. *C. fetus* ssp. *fetus*, 3 S. Heidelberg, 1 S. Enteritidis, 1 S. Pomona, 1 S. Gaminara, 1 S. Typhimurium, 1 S. ssp. IIIb 61:k 1, 5, 7, 1 Vibrio alginolyticus, 1 Y. enterocolitica. Abdominal fluid: 1 S. Typhimurium, 1 S. Enteritidis. Bile: S. Uganda, 1. Buttock: 1 S. Agona. Chest tissue: 2 S. Enteritidis. Endotracheal secretions: 1 S. Heidelberg. Gallbladder: 1 S. Typhimurium. Groin: 1 Y. enterocolitica. Knee femoral membrane: 1 S. Enteritidis. Tibial drainage: 1 S. Stanley. Liver: 1 S. Berta. Tracheal secretions: 2 S. Heidelberg. Nasal Polyp: *E. coli* O157 VTEC. Neck swab: 1 S. Typhimurium. Peritoneal fluid: 1 S. Heidelberg. Pleural fluid: 2 S. Heidelberg. Sputum: 1 S. Typhimurium. Ulcer: S. Cubana. Vaginal secretions: 1 S. ssp. I 4,[5],12:i:-

## Travel-Acquired Infections (Tables 7 and 8)

Although foreign travel is one of the main risk factors for gastro-intestinal illness, this information is rarely captured or reported and is therefore greatly under-represented in the NESP.

A total of 121 cases of enteric infection recorded through the NESP were reported to be linked to foreign travel or to new immigrants arriving in Canada, 108 cases less than in 2008. For the first time since 2001, Asia was the most common geographic region identified (43 cases), with more cases among people who had recently immigrated from, or travelled to this area than the major winter holiday destinations, Mexico and the Caribbean (40 cases).

**Table 7. Number of Infections by Region/Country of Origin**

Geographic Region	No. of Cases (%)
Asia	43 (35.5%)
Mexico	22 (18.2%)
Caribbean	18 (14.9%)
Africa	17 (14.0%)
South America	6 (5.0%)
Central America	5 (4.1%)
Other	4 (3.3%)
Unknown	6 (5.0%)
Total	121

*Salmonella* infections accounted for 38.0% (46/121) of all travel-related cases and 21 different serovars were identified (Table 8). The most commonly reported serovar was *S. Enteritidis*, with a total of 17 isolates, many of them (11/17) associated with travel to Mexico and the Caribbean.

Parasitic organisms comprised 29.8% (36/121) of travel-related infections recorded through the NESP. *Giardia* was most often identified (19 cases), followed by *Entamoeba* (16 cases) and *Cyclospora* (1 case). Twelve of the parasitic infections were among people who had recently immigrated from, or travelled to Africa, while 10 others were linked to travel to, or from, five Asian countries (Table 8).

In 2009, there were 14 *Shigella* infections related to foreign travel. Nine of these had travelled to Asia, two to Africa, and one each in three different regions. Thirteen *Campylobacter* infections were reportedly linked to travel to various regions of the world, but most frequently to Asia (5 cases) and Mexico (4 cases). Other organisms for which travel information was provided to the NESP included six cases of *Yersinia* infection, three *Vibrio* species and three cases of *E. coli* O157:H7.

The country with the highest number of travel-acquired infections identified via the NESP is Mexico (22/121 - 18.2%) (Table 7), which has been the case for the past ten years. Eleven different enteric organisms were reportedly acquired by Canadians who had recently been to Mexico, with the most common being *S. Enteritidis* (6 cases) followed by *C. jejuni* (4 cases). India (8 cases), Cuba (6 cases) and Jamaica (5 cases) were also among the most frequently reported countries when a history of recent travel was noted. Travel to, or from 38 different countries was identified among those enteric infections reportedly acquired outside of Canada in 2009 (Table 8).

**Table 8. Travel-Acquired Infections Reported to the NESP in 2009**

Organism	No. of Cases	Country (No. > 1)
<b><i>Salmonella</i></b>	<b>46 (38.0%)</b>	
S. Enteritidis	17	Mexico (6), Jamaica (3), Thailand(2), Belize, Cuba, Japan, Kenya, Philippines, Uganda
S. Typhimurium	4	Belize, Lebanon, Mexico, Thailand
S. Typhi	3	India (3)
S. Infantis	3	Romania, Venezuela, Dominican Republic
S. ssp 1 4,[5],12, b-	2	Thailand & Vietnam, Mexico
S. Javiana	2	Cuba (2)
Other (10 serovars)	15	Mexico (3), Cuba (2), Dominican Republic (2), China, Costa Rica, Ethiopia, Israel, Jamaica, Pakistan, Philippines, United States
<b>Parasites</b>	<b>36 (29.8%)</b>	
<i>Giardia</i>	19	Myanmar (3), Bhutan (2) , Eritrea (2), Haiti (2), Mexico (2), Nepal (2), China, Kenya, Peru, Thailand, Unknown (3)
<i>Entamoeba</i>	16	Africa (7), Haiti, Ethiopia, Nigeria, Peru, Thailand, Myanmar/Burma, Unknown (3)
<i>Cyclospora</i>	1	Peru
<b><i>Shigella</i></b>	<b>14 (11.6%)</b>	
<i>Sh. boydii</i>	3	Asia, Bangladesh, India
<i>Sh. sonnei</i>	7	Lebanon(2),Cuba, Egypt, Honduras, Mexico, Pakistan
<i>Sh. flexneri</i>	2	Ethiopia, India
<i>Sh. dysenteriae 2</i>	1	Bangladesh
<i>Sh. dysenteriae 4</i>	1	India
<b><i>Campylobacter</i></b>	<b>13 (10.7%)</b>	
<i>C. jejuni</i>	11	Mexico (4), Southeast Asia, China, Colombia, Costa Rica, India, Indonesia, New Zealand
<i>C. coli</i>	2	India, Dominican Republic
<b><i>Yersinia enterocolitica</i></b>	<b>6 (5%)</b>	
<i>Y. enterocolitica</i>	4	Mexico (2), Australia, Saudi Arabia
<i>Y. frederiksenii</i>	1	Turkmenistan
<i>Y. kristensenii</i>	1	Lebanon
<b><i>Vibrio</i></b>	<b>3 (2.5%)</b>	
<i>V. cholerae O1</i>	2	Philippines, Pakistan
<i>V. paraheamolyticus</i>	1	Chile
<b><i>E. coli</i> O157:H7</b>	<b>3 (2.5%)</b>	Mexico (2), Jamaica
<b>TOTAL</b>	<b>121</b>	<b>38 countries identified</b>

### Appendix 1. Serotype data reported to NESP in 2009

Organism	BC	AB	SK	MB	ON	QC	NB	NS	PE	NF	NT	YK	NU	Total
S. Aarhus				1										1
S. Aberdeen					2		1							3
S. Adelaide	1	2			2	2								7
S. Adjame								1						1
S. Agbeni					2									2
S. Ago					5		1							6
S. Agona	10	8	9	2	33	8								70
S. Alachua	2			1	1									4
S. Albany	1	1			4									6
S. Amsterdam			1		1									2
S. Anatum	9	2			4	4								19
S. Apapa					1									1
S. Augustenborg					1									1
S. Baildon					1									1
S. Bardo	1													1
S. Bareilly	2	8			4									14
S. Berta	1				14	3	1							19
S. Blockley		2			6	2								10
S. Bonariensis					1									1
S. Bonn					1									1
S. Bovis-morbificans	3				6									9
S. Braenderup	9	10	3	1	40	5					1			69
S. Brandenburg	1	1	1		7	6								16
S. Bredeney					1									1
S. Caracas		1												1
S. Carmel					1	1								2
S. Carrau	2	4	1		18	10	3	2	1					41
S. Cerro						2	1							3
S. Chester					1									1
S. Cholerae-suis	1				2	1								4
S. Chomedey				1										1
S. Coeln					1									1
S. Colindale					1									1
S. Concord					2									2
S. Corvallis	2			3	4	1								10
S. Cotham	1	1				1		1						4
S. Cubana	1	11			10			1						23
S. Daytona	1													1
S. Derby	4	2		4	9	11								30
S. Dublin			1				1							1
S. Durban			1			1	1							3
S. Ealing							2							2
S. Eastbourne	3	1			4	1								9
S. Ebrie					2									2
S. Edinburg	1	1												2
S. Emek	3				1									4
S. Enteritidis	456	209	71	90	707	329	39	36	5	10	0	1	2	1955

<b>Organism</b>	<b>BC</b>	<b>AB</b>	<b>SK</b>	<b>MB</b>	<b>ON</b>	<b>QC</b>	<b>NB</b>	<b>NS</b>	<b>PE</b>	<b>NF</b>	<b>NT</b>	<b>YK</b>	<b>NU</b>	<b>Total</b>
S. Fillmore										1				1
S. Florida			1											2
S. Fluntern	1						1							1
S. Galiema			1				1							2
S. Gaminara	3	1					1							5
S. Gatuni	1													1
S. Georgia	1													1
S. Give	3					1	4							8
S. Goldcoast							1							1
S. Goverdhan	2													2
S. Haardt	1		1											2
S. Hadar	12	7	3	1	64	8	2	3						100
S. Haifa	2	1				3								6
S. Hartford						11								11
S. Havana		1				6	2							9
S. Heidelberg	39	85	15	45	223	206	25	17	3	7				665
S. Hull						1								1
S. Hvittingfoss	3				1	2	1							7
S. Indiana						3	1							4
S. Infantis	9	19	8	2	53	18		1						110
S. Jangwani		2				1								3
S. Javiana	8	11		1	28	50	3	1						102
S. Johannesburg				2										2
S. Kedougou						2								2
S. Kentucky		2	1			9	2							14
S. Kiambu			1			8	1	2						12
S. Kimuenza						2								2
S. Kingabwa							1							1
S. Kintambo						1								1
S. Kisarawe						1								1
S. Kottbus						1								1
S. Lexington						1								1
S. Litchfield	3		1			5	8		1					18
S. Liverpool						3								3
S. Livingstone	1		1			1								3
S. London	1	1				1	1							4
S. Madelia				1										1
S. Madras		1				1								2
S. Manchester						1								1
S. Manhattan			1			3	1							5
S. Mbandaka	10	6	2		20	2	1	2		1				44
S. Meleagridis	1													1
S. Mgulani							1							1
S. Miami	3	8	1			7	3	1	1					24
S. Michigan	1													1
S. Mississippi	1		1			5								7
S. Mkamba						1								1
S. Molade						1								1
S. Montevideo	8	10	1	3	24	5								51

<b>Organism</b>	<b>BC</b>	<b>AB</b>	<b>SK</b>	<b>MB</b>	<b>ON</b>	<b>QC</b>	<b>NB</b>	<b>NS</b>	<b>PE</b>	<b>NF</b>	<b>NT</b>	<b>YK</b>	<b>NU</b>	<b>Total</b>
S. Monschauai		1				1								2
S. Muenchen	9	12			25	7			1					54
S. Muenster	3				3	4								10
S. Nessziona					1	1								2
S. Newport	17	10	6	11	61	22	2	2	1	1	1			133
S. Norwich					1									1
S. Nottingham						1								1
S. Ohio	1	1			1	1								4
S. Orianenberg	11	14	3	2	17	5		1						53
S. Orion				1	3									4
S. Oslo		1		1	3	1								6
S. Othmarschen	1					1								2
S. Panama	6	2	2	2	4	6	1	1						24
S. Paratyphi A	32	8	1		46	4				1				92
S. Paratyphi B	2	1	1				1			1				6
S. Paratyphi B var Java	23	6	1	1	20	11		1			2			65
S. Pomona			1		4	2								7
S. Poona	6	4			21	11	3			1				46
S. Potsdam						1								1
S. Putten	1	1			1									3
S. Reading		1	1		1	1								4
S. Richmond	2	1												3
S. Rissen	4				2					1				7
S. Romanby					1									1
S. Rubislaw		1			2									3
S. Sandiego		2			15									17
S. Saintpaul	20	23		3	60	19	1	2			0	2		130
S. Schwarzengrund	4	8	2		5	3								22
S. Senftenberg	3	6	1		12	4								26
S. Singapore	2				1									3
S. Stanley	14	6			18	4		1						43
S. Stanleyville		2				2								4
S. Takoradi		3			1									4
S. Telelkebir					4	4								8
S. Tennessee	3				10	1								14
S. Thompson	6	5		3	57	26	1		1					99
S. Tornow		1												1
S. Tsevie						1								1
S. Typhi	41	13	1	7	88	14								164
S. Typhimurium	96	86	26	23	373	134	10	13	5	6	4	1		777
S. Uganda	2				9	7		1						19
S. Urbana	2				1	1								4
S. Virchow	7	2	3		11	5	1							29
S. Vitkin		1												1
S. Wandsworth					1									1
S. Weltevreden	15	3			15	1								34
S. Worthington	1	5			1									7
S. Yoruba	1													1
S. Zanzibar					1									1

<b>Organism</b>	<b>BC</b>	<b>AB</b>	<b>SK</b>	<b>MB</b>	<b>ON</b>	<b>QC</b>	<b>NB</b>	<b>NS</b>	<b>PE</b>	<b>NF</b>	<b>NT</b>	<b>YK</b>	<b>NU</b>	<b>Total</b>	
S. ssp I 3,10:-:-		1													1
S. ssp I 4,[5],12:-:-		1			4										5
S. ssp I 4,[5],12:-:1,2		1				1									2
S. ssp I 4,[5],12:b:-		5			45	24	1								75
S. ssp I 4,[5],12:e,h:-			1												1
S. ssp I 4,[5],12:i:-	41	62	29	28	72	33	4					1	1		271
S. ssp I 4,[5],12:r:-		2													2
S. ssp II 4,12:z39:1,5,7		1													1
S. ssp I 6,7:-:1,5		1					1								2
S. ssp I 6,7:c:-		1				1	1								3
S. ssp I 6,7:e,h:-							1								1
S. ssp I 6,7:k:-		2													2
S. ssp I 6,7:l,w:-						1									1
S. ssp I 6,7:r:-						3									3
S. ssp I 6,7:z4,z23:-						1									1
S. ssp I 6,7:z10:-						1									1
S. ssp I 6,7:-:-		1				2									3
S. ssp I 6,8:-:-						2									2
S. ssp I 6,8:e,h:-		2				2									4
S. ssp I 8,20:i:-		1													1
S. ssp I 9,12:-:-	1	1			1										3
S. ssp I 9,12:-:1,5		1				3									4
S. ssp I 9,12,Vi:-:-	1														1
S. ssp IIIb 11:k:z53					1	1									2
S. ssp I 13,22:-:-							1								1
S. ssp I 13,23:-:-						1									1
S. ssp I 13,23:b:-						1	1								2
S. ssp IIIa 13,23:z4,z23,z32:-						1									1
S. ssp I 16:l,v:-						2									2
S. ssp IV 16:z4,z32:-						2									2
S. ssp II 21:g,t:-		1													1
S. ssp IIIa 21:z29:-						1									1
S. ssp II 35:g,m,s,t:-		1													1
S. ssp IIIa 40:g,z51:-							1								1
S. ssp IIIa 41:z4,z23:-		2			2	1									5
S. ssp IIIa 42:z4,z24:-								1							1
S. ssp IV 42:z36:-							1								1
S. ssp IV 44:z4,z23:-		3			1	1									5
S. ssp IV 44:z4,z32:-						1									1
S. ssp I 45:b:-		1				1									2
S. ssp IIIb 48:c:z						1									1
S. ssp IIIa 48:g,z51:-		1				1									2
S. ssp IV 48:g,z51:-		1					2								3
S. ssp IIIa 48:z4,z24:-						1									1
S. ssp IV 50:g,z51:-						4									4
S. ssp IIIb 50:k:z						1									1
S. ssp IIIa 50:z4,z23:-		1													1
S. ssp IV 50:z4,z23:-	1				1										2

<b>Organism</b>	<b>BC</b>	<b>AB</b>	<b>SK</b>	<b>MB</b>	<b>ON</b>	<b>QC</b>	<b>NB</b>	<b>NS</b>	<b>PE</b>	<b>NF</b>	<b>NT</b>	<b>YK</b>	<b>NU</b>	<b>Total</b>	
S. ssp II 55:k:z39		1				3									1
S. ssp IIIb 61:k:1,5						1									3
S. ssp IIIb 61:k:1,5,7						1									1
S. ssp IIIb 61:-:1,5,7		1				1									2
S. ssp IIIb 61:c:z35					1										1
S. ssp I Rough-O:--:		1	1	1	2		1								6
S. ssp II Rough-O:c:z6						1									1
S. ssp I Rough-O:g,m:-		1													1
S. ssp II Rough-O:i:-						1									1
S. ssp I Rough-O:l,v:e,n,x		1													1
S. ssp I Rough-O:l,v:e,n,z15			1												1
S. ssp I Rough-O:r:1,2		1					4								5
S. ssp I Rough-O:r:-		1													1
S. ssp I Rough-O:z:1,6						1									1
S. ssp I Rough-O:--:1,5						1									1
S. ssp I Rough-O,Vi:d:-							2								2
S. ssp. IV	1														1
<i>Salmonella</i> sp.	5	2	1	34	3		1	11		1					58
<b>Total <i>Salmonella</i></b>	<b>1015</b>	<b>756</b>	<b>204</b>	<b>276</b>	<b>2464</b>	<b>1096</b>	<b>110</b>	<b>101</b>	<b>16</b>	<b>31</b>	<b>8</b>	<b>1</b>	<b>6</b>	<b>6084</b>	
<i>C. coli</i>	36	14	6	6	69	28	1								160
<i>C. jejuni</i>	434	295	143	134	152	45	120			22		1			1346
<i>C. jejuni/coli</i>				1				55	32	8					96
<i>C. curvus</i>						1									1
<i>C. fetus</i>	5	4			3	12									24
<i>C. hyoileum</i>						1									1
<i>C. lanienae</i>	1					1									2
<i>C. laridis</i>	6				3	2	2								13
<i>C. upsaliensis</i>	11	8	2	1	17	5									44
<i>Campylobacter</i> sp.	6			2			52		1	3					64
<b>Total <i>Campylobacter</i></b>	<b>499</b>	<b>321</b>	<b>151</b>	<b>144</b>	<b>244</b>	<b>95</b>	<b>175</b>	<b>55</b>	<b>33</b>	<b>33</b>		1			1751
<i>Shigella boydii</i> 1	1	3			1	1									6
<i>Shigella boydii</i> 2		3			5	2									10
<i>Shigella boydii</i> 4		1			2										3
<i>Shigella boydii</i> 10					1										1
<i>Shigella boydii</i> 19		1			1	1									3
<i>Shigella boydii</i> 20		2				3									5
<i>Shigella boydii</i>	2	2	1	2			1								8
<i>Shigella dysenteriae</i> 2	1	1				1									3
<i>Shigella dysenteriae</i> 3					3	1									4
<i>Shigella dysenteriae</i> 4	2	1				1									3
<i>Shigella dysenteriae</i> 9					1										1
<i>Shigella dysenteriae</i> 12	1														1
<i>Shigella dysenteriae</i> 14		1													1
<i>Shigella dysenteriae</i> 16	1	1				1									3

<b>Organism</b>	<b>BC</b>	<b>AB</b>	<b>SK</b>	<b>MB</b>	<b>ON</b>	<b>QC</b>	<b>NB</b>	<b>NS</b>	<b>PE</b>	<b>NF</b>	<b>NT</b>	<b>YK</b>	<b>NU</b>	<b>Total</b>	
<i>Shigella flexneri</i> 1	47	7				6									54
<i>Shigella flexneri</i> 1a						55	4								6
<i>Shigella flexneri</i> 1b	1														60
<i>Shigella flexneri</i> 2	18	8				26	4								26
<i>Shigella flexneri</i> 2a	1						1								31
<i>Shigella flexneri</i> 2b															1
<i>Shigella flexneri</i> 3	15	4				9	11								19
<i>Shigella flexneri</i> 3a						2	1								20
<i>Shigella flexneri</i> 3b															3
<i>Shigella flexneri</i> 4	3	3				11									6
<i>Shigella flexneri</i> 4a															11
<i>Shigella flexneri</i> 4b	1														1
<i>Shigella flexneri</i> 5	2														2
<i>Shigella flexneri</i> 6	5	3				9	2								19
<i>Shigella flexneri</i> var X		1					2								3
<i>Shigella flexneri</i> var Y	1	1					1								3
<i>Shigella flexneri</i> prov. SH						6	1								
104		1													8
<i>Shigella</i>	175	76	7	26	248	76	9	12		2					631
<i>E. coli</i>					1										1
<i>E. coli</i> Non-O157 VTEC	3				2		1			1					7
<i>E. coli</i> Non-Typed VTEC	52				18										70
<i>E. coli</i> O111					2										2
<i>E. coli</i> O126					1										1
<i>E. coli</i> O157 VTEC	96	96	16	18	154	97	13	3	8		1				502
<i>E. coli</i> O157:NM	14	3				9					1	1			27
<i>E. coli</i> O26					1										1
<b>Total <i>E. coli</i></b>	<b>165</b>	<b>99</b>	<b>16</b>	<b>39</b>	<b>154</b>	<b>107</b>	<b>13</b>	<b>3</b>	<b>9</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>613</b>	
<i>Vibrio cholera</i> 01	1	1			1										3
<i>Vibrio cholera</i> non01/nonO139	2	1				1	2								6
<i>Vibrio alginolyticus</i>	1			1	2			1							5
<i>Vibrio fluvialis</i>	2					1									2
<i>Vibrio mimicus</i>						1									1
<i>Vibrio paraheamolyticus</i>	16	5			1		3		1						26
<i>Vibrio vulnificus</i>					1			3							1
<i>Vibrio</i> sp.							3								3
<b>Total <i>Vibrio</i></b>	<b>22</b>	<b>7</b>	<b>1</b>	<b>6</b>	<b>1</b>	<b>8</b>	<b>1</b>	<b>1</b>							<b>47</b>
<i>Y. enterocolitica</i>	22	35	14		234	16	2	2					1		326
<i>Y. bercovieri</i>		2													2
<i>Y. frederiksenii</i>	12	10	2		3										27

<b>Organism</b>	<b>BC</b>	<b>AB</b>	<b>SK</b>	<b>MB</b>	<b>ON</b>	<b>QC</b>	<b>NB</b>	<b>NS</b>	<b>PE</b>	<b>NF</b>	<b>NT</b>	<b>YK</b>	<b>NU</b>	<b>Total</b>
<i>Y. intermedia</i>	1	3	3		3									10
<i>Y. kristensenii</i>		4	1		1			1						7
<i>Y. mollaretii</i>	1													1
<i>Y. rohdei</i>		1												1
<i>Yersinia</i> sp.				6		1	1							8
<b>Total <i>Yersinia</i></b>	<b>36</b>	<b>54</b>	<b>20</b>	<b>6</b>	<b>241</b>	<b>17</b>	<b>4</b>	<b>2</b>			<b>1</b>			<b>382</b>
<i>Cryptosporidium</i>	19	3	36	24	40	4	18	8	7					159
<i>Cyclospora</i>	12		1	1	19	4								37
<i>Entamoeba histolytica/dispar</i>	84	14	18	20	218	208	1	2		1				566
<i>Giardia</i>	109	35	88	86	170	116	93	63	16	29		3		808
<b>Total Parasites</b>	<b>224</b>	<b>52</b>	<b>143</b>	<b>131</b>	<b>447</b>	<b>332</b>	<b>112</b>	<b>73</b>	<b>23</b>	<b>30</b>		<b>3</b>		<b>1570</b>
Adenovirus	46			24	-			1		1				72
Astrovirus					-					2				2
Norovirus	385	255	560	99	-	472	152	302	46	37		3		2311
Enterovirus				8	-									8
Rotavirus	148	72	248	68	-		85	55	20	95				791
<b>Total Viruses</b>	<b>579</b>	<b>327</b>	<b>808</b>	<b>199</b>	<b>-</b>	<b>472</b>	<b>237</b>	<b>358</b>	<b>66</b>	<b>135</b>		<b>3</b>		<b>3184</b>
<b>TOTAL</b>	<b>2715</b>	<b>1692</b>	<b>1349</b>	<b>822</b>	<b>3804</b>	<b>2196</b>	<b>668</b>	<b>605</b>	<b>148</b>	<b>231</b>	<b>10</b>	<b>9</b>		<b>14262</b>

**Appendix 2. Phage types of Isolates reported in 2009, NML**

Organism	Phage Type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
<b><i>Escherichia coli</i></b>												
<i>E. coli</i> O157:H7	1					2						2
	2			1	1	12	5	1				20
	4		5	4	1	7	9					26
	8		6			12	16					34
	10					3						3
	14		8	1	4	25	3	2	1	1		45
	14a	3	77	8	10	85	46	2	2	2	2	237
	14b					3	1					4
	14c					1						1
	21				1	3	1	5	1			11
	23					1	1			3		5
	27						2					2
	31	1					1					2
	32		3			7	2					12
	33	1	2									3
	34		1			1	1				1	4
	38		1									1
	45					3				1		4
	48					3			1			1
	49		2									2
	54	2				5						7
	59			1								1
	63							1				1
	65		1									1
	68	2				1						3
	70					1	1					2
	87					1						1
	Atypical		3			10	1					14
	Subtotal	9	109	15	17	183	90	11	5	7	3	449
<i>E. coli</i> O157: H Nonmotile	1	1										1
	8					3	5					8
	14		2				1	2				5
	14a		2	1		2						5
	14c						1					1
	20						1					1
	88					2				1		2
	Atypical											1
Total <i>E. coli</i>		10	113	16	17	190	98	13	5	8	3	473
<b><i>Salmonella</i></b>												
<i>S. Enteritidis</i>	1	21	15	4	7	72	21	3	4	1	2	150
	1a		1			1						2
	1b	5	4	3		12	6					30
	2		1	2		1						4
	3				1	1	1					3

Phage Type Data 2009

Organism	Phage Type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
	<b>3a</b>	1				1						<b>2</b>
	<b>4</b>	7	8	1	1	27	5		3			<b>52</b>
	<b>4a</b>					1						<b>1</b>
	<b>4b</b>					1						<b>1</b>
	<b>5b</b>	12	3		1	54	40	5	1		1	<b>117</b>
	<b>6</b>	1	2			6	2					<b>11</b>
	<b>6a</b>	14	23	1	4	15	10		1			<b>68</b>
	<b>6c</b>			1								<b>1</b>
	<b>7</b>	1	1			1						<b>3</b>
	<b>7a</b>	2	1			1						<b>4</b>
	<b>8</b>	233	82	39	42	220	78	8	13		3	<b>718</b>
	<b>11b</b>		1	1			3					<b>5</b>
	<b>13</b>	30	24	12	17	107	32	15	3			<b>240</b>
	<b>13a</b>	34	29	3	1	132	100	3	3		4	<b>309</b>
	<b>14b</b>	4	3			5	2					<b>14</b>
	<b>14c</b>					2						<b>2</b>
	<b>15a</b>	1										<b>1</b>
	<b>19</b>	1				5	3		3			<b>12</b>
	<b>19a</b>		1									<b>1</b>
	<b>20</b>	1										<b>1</b>
	<b>21</b>	3	2	1	1	9	8					<b>24</b>
	<b>21c</b>	1	2			6	1					<b>10</b>
	<b>22</b>	2	3			9	1	2				<b>17</b>
	<b>23</b>	1	6	1		8	2		1			<b>19</b>
	<b>26</b>					1	1					<b>2</b>
	<b>28</b>	1										<b>1</b>
	<b>29</b>						1					<b>1</b>
	<b>30</b>		1									<b>1</b>
	<b>31</b>	4				1						<b>4</b>
	<b>34</b>											<b>1</b>
	<b>34a</b>	1										<b>1</b>
	<b>35</b>	1	3									<b>4</b>
	<b>37</b>								1			<b>1</b>
	<b>41</b>	4	1			1						<b>6</b>
	<b>43</b>	1										<b>1</b>
	<b>44</b>		1									<b>1</b>
	<b>45</b>					1						<b>1</b>
	<b>47</b>	1										<b>1</b>
	<b>51</b>	20	12	2	13	11	4	1				<b>63</b>
	<b>52</b>	2										<b>2</b>
	<b>53</b>	1										<b>1</b>
	<b>55</b>					1	1		1			<b>3</b>
	<b>57</b>					1	1	1				<b>3</b>
	<b>Atypical</b>	23	3	4	2	26	13	2	2	3		<b>78</b>
	<b>Untypable</b>	4	18		1	3	3					<b>29</b>
	<b>Subtotal</b>	<b>438</b>	<b>252</b>	<b>74</b>	<b>92</b>	<b>743</b>	<b>339</b>	<b>39</b>	<b>36</b>	<b>4</b>	<b>10</b>	<b>2027</b>
<b>S. Hadar</b>	<b>2</b>	1				21	2					<b>24</b>
	<b>4</b>					1						<b>1</b>

Phage Type Data 2009

Organism	Phage Type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
	10					5						5
	11		4	2	1	9	2	1	3			22
	17	1					1					2
	18		1			1						2
	21					1						1
	22		1									1
	34	1										1
	41		1									1
	47	4				2						6
	56	1				1						2
	Atypical		1	1			2		1			3
	Untypable											2
	Subtotal	8	8	3	1	43	5	2	3	0	0	73
S. Heidelberg	1		2		1	4	3	1			1	12
	2		5	3	12	20	16	1	3			60
	3					1						1
	4						3					3
	5	1	3	1	6	10	5					26
	8	1										1
	9					1						1
	10						2		1			3
	11	1						1				2
	11a					2	4				1	7
	13	1		1								2
	16					2	4					6
	17		1			1	3					5
	18	2	7	1	2	5	8	2			1	28
	19	15	58	4	15	128	104	10	5	2	2	343
	19a					4	4		1			9
	19b					9						9
	19c	1					1					2
	19d					1						1
	20					1	1					2
	21		2				1					3
	22		2			1						3
	24								1			1
	25			1	1			1				3
	26				1	4	14	2				21
	29		13	1	8	24	10	1	2		1	60
	29a	1					1					2
	32	1				3	2		4			10
	32a						1					1
	32b	1				1	1					3
	35						2					2
	36		1									1
	41	4	4	1		9	4	3			1	26
	47		1									1
	51						2					2

Phage Type Data 2009

Organism	Phage Type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
	52	2	5		1		1					9
	53					2						2
	55					1						1
	56		1				2					3
	Atypical	4	4	1		9	14	2	1	1		36
	Untypable		1	1	1		1	1				5
	Subtotal	31	114	15	48	243	214	25	18	3	7	718
S. Infantis	1		2	1		1						4
	3		1	1		6						8
	4		3	1		6	2					12
	6						1					1
	7	2	10	1		20	3					36
	8		3	1								4
	9		2	3	1	2						8
	12						2					2
	13	1	1			2	1		1			6
	24					1						1
	26						1					1
	Atypical				1							1
	Subtotal	3	22	8	2	38	10	0	1	0	0	84
S. Newport	1					3	1					4
	2	2	2		1	7	1		1			14
	3		2		1	4		1				8
	4					1						1
	9	2	1	1		16	4					24
	10					8	3					11
	11			2	3							5
	13					3	1					4
	14	4				2		1				7
	14a	1										1
	14b					2					1	3
	14c		1				1					2
	15	1	1			2	1					5
	16				1	2	1					4
	17c	1	1			2						4
	17e		1		2	3						6
	Atypical	5	3	3	6	8	10		1			36
	Subtotal	16	12	6	14	63	23	2	2	0	1	139
S. Oranienburg	1			1		1						2
	2		2									2
	3		1									1
	6		4	1		3	1					9
	11		1			3						4
	12		1									1
	13				1							1
	15	2	4	1								7

Phage Type Data 2009

Organism	Phage Type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
	<b>Atypical</b>	2	2		3	2	1		1			11
	<b>Untypable</b>					1						1
	<b>Subtotal</b>	4	15	3	4	10	2	0	1	0	0	39
S. Panama	<b>A</b>					1			1			2
	<b>F</b>		1									1
	<b>G</b>			1	1			1				3
	<b>H</b>		1									1
	<b>Atypical</b>	3					3					6
	<b>Untypable</b>		1	1	1							3
	<b>Subtotal</b>	3	3	2	2	1	3	1	1	0	0	16
S. Paratyphi B	<b>3b var 7</b>						1					1
	<b>3b var. 2</b>						1					1
	<b>Battersea</b>						2	1				3
	<b>Dundee</b>			1		1						2
	<b>Dundee var 2</b>						1					1
	<b>Atypical</b>	1	1				5					7
	<b>Untypable</b>						1					1
	<b>Subtotal</b>	1	1	1	0	1	11	1	0	0	0	16
S. Paratyphi B var. Java	<b>3b var 2</b>	1										1
	<b>3b var 7</b>					3			1			4
	<b>Battersea</b>	1					3					4
	<b>Dundee</b>		4		1	4					1	10
	<b>Atypical</b>	3	5			5						13
	<b>Subtotal</b>	5	9	0	1	12	3	0	1	0	1	32
S. ssp. 14,[5],12:b:-	<b>3b var 2</b>					3	6					9
	<b>Battersea</b>	2		3		18	22					45
	<b>Dundee</b>	1				1						1
	<b>Dundee var. 2</b>											1
	<b>Atypical</b>		1			5	2					8
	<b>Untypable</b>	1	1	1		3	1	1	0	0	0	8
	<b>Subtotal</b>	1	5	1	3	30	31	1	0	0	0	72
S. ssp. (I) 4,[5],12:i:-	<b>21</b>		2		3	1						6
	<b>35</b>						4					4
	<b>41</b>	1	1	1	1	3						7
	<b>51</b>		1		4							5
	<b>104a</b>	1										1
	<b>120</b>		1	1		1	1					4
	<b>179</b>						1					1
	<b>191</b>	12	14	15	45	35	3	1				125
	<b>191a</b>	4	34	8	4	1			1			52
	<b>193</b>	2	1	1		5	6		1			16
	<b>193a</b>						2					2

Phage Type Data 2009

Organism	Phage Type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
	203		1	1								2
	U291		2	1		15	8	1	1			28
	U302		1					1				2
	U311	1		1								2
	UT1					2		1				3
	UT7		1									1
	Atypical	1	13	3	2	9	5					33
	Untypable		1			2						3
	Subtotal	22	73	32	59	74	30	4	3	0	0	297
S ssp. I 4,[5],12:-:1,2	193						1					1
S ssp. I Rough-O,Vi:d:-	C4						1					1
S ssp. I Rough-O:d:-	A						1					1
	UVS	1										1
	UVS (I+IV)					1						1
	Subtotal	1	0	0	0	1	1	0	0	0	0	3
S ssp. I Rough-O:i:1,2	194						1					1
S ssp. I Vi:d:-	UVS(I+IV)					1						1
S. Thompson	1		1		2	17	21			1		42
	2					4						4
	5						1					1
	14					3						3
	17					1						1
	19					1						1
	25	1	1			2						4
	26		1									1
	Atypical	1	2			8		1				12
	Subtotal	2	5	0	2	36	22	1	0	1	0	69
S. Typhi	28	1										1
	35	2										2
	40					1						1
	46					1						1
	53						1					1
	A	1	1			3	2					7
	B1					4						4
	D1					1						1
	D2					1						1
	DVS	2		1		2	1					6
	E1	11	3		7	24	1					46
	E9		2			3						5
	E9 var	3			1	9	1					14
	E10	2						1				3
	E11	1										1

Organism	Phage Type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
	E14	2			1	1						4
	K1					1						1
	M1						1					1
	O					2						2
	UVS	4	2			11	3					20
	UVS(I+IV)	3	1			11						15
	Untypable	6	4			11	3					24
	Subtotal	38	13	1	9	86	14	0	0	0	0	161
S. Typhimurium	1					2	3					5
	2	1	7	4		11	11				1	35
	3 aerogenic	1	2			6	1	1				11
	4					1	1					2
	9		2			3		1				6
	10	2	1		2	11	3					20
	12		1		1	4	5		1			11
	15a	7	2			2						11
	20		1									1
	21		1			2			4	1		8
	22					3	2		1			6
	32		3			1						4
	35						1					1
	39	1				1						2
	40		1			3	1					5
	41	1	1	1	1	5	1			1		11
	51	1			1	4		1				7
	64					1						1
	66			1		3						4
	69					5	1					6
	82				1	1	1					3
	94		1			1			1			3
	96		2									2
	99	1				2	4					7
	104	10	20		2	64	4					100
	104a			1		1	7					9
	104b	1	3			9	13		2			28
	106					2						2
	108		1	5	4	98	12	1	4		2	127
	110		1				1					2
	110b		1			10	7				1	19
	116					1						1
	117					1						1
	120			1		12	3					16
	125		1									1
	132	1	4			16	5					26
	135	1				4	1					6
	136		1			1						2
	160	1	1	2	1	3	24	2				33
	170		1	2	1	16	1				1	22

Phage Type Data 2009

Organism	Phage Type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
	180					2						2
	191	2			1					1	1	5
	191a	1										1
	192			1								1
	193	1	3			9	9				1	23
	193a						1					1
	194		2			1	1			1		5
	195										1	1
	203				1	1						2
	204					1						1
	208					1	3					4
	U284		2	1								3
	U285					5						5
	U288						1					1
	U291	1										1
	U302		3			13	3					19
	U310					1						1
	U311	1				1	1					3
	UT1	3				4	1					8
	UT2		1			1						2
	UT5	1	14	1	3	3	2					24
	UT7	1	2			3						6
	Atypical	9	19	8	4	23	23	3	1	1		91
	Untypable	2	1			2						5
	Subtotal	51	106	28	22	381	158	10	13	5	8	782
Total Salmonella		624	638	174	259	1763	869	87	79	13	27	4533
<b>Shigella</b>												
<i>Shigella boydii</i> 1	9		1									1
	12		2									2
	Atypical		1									1
	Subtotal	0	4	0	0	0	0	0	0	0	0	4
<i>Shigella boydii</i> 2	6		1	1								2
	Atypical		2		1							3
	Subtotal	0	3	1	1	0	0	0	0	0	0	5
<i>Shigella boydii</i> 4	13		1			1						2
<i>Shigella boydii</i> 12	Atypical				1							1
<i>Shigella boydii</i> 18	3		1									1
<i>Shigella boydii</i> 19	3		4	1				3				5
<i>Shigella boydii</i> 20	3			1								4
<i>Shigella sonnei</i>	1			25	3		4		5	1		38
	4							2				2

Phage Type Data 2009

Organism	Phage Type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
	19		1	1								2
	Atypical		6									7
	Subtotal	0	32	4	0	5	0	7	1	0	0	49
<b>Total <i>Shigella</i></b>		4	43	5	2	6	3	7	1	0	0	71
<b>Total</b>		<b>638</b>	<b>794</b>	<b>195</b>	<b>278</b>	<b>1959</b>	<b>970</b>	<b>107</b>	<b>85</b>	<b>21</b>	<b>30</b>	<b>5077</b>

### Appendix 3. Serotype data reported to NESP in 2008

Organism	BC	AB	SK	MB	ON	QC	NB	NS	PEI	NL	NT	NU	YK	Total
S. Aberdeen		1			2	1								4
S. Adelaide	1	2			4	1								8
S. Agama					1									1
S. Agbeni		1			1									2
S. Ago					1									1
S. Agona	9	13	6	10	46	12	4	5		2				107
S. Alachua	1							1						2
S. Albany	2					1		2						5
S. Altona	1													1
S. Amsterdam				2	3									5
S. Anatum	4	5	1	1	12	3	1	2						29
S. Apapa				1										1
S. Apeyeme		1												1
S. Arechavaleta		1			1									2
S. Banana			1											1
S. Bareilly	4	1				11	1		1					18
S. Berta		4	2			21	3							30
S. Bledgdam		1												1
S. Blockley	3	1				3	1							8
S. Bochum	2													2
S. Bonariensis					1									1
S. Bovis-morbificans		4	2			13	3	1						23
S. Braenderup	6	5	3	4	25	12		1			1			57
S. Brandenburg	4	6		3	8	4								25
S. Bredeney		1				3	2							6
S. Bron						1								1
S. Brunei						1								1
S. Cerro					2									2
S. Chester	2					7		1						10
S. Chingola					1									1
S. Cholerae-suis						1	2							3
S. Coeln			2			1	1							4
S. Colindale						2								2
S. Corvallis	1	2				4	1							8
S. Cotham	1													1
S. Cubana	1	1				2	1							5
S. Dahra						3								3
S. Derby	1	1		2		15	2		1					22
S. Dublin	1	2				4	1							8
S. Durban						2	1							3
S. Ealing			1			3								4
S. Eastbourne	1			1		3	2		1					8
S. Edinburg	1					1								2
S. Emek						2								2
S. Enteritidis	414	291	61	83	771	491	39	43	10	31	4		1	2239
S. Escanaba	1						2							1
S. Florida														2

Organism	BC	AB	SK	MB	ON	QC	NB	NS	PEI	NL	NT	NU	YK	Total
S. Fluntern					1	1								2
S. Gaminara		2			1	2								5
S. Gatuni					2									2
S. Gbadago					1									1
S. Georgia	2													2
S. Give	3			1	4	5	1							14
S. Gnesta					1									1
S. Goettingen		1			2									3
S. Hadar	18	5	9	3	54	10	2	8		3			1	113
S. Haifa		1	1		3	1								6
S. Hartford		1			14	14	4	1						34
S. Havana					3									3
S. Heidelberg	34	50	7	18	181	117	15	24	5	4			1	456
S. Holcomb								2						2
S. Hull					1	1								2
S. Hvittingfoss	2				2									4
S. Indiana	1	2			7					1				11
S. Infantis	9	20	2	2	69	10	1	4	1	1				119
S. Inverness							1							1
S. Ireneae		3												3
S. Irumu					1									1
S. Istanbul					3									3
S. Jangwani					1									1
S. Javiana	6	5	2	2	30	17	2	1					1	66
S. Johannesburg	1	1												2
S. Kentucky	6	4		3	14	8				1				36
S. Kiambu	1	3	1		10	1								16
S. Kingabwa						1								1
S. Kisarawe					1									1
S. Larochelle					1									1
S. Lexington	1	1												2
S. Lingueire		1												1
S. Litchfield	6	10	2	2	12	6	1	1						40
S. Livingstone	1				2									3
S. Lomalinda		1			1									2
S. London	5	5			5	1								16
S. Madelia										1				1
S. Manhattan	1			4	8	2								15
S. Mbandaka	7	8	2	1	14	2	1							35
S. Miami					5		2							7
S. Michigan	1				1									2
S. Minnesota		1			2									3
S. Mississippi					2									2
S. Montevideo	11	3			17	4		2						37
S. Monschau						1								1
S. Muenchen	1	8	1	1	22	5								38
S. Muenster	5				2	1								8
S. Nessziona						1								1
S. Newport	18	30	8	5	77	39	3	3		2				185

Organism	BC	AB	SK	MB	ON	QC	NB	NS	PEI	NL	NT	NU	YK	Total
S. Nima		2												2
S. Ohio	2			1	4									7
S. Oranienburg	3	2	1	3	27	4	3	1					1	45
S. Orientalis	1					1								1
S. Orion						1								1
S. Oslo	2	2			6	2		1						13
S. Othmarschen	4													4
S. Ouakam					1									1
S. Overschie		1												1
S. Oxford	1				1									2
S. Panama	4	2		1	6	6								19
S. Paratyphi A	32	11		3	60	3								109
S. Paratyphi B	5		1	1		2		3						12
S. Paratyphi B var. Java	11	9		1	15	18	1							55
S. Paratyphi C		2	1											3
S. Pomona	1	1			3	1	1							7
S. Poona	6	3		1	31	22	1	3						67
S. Potsdam					2									2
S. Praha				1		2								3
S. Putten					1									1
S. Reading	5	1	1		2	2								11
S. Richmond	1	1			2	1								5
S. Rissen	3	1												4
S. Romanby	2			1										3
S. Rubislaw					1	2								3
S. Sandiego	2				1	4								7
S. Saintpaul	10	11	2	1	45	15	3	3				1	1	92
S. Schwarzengrund	2	6	1	3	11	5								28
S. Senftenberg	4	2			11	3		1						21
S. Singapore	2													2
S. Soerenga					1									1
S. Stanley	20	8	1		27	4		1			1			62
S. Stanleyville	1				1	1								3
S. Sueeldorf			1											1
S. Sundsvall		1												1
S. Telekебир					2	6								8
S. Telhashomer					1									1
S. Tennessee	3	2			13	2								20
S. Thompson	2	6		5	78	35	1	3						130
S. Typhi	49	17	1	4	103	18								192
S. Typhimurium	102	119	33	26	455	132	15	22	2	5		3		914
S. Uganda	8	1			8	4								21
S. Urbana			1			1								2
S. Uzaramo	1													1
S. Virchow	9	2	1	2	17	2								33
S. Virginia		1												1
S. Wandsworth		1												1
S. Weltevreden	1	2			8	2								13
S. Worthington					3									3

Organism	BC	AB	SK	MB	ON	QC	NB	NS	PEI	NL	NT	NU	YK	Total
S. ssp. I 3,10:-:-	3		1		2									6
S. ssp I 4,[5],12:-:-		2	1		3									6
S. ssp I 4,[5],12:-:1,2		2												2
S. ssp I 4,[5],12:b:-		7	1		44	21	1							74
S. ssp I 4,[5],12:i:-	31	34	18		61	32				2	1	1		180
S. ssp I 4,[5],12:r:-		2												2
S. ssp I 6,7:c:-		1	1		2		1							5
S. ssp I 6,7:e,h:-							1							1
S. ssp I 6,7:-:-						3	1							4
S. ssp I 6,8:-:-							1							1
S. ssp I 1,6,14,25:z:-							1							1
S. ssp I 8,20:-:-							1							1
S. ssp I 9,12:-:-	1	1			2									4
S. ssp I 9,12:l,z13:-						1								1
S. ssp I 9,12:-:1,5		1			1									2
S. ssp IIIa 11:z4,z23:-							1							1
S. ssp IV 11:z4,z23:-							1							1
S. ssp IV 16:z4,z32:-						1								1
S. ssp II 21:z10:z6						1								1
S. ssp IIIa 41:z4,z23:-		2			2							1		5
S. ssp II 44:z4,z23:-							1							1
S. ssp I 45:b:-		1												1
S. ssp IV 45:g,z51:-			1											1
S. ssp IIIb 47:k:z						1								1
S. ssp IIIb 47:k:z53						1								1
S. ssp IV 48:g,z51:-						1	1							2
S. ssp IIIb 48:i:z		1	1											2
S. ssp IIIa 48:z4,z24:-											4			4
S. ssp IIIb 50:k:z		1				1								2
S. ssp IIIb 50:l,v:z35	1					1								2
S. ssp IV 50:z4,z23:-							2							2
S. ssp IIIb 50:z:z52							1							1
S. ssp IV 50:-:-						1								1
S. ssp IIIb 53:z10:z35						1								1
S. ssp IIIa 53:z4,z23:-						1								1
S. ssp II 55:k:z39		1												1
S. ssp II 58:l,z13,z28:z6		1												1
S. ssp IIIb 61:l,v:z35						2								2
S. ssp IIIb 61:z52:z53						1								1
S. ssp I Rough-O:b:-						1								1
S. ssp I Rough-O:b:e,n,x						1								1
S. ssp I Rough O:e,h:1,5							2							2
S. ssp I Rough-O:f,g,t:-			1											1
S. ssp I Rough-O:g,m:-		1												1
S. ssp I Rough-O:g,m,s:-		1												1
S. ssp I Rough-O:g,m,s,t:-		1												1
S. ssp I Rough-O:g,m,t:-		1												1
S. ssp I Rough-O:i:-		1												1
S. ssp I Rough-O:i:1,2		1												1

Organism	BC	AB	SK	MB	ON	QC	NB	NS	PEI	NL	NT	NU	YK	Total
<i>S. ssp I Rough-O:l,v:1,2</i>	1		1										1	1
<i>S. ssp I Rough-O:m,t:-</i>														1
<i>S. ssp I Rough-O:r:1,2</i>						1								1
<i>S. ssp I Rough-O:r:-</i>							1							1
<i>S. ssp I Rough-O:y:1,5</i>							1							1
<i>S. ssp I Rough-O:z:-</i>						1								1
<i>S. OR:- ssp. I</i>			1			3								4
<i>S. ssp. I</i>	9			13	2			3	3					30
<i>S. ssp. IV</i>	1			1			1							3
<i>Salmonella</i> sp.			1	27	3		2	14						47
<b>Total <i>Salmonella</i></b>	<b>946</b>	<b>792</b>	<b>186</b>	<b>244</b>	<b>2657</b>	<b>1162</b>	<b>108</b>	<b>159</b>	<b>22</b>	<b>52</b>	<b>13</b>	<b>5</b>	<b>5</b>	<b>6351</b>
<i>C. coli</i>	5	15	12	13	63	27	4							139
<i>C. jejuni</i>	271	249	139	111	210	67	112	2		21	2		1	1185
<i>C. jejuni/coli</i>				2				79	34	7				122
<i>C. fetus</i>		2			13	16								31
<i>C. hyoilealis</i>		2				2								4
<i>C. laridis</i>	2	2			3	5	2		1					15
<i>C. rectus</i>						1								1
<i>C. upsaliensis</i>	2	5	2		27	5	1						1	43
<i>Campylobacter</i> sp.	19		3	1			45		2	4				74
<b>Total <i>Campylobacter</i></b>	<b>299</b>	<b>275</b>	<b>156</b>	<b>127</b>	<b>316</b>	<b>123</b>	<b>164</b>	<b>81</b>	<b>37</b>	<b>32</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>1614</b>
<i>Shigella boydii</i> 1					1									1
<i>Shigella boydii</i> 2						1								1
<i>Shigella boydii</i> 4	1				5	2								8
<i>Shigella boydii</i> 8					1									1
<i>Shigella boydii</i> 10	4	2												6
<i>Shigella boydii</i> 11						1								1
<i>Shigella boydii</i> 12					1									1
<i>Shigella boydii</i> 13					2									2
<i>Shigella boydii</i> 18	1													1
<i>Shigella boydii</i> 19		1				1								2
<i>Shigella boydii</i> 20				1	2									3
<i>Shigella boydii</i> prov. 96					1									1
<i>Shigella boydii</i>	2			2	2									6
<i>Sh. dysenteriae</i> 2	3													3
<i>Sh. dysenteriae</i> 4						1								1
<i>Sh. dysenteriae</i> 12					1									1
<i>Sh. dysenteriae</i> 16		1			2									3
<i>Sh. dysenteriae</i> prov. 103					1									1
<i>Shigella flexneri</i> 1	22	9												31
<i>Shigella flexneri</i> 1a					1									1
<i>Shigella flexneri</i> 1b					33	5								38
<i>Shigella flexneri</i> 2	11	13												24
<i>Shigella flexneri</i> 2a	2				26	11								39
<i>Shigella flexneri</i> 2b					1									1

Organism	BC	AB	SK	MB	ON	QC	NB	NS	PEI	NL	NT	NU	YK	Total
<i>Shigella flexneri</i> 3	10	7												17
<i>Shigella flexneri</i> 3a	1				8	7								16
<i>Shigella flexneri</i> 3b					3	2								5
<i>Shigella flexneri</i> 4	1	1				2								4
<i>Shigella flexneri</i> 4a					5									5
<i>Shigella flexneri</i> 6	9	3			8									20
<i>Shigella flexneri</i> var X						1								1
<i>Shigella flexneri</i> var Y	3					5	2			1				4
<i>Shigella flexneri</i> prov.			1											8
SH 104														
<i>Shigella flexneri</i>	1		1	6	2		8	2		1				21
<i>Shigella sonnei</i>	110	32	6	16	144	84		3		1			1	397
<i>Shigella</i> sp.	4			1										5
<b>Total <i>Shigella</i></b>	<b>185</b>	<b>70</b>	<b>7</b>	<b>26</b>	<b>256</b>	<b>119</b>	<b>8</b>	<b>5</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>680</b>
<hr/>														
<i>E. coli</i> Non-O157 VTEC	4				2			1						7
<i>E. coli</i> Non-Typed VTEC	20				9									29
<i>E. coli</i> O111					1									1
<i>E. coli</i> O125					1									1
<i>E. coli</i> O127a					2									2
<i>E. coli</i> O128:H2					1									1
<i>E. coli</i> O157 VT-			1	1										2
<i>E. coli</i> O157 VTEC	49	137	11	24	267	123	16	6	2	4			1	640
<i>E. coli</i> O157:NM	11	3				5								19
<b>Total <i>E. coli</i></b>	<b>84</b>	<b>140</b>	<b>12</b>	<b>41</b>	<b>267</b>	<b>128</b>	<b>17</b>	<b>6</b>	<b>2</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>702</b>
<hr/>														
<i>Vibrio cholera</i> 01	1				2									3
<i>Vibrio cholera</i> non01/O139	2	4			1	3								10
<i>Vibrio cholera</i>							1							1
<i>Vibrio alginolyticus</i>					4		1							5
<i>Vibrio fluvialis</i>	2	1			1		2							6
<i>Vibrio mimicus</i>			1											1
<i>Vibrio paraheamolyticus</i>	5	4			3		1							13
<b>Total <i>Vibrio</i></b>	<b>10</b>	<b>9</b>	<b>1</b>	<b>0</b>	<b>11</b>	<b>3</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>39</b>
<hr/>														
<i>Y. enterocolitica</i>	38	45	9		244	19	1	4	1					361
<i>Y. aldovae</i>		1												1
<i>Y. frederiksenii</i>	5	4	3		3									15
<i>Y. intermedia</i>		3	1		4									8
<i>Y. kristensenii</i>		3												3
<i>Y. molaris</i>	2	1			1									4
<i>Y. rohdei</i>		4	1											5
<i>Yersinia</i> sp.				17										17
<b>Total <i>Yersinia</i></b>	<b>45</b>	<b>61</b>	<b>14</b>	<b>17</b>	<b>252</b>	<b>19</b>	<b>1</b>	<b>4</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>414</b>

Serotype Data 2008

<b>Organism</b>	<b>BC</b>	<b>AB</b>	<b>SK</b>	<b>MB</b>	<b>ON</b>	<b>QC</b>	<b>NB</b>	<b>NS</b>	<b>PEI</b>	<b>NL</b>	<b>NT</b>	<b>NU</b>	<b>YK</b>	<b>Total</b>
<i>Cryptosporidium</i>	32	10	78	52	49	6	12	21	5	3			2	<b>270</b>
<i>Cyclospora</i>	7				11	2								<b>20</b>
<i>Entamoeba histolytica/dispar</i>	96	7	14	15	330	171	2	11		3			2	<b>651</b>
<i>Giardia</i>	86	34	108	62	240	75	91	85	8	43		1	9	<b>842</b>
<b>Total Parasites</b>	<b>221</b>	<b>51</b>	<b>200</b>	<b>129</b>	<b>630</b>	<b>254</b>	<b>105</b>	<b>117</b>	<b>13</b>	<b>49</b>	<b>0</b>	<b>1</b>	<b>13</b>	<b>1783</b>
Adenovirus	59			60										<b>119</b>
Astrovirus											2			<b>2</b>
Norovirus	452	361	629	160		372	89	105	23	114			2	<b>2307</b>
Enterovirus				13										<b>13</b>
Rotavirus	206	123	274	54			84	3	43	20				<b>807</b>
<b>Total Viruses</b>	<b>717</b>	<b>484</b>	<b>903</b>	<b>287</b>	<b>0</b>	<b>372</b>	<b>173</b>	<b>108</b>	<b>66</b>	<b>136</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>3248</b>
<b>TOTAL</b>	<b>2507</b>	<b>1882</b>	<b>1479</b>	<b>871</b>	<b>4389</b>	<b>2180</b>	<b>581</b>	<b>480</b>	<b>142</b>	<b>275</b>	<b>15</b>	<b>6</b>	<b>24</b>	<b>14831</b>

### Appendix 4. Phage types of Isolates reported in 2008, NML

Organism	Phage Type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
<i>Escherichia coli</i>												
<i>E. coli</i> O157:H7	1	1	10			22	2	4	1		1	14
	2	4	9		1	32	6	1	1			46
	4		11		6	12	9	1	1			55
	8		29			5	15			1		63
	10						5					5
	14	1	25	1	3	17	8	4		1	1	61
	14a	1	306	9	9	152	77	3	4		1	562
	14b	1				2						3
	14c						2					2
	21		3			5	2	1				11
	23	1	3			21						25
	24		1									1
	31		7									7
	32		16	2	4	7	7	1	1			38
	33	2	8		3	1	3					17
	34		6		1	1	2					10
	38					1	1					2
	41		1									1
	42						1					1
	45		3			4	4					11
	46		1									1
	47		1									1
	49		10			2						12
	54		4			1	2					7
	63					1			1			2
	67					1						1
	70	1	3			1	1					6
	74	1	1			2						4
	Atypical		14			9	4		1		1	29
	Subtotal	13	472	12	27	299	146	15	8	2	4	998
<i>E. coli</i> O157:H Nonmotile	2					2						2
	8		1			5	2					8
	14		2			2	1					5
	14a		4									4
	14c					1	1					2
	23		1									1
	31					4						4
	32		1									1
	47					3						1
	49					3						3
	54					3		2				3
	Atypical							2				2
	Untypable							2				2
Total <i>E. coli</i>		14	480	12	27	319	155	15	8	2	4	1036

Organism	Phage Type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
<b><i>Listeria monocytogenes</i></b>												
<i>Listeria monocytogenes</i>	1/2a	7	17	3	4	120	1	2		1	1	156
	1/2b	2	1			9						12
	1/2c					1						1
	4a					2						2
	4b	5	2	1	1	14		2	1		1	27
	<b>Subtotal</b>	<b>14</b>	<b>20</b>	<b>4</b>	<b>5</b>	<b>146</b>	<b>1</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>198</b>
<b><i>Salmonella</i></b>												
<i>S. Enteritidis</i>	1	23	20	2	6	75	26	3	2		2	159
	1a	8	4	1	2	12	14		1			42
	1b	2	1			2						3
	2	1	1			1	1					4
	3					1						2
	4	25	44	2	8	63	28	1	6		2	179
	4a	1				2	1					4
	4b					1	1				1	3
	5a					2						2
	5b	13	15		5	42	36	1	2		1	115
	6	9	7			16	5		3			40
	6a	34	35	4	3	38	13			1	1	129
	7	2				1						3
	8	208	130	31	37	225	114	14	9	6	8	782
	11b	3	8	5		7		1			1	25
	13	45	31	3	20	118	183	10	13	2		425
	13a	17	10	6	2	105	51	6	1		3	201
	14b	1				4	3					8
	18	1										1
	19		1		1	3		2	1			8
	20	3										3
	21	2	3			8	6		1	1		21
	21a	1				1						2
	21b		1			2						3
	21c		1									1
	22					1	2		1			4
	23		1	1		1	1					4
	24		1			1	1	1				4
	26		1									1
	27					1	1					2
	28					1						1
	29	1										1
	32a	3										3
	33					1						1
	34	1										1
	35	1										1
	36		1									1
	37						1					1
	41	2	2	1		1						5
	43		1									1
	911					1	4	2				7

Phage Type Data 2008

Organism	Phage Type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
	<b>Atypical</b>	7	16	2		14	13		1			53
	<b>Untypable</b>	5	5			8	1				18	37
	<b>Subtotal</b>	<b>419</b>	<b>340</b>	<b>58</b>	<b>85</b>	<b>758</b>	<b>506</b>	<b>39</b>	<b>41</b>	<b>10</b>	<b>37</b>	<b>2293</b>
<i>S. Hadar</i>	<b>2</b>	3				12	3	1				<b>19</b>
	<b>5</b>	1	4	1			1					<b>7</b>
	<b>10</b>					1			3			<b>4</b>
	<b>11</b>	1	3	5	1	6			2		2	<b>20</b>
	<b>14</b>	1	8		1						1	<b>11</b>
	<b>17</b>	1	1	1		3					1	<b>7</b>
	<b>18</b>		1				1		1			<b>3</b>
	<b>21</b>							1				<b>1</b>
	<b>23</b>		1									<b>1</b>
	<b>47</b>		3	2	1							<b>6</b>
	<b>55</b>		1									<b>1</b>
	<b>56</b>		1						1			<b>2</b>
	<b>Atypical</b>					1						<b>1</b>
	<b>Untypable</b>	2				1					2	<b>5</b>
	<b>Subtotal</b>	<b>9</b>	<b>23</b>	<b>9</b>	<b>3</b>	<b>24</b>	<b>5</b>	<b>3</b>	<b>6</b>	<b>0</b>	<b>6</b>	<b>88</b>
<i>S. Heidelberg</i>	<b>2</b>					4		1				<b>5</b>
	<b>5</b>		1		1	8		5	7	2		<b>24</b>
	<b>6</b>				1							<b>1</b>
	<b>8</b>					1	1					<b>2</b>
	<b>9</b>						1					<b>1</b>
	<b>10</b>						1					<b>1</b>
	<b>11</b>		1			11	14				1	<b>27</b>
	<b>11a</b>		1				1					<b>2</b>
	<b>16</b>					1	1					<b>2</b>
	<b>17</b>		1									<b>1</b>
	<b>18</b>		3	1			1					<b>5</b>
	<b>19</b>	8	40	2	12	102	71	5	8	2	2	<b>252</b>
	<b>19a</b>	1				2		1	4	1		<b>9</b>
	<b>19b</b>	1				1						<b>2</b>
	<b>20</b>	1	1				1					<b>3</b>
	<b>21</b>		2			2						<b>2</b>
	<b>22</b>		2									<b>4</b>
	<b>25</b>		1									<b>1</b>
	<b>26</b>					3	4		2			<b>9</b>
	<b>29</b>	1	7		1	20	9	1				<b>39</b>
	<b>32</b>	1	5			1		1				<b>8</b>
	<b>32b</b>		1				3		1			<b>5</b>
	<b>35</b>			2		1						<b>3</b>
	<b>36</b>		1			2	1	1				<b>5</b>
	<b>40</b>		1			1						<b>2</b>
	<b>41</b>		2	2	1	3	6	1			2	<b>17</b>
	<b>46</b>					1						<b>1</b>
	<b>52</b>					1	2	1				<b>4</b>
	<b>54</b>		1									<b>1</b>

Phage Type Data 2008

Organism	Phage Type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
	<b>Atypical</b>	4	13		1	8	10	1				37
	<b>Untypable</b>		1		1	1						3
	<b>Subtotal</b>	17	85	7	19	175	126	17	22	5	5	478
<i>S. Infantis</i>	1		7		1	7			1		1	17
	3	1	1		1	4	1					8
	4		4			4	1					9
	7	2	7	1		26	1	1	2	1		41
	8		14	1	1	1						17
	9		6			2						8
	12	1				1						2
	13		4			4						8
	24					1	1					2
	26	1					1					2
	<b>Untypable</b>					1						1
	<b>Subtotal</b>	5	43	2	3	51	5	1	3	1	1	115
<i>S. Newport</i>	1	2	3									5
	2	3	2			9	1			1		16
	3	1	3			7	3		1			15
	4	2		1		7	4		1			15
	5						1					1
	9	3	3	4	1	23	6	1				41
	10	1	1			1	7					10
	11					2						2
	13	1	2		1	4	4					12
	13a						1					1
	14					2						2
	14b				1	2	1					4
	14c		4		1	1						6
	15	1	2			2	2	1				8
	16		1		1	4						6
	17						2					2
	17a		1				1					2
	17b						6					6
	17c				1	2	1					4
	17d	1										1
	<b>Atypical</b>	5	11	3	6	9	1	1				30
	<b>Subtotal</b>	20	33	8	6	75	41	3	2	0	1	189
<i>S. Oranienburg</i>	1		5			1	1	1	1			9
	2		3									3
	3				1							1
	6		4		1	1						6
	8					1						1
	11		6	1		2			2			11
	12					3						3
	15		4									4
	<b>Atypical</b>	2	4			4						10

Phage Type Data 2008

Organism	Phage Type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
	Untypable		1		1							2
	Subtotal	2	27	1	3	12	1	3	1	0	0	50
S. Panama	A		1				2					3
	G											2
	H	2	1			2						3
	Atypical	1				2						3
	Untypable				1	1						2
	Subtotal	3	2	0	1	5	2	0	0	0	0	13
S. Paratyphi B	Battersea	1					1					2
	Dundee						1					1
	Worksop						1					1
	Atypical			1	1		10		2			14
	Subtotal	1	0	1	1	0	13	0	2	0	0	18
S. Paratyphi B var. Java	3b var 2				1							1
	3b var.7	1				2	1					4
	Battersea	3					1					4
	Dundee		1			1	2					4
	Atypical	2	6		1	6	6	1	2			24
	Untypable		1		1							2
	Subtotal	6	8	0	3	9	10	1	2	0	0	39
S. ssp I 4,[5],12:b:-	3b var. 2					8	2	1				11
	3b var. 7					1						1
	Atypical	1				4	2					7
	Battersea				2	11	11		1			25
	Dundee		1									1
	var 1											
	Dundee		1			2						3
	var 2											
	U302						2					2
	Untypable	2	4	1	1	7	6			2		23
	Subtotal	2	7	1	3	33	23	1	1	2	0	73
S. ssp I 4,[5],12:i:-	1					1						1
	22	1										1
	35					1	3					4
	41			2								2
	41 & 191			2								2
	99			1						1		2
	104						1					1
	104b		4									4
	110b						1					1
	120					1						1
	191	4	12	9	19	9	15		1			69
	191a		1	1		3						2
	193	1	3		2	3	3		1		1	14
	194						1					1

Phage Type Data 2008

Organism	Phage Type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
	<b>U276</b>		1									1
	<b>U291</b>		3	1		11	1					17
	<b>U302</b>							2				2
	<b>UT1</b>		3			1						4
	<b>UT5</b>		1		1	2						4
	<b>Atypical</b>	8	23	7	3	8	7				1	57
	<b>Untypable</b>	2	1									3
	<b>Subtotal</b>	<b>16</b>	<b>52</b>	<b>23</b>	<b>25</b>	<b>37</b>	<b>34</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>193</b>
<i>S. ssp I 9,12:-:-</i>	<b>UVS(1+1V)</b>					1						1
<i>S. ssp I Rough-O:d:-</i>	<b>UVS(I+IV)</b>	3										3
<i>S. ssp I Rough-O:i:-</i>	<b>193</b>			1								1
<i>S. Thompson</i>	<b>1</b>	2	1		3	15	11					32
	<b>2</b>						1	1				1
	<b>5</b>					1	1					2
	<b>11</b>	1				1						2
	<b>13</b>					1						1
	<b>14</b>					1						1
	<b>17</b>		2		1	1		1				5
	<b>25</b>					3	1					4
	<b>26</b>									2		2
	<b>27</b>						2					2
	<b>Atypical</b>		3		1	13	1					18
	<b>Subtotal</b>	<b>3</b>	<b>6</b>	<b>0</b>	<b>5</b>	<b>36</b>	<b>17</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>70</b>
<i>S. Typhi</i>	<b>35</b>						1					1
	<b>46</b>					1	1					2
	<b>A</b>	2			1	2						5
	<b>B1</b>					1						1
	<b>C1</b>					1						1
	<b>D.V.S.</b>		1									1
	<b>D1</b>	2				3						5
	<b>D2</b>	4				8						12
	<b>E1</b>	24	4			32	5					65
	<b>E14</b>	1				1	1					3
	<b>EI</b>					1						1
	<b>G3</b>	5			3	8	2					18
	<b>J1</b>	1	2			3						6
	<b>K1</b>					2	2					4
	<b>M1</b>					2						2
	<b>O</b>	2				1						3
	<b>UT</b>		1			1						2
	<b>UVS</b>	3	3			9	4					19
	<b>UVS(I+IV)</b>	4	2			13	1					20
	<b>Untypable</b>	1	4	1	4	9	1					16
	<b>Subtotal</b>	<b>49</b>	<b>17</b>	<b>1</b>	<b>4</b>	<b>98</b>	<b>18</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>187</b>

## Phage Type Data 2008

Organism	Phage Type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
<b>S. Typhimurium</b>	<b>1</b>					5	4					<b>9</b>
	<b>2</b>		2			9	5	1	1			<b>18</b>
	<b>3</b>					1						<b>1</b>
	<b>3 aerogenetic</b>		1	1		5		1	1			<b>8</b>
	<b>4</b>		2			3						<b>3</b>
	<b>8</b>					12		1	6	1		<b>3</b>
	<b>9</b>					15	1					<b>20</b>
	<b>10</b>	3	2		2	2	4					<b>23</b>
	<b>12</b>					2			2			<b>8</b>
	<b>15a</b>	4	1			1		1				<b>7</b>
	<b>21</b>		1		1	1						<b>3</b>
	<b>22</b>		4			2	1		1			<b>8</b>
	<b>26</b>		1									<b>1</b>
	<b>29</b>										1	<b>1</b>
	<b>31</b>					1			1			<b>1</b>
	<b>32</b>						1					<b>1</b>
	<b>35</b>	1		1		2	1	1				<b>5</b>
	<b>40</b>		1	1				1				<b>3</b>
	<b>41</b>		1	1	1	5	2					<b>10</b>
	<b>41a</b>					1						<b>1</b>
	<b>46</b>		1									<b>1</b>
	<b>66</b>					1				1		<b>2</b>
	<b>66a</b>		2									<b>2</b>
	<b>69</b>		1			2	3		1			<b>7</b>
	<b>75</b>	1	1									<b>2</b>
	<b>87</b>					2						<b>2</b>
	<b>93</b>					1						<b>1</b>
	<b>94</b>			1	1							<b>2</b>
	<b>96</b>		1									<b>1</b>
	<b>98</b>		1						1			<b>2</b>
	<b>99</b>		1	2	3	3						<b>9</b>
	<b>104</b>	7	100	10		28	8	2				<b>155</b>
	<b>104a</b>			2	1	6	8					<b>17</b>
	<b>104b</b>	1				46	2					<b>49</b>
	<b>106</b>	1		1								<b>2</b>
	<b>107</b>					1						<b>1</b>
	<b>108</b>	2	23	5	6	106	24	3	3		1	<b>173</b>
	<b>110b</b>					3	1					<b>4</b>
	<b>116</b>		1									<b>1</b>
	<b>120</b>	1		1		4	2					<b>8</b>
	<b>132</b>		7			2	5					<b>14</b>
	<b>135</b>					1						<b>1</b>
	<b>160</b>		2				1					<b>3</b>
	<b>177</b>						1					<b>1</b>
	<b>180</b>						1			1		<b>3</b>
	<b>191</b>							2				<b>2</b>
	<b>193</b>	1	1	1	4	13	5		1			<b>26</b>
	<b>194</b>					1						<b>1</b>
	<b>195</b>		1	1		2	3		1		1	<b>9</b>

Phage Type Data 2008

Organism	Phage Type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
	204a		1			2						3
	208						1					1
	U276				1							1
	U285	3									1	4
	U302		5	1	1	17	11		2			35
	UT1	4	3	1	1	1	1	2				13
	UT5	6	18		2	8	9					43
	Atypical	7	22	4	2	49	28	1	1	1	1	116
	Untypable	1	5	1	1	3	1					12
	Subtotal	43	213	33	26	367	135	15	23	2	6	863
<b>Total Salmonella</b>		598	856	145	187	1681	936	84	108	21	58	4674
<b>Shigella</b>												
	<i>Shigella boydii</i>											
	<i>Shigella boydii</i> 2	13		1		1						2
	<i>Shigella boydii</i> 4	13		3		1						4
	Atypical	1										1
	Subtotal	4	0	0	1	0	0	0	0	0	0	5
	<i>Shigella boydii</i> 8	13					1					1
	<i>Shigella boydii</i> 10											1
	<i>Shigella boydii</i> 19	3		1								1
	Atypical	1										1
	Subtotal	1	1	0	0	0	0	0	0	0	0	2
	<i>Shigella boydii</i> 20	3		3								3
	6				1							1
	Atypical	2										2
	Subtotal	5	0	0	1	0	0	0	0	0	0	6
	<i>Shigella boydii</i> Prov. 96											1
	Atypical	1										
	<i>Shigella sonnei</i>	1		23	2		5					30
	2		1	1								2
	9		1									1
	15		1			3						4
	Atypical		7			5						12
	Subtotal	0	33	3	0	13	0	0	0	0	0	49
<b>Total Shigella</b>		12	35	3	3	14	0	0	0	0	0	67
<b>Total</b>		638	1391	164	222	2160	1092	103	117	24	64	5975

### Appendix 5. Serotype data reported to NESP in 2007

Organism	BC	AB	SK	MB	ON	QC	NB	NS	PE	NF	NT	YK	NU	Total
S. Aberdeen					3									3
S. Adelaide		6		1	9	2								18
S. Ago					2									2
S. Agodi	1													1
S. Agona	12	13	2	3	48	22	2	4		3				109
S. Alachua		1				1								2
S. Albany	4	2			1	2		1						10
S. Anatum	2	1			18	1								22
S. Arechavaleta					1									1
S. Baildon		1												1
S. Bardo		1			1									2
S. Bareilly	4	1			7			1						13
S. Barranquilla	2													2
S. Belfast	1													1
S. Berta		1	1		18	3								23
S. Blockley	2			1		3								6
S. Bonariensis					1									1
S. Bonn			1											1
S. Bovis-morbificans	3	1		3	9	7								23
S. Bradford	1													1
S. Braenderup	9	6	1	2	39	7	1	2		1				68
S. Brandenburg	5	1		2	8	6								22
S. Bredeney		1												1
S. Brijbhum	1													1
S. Carmel		1												1
S. Cerro	1	1			7	1								10
S. Chester	4				5			1						10
S. Cholerae-suis			1		2	2								5
S. Coeln				1										1
S. Colindale					1									1
S. Colorado								1						1
S. Corvallis	2	4			1	1								8
S. Cotham		2												2
S. Cubana					3									3
S. Daytona		1												1
S. Denver	1													1
S. Derby	4	7			10	3		2						26
S. Dublin	2	1			1									4
S. Durham					1									1
S. Ealing	1				3									4
S. Eastbourne					4									4
S. Ebrie					1									1
S. Edinburg						1								1
S. Emek					1									1
S. Enteritidis	300	276	38	52	690	214	36	34	5	11	3	1	1	1661
S. Florida		1				1								2
S. Fluntern					1									1

Organism	BC	AB	SK	MB	ON	QC	NB	NS	PE	NF	NT	YK	NU	Total
S. Gaminara	2					1	1							2
S. Gatuni														2
S. Give	1	2		6	8									17
S. Glostrup	1													1
S. Grumpensis	1													1
S. Haardt	1													1
S. Hadar	14	37	3	6	60	14		4		6				144
S. Haifa	1				4									5
S. Hartford		5		1	14		1							21
S. Havana	5	1			7	3								16
S. Heidelberg	40	85	12	22	210	114	46	18	6	5	1		1	560
S. Herston						1								1
S. Hidalgo						1								1
S. Hvittingfoss	3	1				2	2							8
S. Indiana						5	1							6
S. Infantis	10	11	3	2	78	20		3	3	1				131
S. Inverness	2					1								3
S. Irenea		1												1
S. Irumu	1				2									3
S. Istanbul		2			4									6
S. Ituri							1							1
S. Jangwani							1							1
S. Javiana	6	4			27	9	2	1						49
S. Johannesburg		2	1		2									5
S. Kedougou	1	1												2
S. Kentucky	5	4			23	4		1						37
S. Kiambu	3	5			9	1	1							19
S. Kiel						1								1
S. Kingston		1				1	1							3
S. Kintambo						1								1
S. Kisangani							1							1
S. Kottbus		1				2								3
S. Kua	1													1
S. Larochele						1								1
S. Lexington	1													1
S. Limete		1												1
S. Litchfield					8	1								9
S. Livingstone	1													1
S. Lomalinda		2												2
S. London				3	5		1							9
S. Madras							1							1
S. Manhattan	1				4			1						6
S. Matadi							2							2
S. Mbandaka	15	6		23	11	5		1						61
S. Meleagridis						2								2
S. Miami					2	2								4
S. Minnesota	1				2									3
S. Mississippi			1		7			1						9
S. Montevideo	7	5			27	4	4		1					48

Organism	BC	AB	SK	MB	ON	QC	NB	NS	PE	NF	NT	YK	NU	Total
S. Monschau	1													1
S. Muenchen	9	8	1	1	45	17	2							83
S. Muenster	1	3			6	5								15
S. Napoli	2				1	2	2	1						2
S. Nessziona														6
S. Newport	17	16	4	11	69	19	5	1						142
S. Nottingham							1							1
S. Ohio				2	10	1								13
S. Ondersteopoort					1									1
S. Orianenburg	13	25	1	5	95	4				2				145
S. Orion					1									1
S. Oslo	1	1			5	1								8
S. Othmarschen	1													1
S. Panama	4	6			9	7		1						27
S. Paratyphi A	25	12	1		54	2				2				94
S. Paratyphi B				1										3
S. Paratyphi B var Java	11	9	7	1	32	14		3						77
S. Pomona	1				3	2								6
S. Poona	5	5			11	6		1						28
S. Praha						1								1
S. Putten						1								1
S. Reading	2			2	4									8
S. Richmond	2		1											3
S. Rissen	2				3	2								7
S. Rubislaw					2									2
S. Sandiego	1	3			4	4					1			13
S. Saintpaul	22	9	5	9	33	31	6	2	4	2				123
S. Schwarzengrund	3	10	1	1	9	2	1	1	1	1				30
S. Senftenberg	11	2	2		11	1		1			1			29
S. Singapore					1									1
S. Stanley	21	5	1	3	30	19	1	1						81
S. Stanleyville						1								1
S. Szentes					1									1
S. Tambacounda	3													3
S. Telelkebir		2			2	3								7
S. Tennessee	1	2	1		8	1								13
S. Thompson	5	7		2	119	25	4	10		1				173
S. Typhi	33	20		4	82	19								158
S. Typhimurium	88	155	24	28	794	208	14	11	5	7	3		4	1341
S. Uganda		1			19	1								21
S. Urbana		4				1								5
S. Virchow	10	5	3		15	2					1			36
S. Virginia	1													1
S. Vitkin		1												1
S. Wandsworth	1													1
S. Wangata					1									1
S. Weltevreden	3	1	1		10	3	1							19
S. Worthington					5									5
S. Yovokome					1									1

Organism	BC	AB	SK	MB	ON	QC	NB	NS	PE	NF	NT	YK	NU	Total
S. ssp. I 3,10:-:-					1									1
S. ssp. I 4,[5],12:-:-	1				2									3
S. ssp. I 4,[5],12:b:-		4			66	7	1							78
S. ssp. I 4,[5],12:i:-	47	31	7		66	29		3			1			174
S. ssp. I 6,7:-:e,n,z15		1												1
S. ssp. I 6,7:c:-						1								1
S. ssp. I 6,7:d:-	1													1
S. ssp. I 6,7:e,h:-		1				1								2
S. ssp. I 6,7:r:-						2								2
S. ssp. IV 6,7:z4,z24:-						1								1
S. ssp. I 6,8:-:-						1								1
S. ssp. I 6,8:e,h:-						1								1
S. ssp. I 6,8:z10:-		1				1								2
S. ssp. I 8,20:-:-						1								1
S. ssp. I 9,12:-:-	1	1				1								3
S. ssp. II 9,12:d:e,n,x							1							1
S. ssp. I 9,12:l,v:-						1								1
S. ssp. I 9,12:-:1,5						1								1
S. ssp. IIIb 14:z10:z		1												1
S. ssp. IIIb 38:-:-	1													1
S. ssp. IIIa 41:z4,z23:-		1				1	1							3
S. ssp. IV 43:z4,z23:-						1								1
S. ssp. I 44:-:-		1												1
S. ssp. IIIa 44:z4,z23,z32:-						1	1							2
S. ssp. IV 44:z4,z32:-			1											1
S. ssp. IV 45:g,z51:-	1													1
S. ssp. IIIb 47:z10:z35		1												1
S. ssp. IV 48:g,z51:-							2							2
S. ssp. IIIb 48:i:z							1							1
S. ssp. IIIa 48:z4,z24:-	1													1
S. ssp. IV 48:z4,z32:-							2							2
S. ssp. IIIb 50:k:z	2	1	1											4
S. ssp. IIIb 50:r:z		1												1
S. ssp. IIIb 60:r:z		1												1
S. ssp. IIIb 61:k:1,5,7	1					1	2							4
S. ssp. IIIb 61:l,v:1,5,7						1								1
S. ssp. IIIb 61:l,v:z35						1								1
S. ssp. IIIb 61:z52:z53				1										1
S. ssp. I OR:-:-						4								4
S. ssp. I O(Rough):g,m:-						1		1						2
S. ssp. I O(Rough):i:1,2	2													2
S. ssp. IIIb O(Rough):k:z35	2													2
S. ssp. I O(Rough):l,v:e,n,x	2	1												3
S. ssp. I O(Rough):r:1,5							2							2
S. ssp. I O(Rough):z:1,5							1							1
S. ssp. I O(Rough):z:1,6		1												1
S. ssp. I O(Rough):z38:-									1					1
S. ssp. I O(Rough):-:1,2						2				1				2
S. ssp. I	1	1				1	1	1		1				6

Organism	BC	AB	SK	MB	ON	QC	NB	NS	PE	NF	NT	YK	NU	Total
S. ssp. III				1				1						2
Salmonella sp.				22	2		8	3						36
<b>Total Salmonella</b>	<b>840</b>	<b>876</b>	<b>127</b>	<b>223</b>	<b>3089</b>	<b>920</b>	<b>136</b>	<b>123</b>	<b>21</b>	<b>44</b>	<b>12</b>	<b>2</b>		<b>6419</b>
<i>C. coli</i>	6	22	14	3	101	24	6			1				177
<i>C. jejuni</i>	407	344	187	101	304	56	113	2	2	42	2	3		1563
<i>C. jejuni/coli</i>							1	67	26	3				97
<i>C. curvus</i>		1												1
<i>C. fetus</i>					9	15								24
<i>C. hyoilectinalis</i>						3								3
<i>C. laridis</i>		1	1		6	3								11
<i>C. upsaliensis</i>	1	5	5		28	5								44
<i>Campylobacter</i> sp.			1	1			36			1				39
<b>Total Campylobacter</b>	<b>414</b>	<b>373</b>	<b>208</b>	<b>105</b>	<b>448</b>	<b>106</b>	<b>156</b>	<b>69</b>	<b>28</b>	<b>47</b>	<b>2</b>	<b>3</b>		<b>1959</b>
<i>Shigella boydii</i> 1	1													1
<i>Shigella boydii</i> 2		3			2									5
<i>Shigella boydii</i> 3	1													1
<i>Shigella boydii</i> 4					1	2								3
<i>Shigella boydii</i> 9		1			1									2
<i>Shigella boydii</i> 12	1					1								2
<i>Shigella boydii</i> 13					1									1
<i>Shigella boydii</i> 14						1								1
<i>Shigella boydii</i> 15					1									1
<i>Shigella boydii</i> 19		2			1									3
<i>Shigella boydii</i> 20		3			4	2								9
<i>Shigella boydii</i>			1											1
<i>Shigella dysenteriae</i> 2	2				1									3
<i>Shigella dysenteriae</i> 3		1					1							2
<i>Shigella dysenteriae</i> 4	2													2
<i>Shigella dysenteriae</i> 12	1													1
<i>Shigella dysenteriae</i> 16		2			1	1								4
<i>Sh. dysenteriae</i> prov.103					1									1
<i>Sh. dysenteriae</i> prov.111		1												1
<i>Shigella dysenteriae</i>				2										2
<i>Shigella flexneri</i> 1	3	4	1											8
<i>Shigella flexneri</i> 1a						1	1							2
<i>Shigella flexneri</i> 1b						11	8							19
<i>Shigella flexneri</i> 2	13	11	1											25
<i>Shigella flexneri</i> 2a		1			23	14								38
<i>Shigella flexneri</i> 2b					3	1								4
<i>Shigella flexneri</i> 3	12	2	2				6	5						16
<i>Shigella flexneri</i> 3a														11
<i>Shigella flexneri</i> 3b							1							1
<i>Shigella flexneri</i> 4	2	1												3
<i>Shigella flexneri</i> 4a	1				7									8
<i>Shigella flexneri</i> 4c					1									1

Organism	BC	AB	SK	MB	ON	QC	NB	NS	PE	NF	NT	YK	NU	Total
<i>Shigella flexneri</i> 6	6	7			11	1								25
<i>Shigella flexneri</i> 8					1									1
<i>Shigella flexneri</i> 11	1					1	1							1
<i>Shigella flexneri</i> var X	2	1				1	1							5
<i>Shigella flexneri</i> var Y						1								1
<i>Shigella flexneri</i> prov. 104		3			4									7
<i>Shigella flexneri</i>	4			5				3	1					13
<i>Shigella sonnei</i>	129	45	2	5	136	69		4						390
<i>Shigella</i> sp.	11													11
<b>Total <i>Shigella</i></b>	<b>192</b>	<b>88</b>	<b>7</b>	<b>12</b>	<b>221</b>	<b>108</b>	<b>3</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>		<b>636</b>
 <i>E. coli</i> O157 VTEC	111	243	33	18	307	149	24	5	14	7	1			912
<i>E. coli</i> O157:NM	11	6				4								21
<i>E. coli</i> O157 VT-				1										1
<i>E. coli</i> Non-O157 VTEC	8			4			1			2				15
<i>E. coli</i> Non-Typed VTEC	37			21										58
<i>E. coli</i> O109:H28										1				1
<i>E. coli</i> O111				1										1
<i>E. coli</i> O111:NM	3													3
<i>E. coli</i> O114				1										1
<i>E. coli</i> O125				1										1
<i>E. coli</i> O128				2										2
<i>E. coli</i> O55				2										2
<b>Total <i>E. coli</i></b>	<b>170</b>	<b>249</b>	<b>33</b>	<b>51</b>	<b>307</b>	<b>153</b>	<b>25</b>	<b>5</b>	<b>14</b>	<b>10</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1018</b>
 <i>Vibrio cholera</i> O1	1	1			1	1								4
<i>Vibrio cholera</i> non O1/O139	4	3	2											9
<i>Vibrio alginolyticus</i>	1						1							2
<i>Vibrio fluvialis</i>	1						1							2
<i>Vibrio furnissii</i>	1													1
<i>Vibrio mimicus</i>	1													1
<i>Vibrio paraheamolyticus</i>	9	4	2			2								15
<i>Vibrio vulnificus</i>	1													3
<b>Total <i>Vibrio</i></b>	<b>19</b>	<b>8</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>		<b>37</b>
 <i>Y. enterocolitica</i>	47	64	14	5	275	21	4	4	1	2		1		438
<i>Y. bercovieri</i>					1									1
<i>Y. frederiksenii</i>	13	1	2	2	4									22
<i>Y. intermedia</i>	7	4	6		4									21
<i>Y. kristensenii</i>			1		2									3
<i>Yersinia</i> sp.				3										3
<b>Total <i>Yersinia</i></b>	<b>57</b>	<b>69</b>	<b>23</b>	<b>10</b>	<b>286</b>	<b>21</b>	<b>4</b>	<b>4</b>	<b>1</b>	<b>2</b>		1		<b>488</b>

Serotype Data 2007

<b>Organism</b>	<b>BC</b>	<b>AB</b>	<b>SK</b>	<b>MB</b>	<b>ON</b>	<b>QC</b>	<b>NB</b>	<b>NS</b>	<b>PE</b>	<b>NF</b>	<b>NT</b>	<b>YK</b>	<b>NU</b>	<b>Total</b>
<i>Cryptosporidium</i>	24	16	24	44	63	4	11	13	2	1		3		<b>205</b>
<i>Cyclospora cayetanensis</i>						4		2						<b>6</b>
<i>Cyclospora sp.</i>	7			1	7									<b>15</b>
<i>Entamoeba histolytica/dispar</i>	113	11	31	21	326	135	1	11	1	3		2		<b>656</b>
<i>Giardia</i>	114	22	98	48	251	81	73	58	7	31		13		<b>796</b>
<b>Total Parasites</b>	<b>258</b>	<b>49</b>	<b>153</b>	<b>114</b>	<b>647</b>	<b>224</b>	<b>85</b>	<b>84</b>	<b>10</b>	<b>35</b>	<b>0</b>	<b>18</b>		<b>1678</b>
Adenovirus	87			78			2			1				<b>168</b>
Astrovirus										1				<b>1</b>
Norovirus	482	296	689	198		916	152	408	18	153	1	8		<b>3321</b>
Enterovirus				14										<b>14</b>
Rotavirus	232	181	369	82		181	18	20	63	3	3	1		<b>1153</b>
<b>Total Viruses</b>	<b>801</b>	<b>477</b>	<b>1058</b>	<b>372</b>	<b>0</b>	<b>916</b>	<b>335</b>	<b>426</b>	<b>38</b>	<b>218</b>	<b>4</b>	<b>11</b>		<b>4657</b>
<b>Total Organisms</b>	<b>2761</b>	<b>2189</b>	<b>1613</b>	<b>887</b>	<b>5001</b>	<b>2450</b>	<b>746</b>	<b>716</b>	<b>112</b>	<b>356</b>	<b>20</b>	<b>6</b>	<b>35</b>	<b>16892</b>

## Appendix 6. Phage types of Isolates reported in 2007, NML

Organism	Phage type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	NT	Total
<i>Escherichia coli</i>													
<i>E. coli</i> O157:H7	1						5						5
	2	3	1		1	19	5						28
	4	4			1	6	12	1					26
	8	10	1			19	5						35
	10	1					2						3
	14	24	3	1	26	11				4			69
	14a	257	11	13	167	72	16	8		3	2		549
	14b				4		1						5
	14c	3											3
	21	12				1							13
	23	1				5	1						7
	28	2											2
	31	3	2			3	1						9
	32	30	1			12	23	2				1	69
	33	7				2	3			1			13
	34	1				4							5
	38					1							1
	42						1						1
	45	1				1							2
	47					1							1
	49	2					1						3
	54	4				2	4						10
	59	1											1
	70		1			1							2
	72	1		1									2
	74	1											1
	87					1							1
	Atypical	2	1			17	19	1			3		43
	Untypable		1										1
	Subtotal	0	371	22	16	292	165	21	8	10	7	0	912
<i>E. coli</i> O157:H Nonmotile	4					3							3
	8					7	3						10
	10					1							1
	14	2				1							3
	14a	1	1	1	7					1			11
	14c	2											2
	33	1											1
	87					1							1
	Atypical					1							1
	Subtotal	0	6	1	1	20	4	0	0	1	0	0	33
Total <i>E. coli</i>		0	377	23	17	312	169	21	8	11	7	0	945

Organism	Phage type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	NT	Total
<i>Listeria monocytogenes</i>													
<i>Listeria monocytogenes</i>	1/2a	1	5			10							16
	1/2b	5	2			3							10
	1/2c	2											2
	4b		1		1	8			1				11
	Subtotal	8	8	0	1	21	0	0	1	0	0	0	39
<i>Salmonella</i>													
<i>S. ssp. I 4,[5],12:b:-</i>	3b var. 2					6	1	1					8
	3b var. 7					1							1
	Battersea		3		1	4	1						9
	Dundee					1							1
	Dundee var. 1					2							2
	Dundee var. 2					1							1
	Atypical					2							2
	Untypable	1	1	0	1	6	3						11
	Subtotal	1	4	0	1	23	5	1	0	0	0	0	35
<i>S. ssp. I 4,[5],12:i:-</i>	35		1			1			1				3
	41	1	1	3			1						6
	99			1								1	2
	120		3			1							4
	125	1					1						2
	146a var.			1		1							2
	190					1							1
	191	14	11	3	1	8	2						39
	191a			1									1
	193		2	2		3							7
	195					1							1
	UT 1						1						1
	UT 2						1						1
	UT 5		1			1							2
	U284						1						1
	U291	1	7		2	12	10					2	34
	U292			1				1					1
	U302							1					1
	U310							1					1
	Atypical	4	9	3		10	11						37
	Untypable	1											1
	Subtotal	22	35	15	3	39	30	0	1	1	2	0	148
<i>S. Agona</i>	11					1							1
	12					3							3
	Not Applicable							2					2
	Subtotal	0	0	0	0	4	0	2	0	0	0	0	6

Phage Type Data 2007

Organism	Phage type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	NT	Total
<i>S. Enteritidis</i>	1	20	16	2	4	64	30	1	2	2	1		142
	1a	2				7	3		1				13
	1b		2			2	1						5
	2		10										10
	3					2							2
	4	20	18	2	4	75	12	4	3	1			139
	4a						1						1
	4b	8					1						9
	5a					1	1						2
	5b	1	9	1	2	32	21		2				68
	6	11	20	1	1	26	5	1	2		1		68
	6a	17	14	2	1	25	7	1					67
	6b					1							1
	8	41	97	9	23	103	53	11	5	2	5	1	350
	9b		6				1						6
	9c												1
	11b	1	4	3			1						8
	12					1							1
	13	141	39	15	23	258	53	11	7		1		548
	13a	2	1	1	2	3	1	1	2				13
	14b	4	3			5	3	1	1				17
	15					1							1
	16					1							1
	18	1											1
	19					1	1						2
	19a		1										1
	20		3	1		2	1						7
	21	5	4			18	1						28
	21a					3							3
	22		1		1	1							3
	23		3										3
	24					1	1						2
	26	2											2
	27		3			1	1						5
	29					1							1
	29a	6	33	2		17	4	6	7				73
	30	4	14			7	8						35
	31					2							2
	32a		1				2	1					1
	33						3						3
	34												3
	35		1										1
	37	1				3							4
	38					1							1
	40		2										2
	43		1										1
	911					4							4
	UT 1				2								2
	Atypical	8	6	1		22	5	1					43

Organism	Phage type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	NT	Total
	Untypable	5	7		1	7	2						22
	<b>Subtotal</b>	<b>300</b>	<b>319</b>	<b>40</b>	<b>64</b>	<b>703</b>	<b>218</b>	<b>38</b>	<b>32</b>	<b>5</b>	<b>8</b>	<b>1</b>	<b>1728</b>
<i>S. Hadar</i>	1						1						1
	2	1	8		1	24	3				3		40
	4		1										1
	5		5			1	1		4				11
	10	5	2		2	3	1						13
	11	1	10	3	5	3	1		1				24
	13	1											1
	14		3		1								4
	17						1					2	3
	18						1	1					2
	19		1	2									3
	32		1										1
	33		4		1								5
	47	1	8				1						10
	56	1	1			1							3
	58		1										1
	Atypical	1	1		1	1	2						6
	<b>Subtotal</b>	<b>11</b>	<b>46</b>	<b>5</b>	<b>11</b>	<b>34</b>	<b>12</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>129</b>
<i>S. Heidelberg</i>	1			1		1	1						3
	2					2	1						3
	5	2	1			4	4				1		12
	6					1	2						3
	8					2							2
	9						2	1					3
	10		1							1			2
	11					18	2						20
	11a					6	3	1					10
	12						1						1
	16					3	4						7
	17	1	1						1				3
	18	3	4	1		1		1					10
	18a					1		4					5
	19	3	75	6	9	77	53	14	7	1			245
	19a					1	4	18	5				28
	19b		1			2	1						4
	22		4				1						5
	25					1				1			1
	26				4	37	4	6			1		52
	29	2	8	1	9	39	11				1		71
	29a	2											2
	32	2	6	1		3			1	1			12
	35	1			4								3
	36		1			1							5
	37		1			3	2						2
	40												5

Phage Type Data 2007

Organism	Phage type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	NT	Total
	<b>41</b>		1			10	4	1	3		2		<b>21</b>
	<b>44</b>					2							<b>2</b>
	<b>46</b>						1						<b>1</b>
	<b>47</b>						3						<b>3</b>
	<b>51</b>	1		1	1	5	2	1					<b>9</b>
	<b>52</b>		1										<b>2</b>
	<b>53</b>						1	1					<b>1</b>
	<b>54</b>						1						<b>2</b>
	<b>55</b>						1						<b>1</b>
	<b>Atypical</b>	2	15		16	7	9	2			1		<b>52</b>
	<b>Subtotal</b>	<b>19</b>	<b>120</b>	<b>11</b>	<b>46</b>	<b>227</b>	<b>115</b>	<b>50</b>	<b>17</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>612</b>
<i>S. Infantis</i>	<b>1</b>			1		2	2						<b>5</b>
	<b>3</b>						1						<b>1</b>
	<b>4</b>		1			6	2						<b>9</b>
	<b>5</b>					3	2						<b>5</b>
	<b>7</b>	2	2	1		35	1				1		<b>42</b>
	<b>8</b>	1	1	2		4							<b>8</b>
	<b>10</b>					1							<b>1</b>
	<b>12</b>	2			1								<b>3</b>
	<b>13</b>		1	1		3							<b>5</b>
	<b>17</b>			1									<b>1</b>
	<b>26</b>		1			4	1				1		<b>7</b>
	<b>29</b>				1		1				1		<b>3</b>
	<b>Atypical</b>	1	1			1	1						<b>4</b>
	<b>Subtotal</b>	<b>6</b>	<b>7</b>	<b>6</b>	<b>2</b>	<b>60</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>94</b>
<i>S. Muenchen</i>	<b>11</b>					6							<b>6</b>
	<b>Untypable</b>					8							<b>8</b>
	<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>14</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>14</b>
<i>S. Newport</i>	<b>1</b>					2			1				<b>3</b>
	<b>2</b>		3		1	11							<b>15</b>
	<b>3</b>	9				3	1						<b>13</b>
	<b>4</b>	1				6	1	1					<b>9</b>
	<b>5</b>		1										<b>1</b>
	<b>9</b>		2	1		17	8	1					<b>29</b>
	<b>10</b>		1			3							<b>4</b>
	<b>11</b>					2							<b>2</b>
	<b>13</b>	1	3			5							<b>9</b>
	<b>14</b>		1		2	3							<b>6</b>
	<b>14a</b>						1						<b>1</b>
	<b>14b</b>	3				2							<b>5</b>
	<b>14c</b>				1								<b>1</b>
	<b>15</b>	2	1			3	1						<b>7</b>
	<b>16</b>							1					<b>1</b>
	<b>17c</b>		1	2	2	1	2						<b>8</b>
	<b>17e</b>		1										<b>1</b>
	<b>Atypical</b>	2	3	1	1	12	3	3					<b>25</b>

Organism	Phage type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	NT	Total
S. O 4,5,12:Hb:H-	Battersea						1						1
S. O 4,12,H:b_	Battersea						1						1
S. O 4,5,12:H:iH-	U291						1						1
S. OR:i:1,2	193				1								1
S. Oranienburg	1	1				4	1						6
	2		1			1							1
	6		1			1							2
	8	1				1							2
	11		5										5
	Subtotal	2	7	0	0	6	1	0	0	0	0	0	16
S. Panama	A		1			1	2						4
	G	1	2			1							4
	H					1							1
	Untypable		1			2							3
	Atypical		1										1
	Subtotal	1	5	0	0	5	2	0	0	0	0	0	13
S. Paratyphi B	3b var 2				1								1
	Battersea	1											1
	Dundee						2						2
	Atypical						6						6
	Subtotal	1	0	0	1	0	8	0	0	0	0	0	10
S. Paratyphi B var. Java	3b var. 2				1	6	1						8
	3b var. 7		1										1
	Battersea			5			1						6
	Dundee	1	1			2	1						5
	Dundee var. 1					1							1
	Dundee var. 2	1		1			1						3
	Sterling	1				1							2
	Untypable		4	1	1	2							8
	Worksop		1										1
	Atypical	2	2		3	5	5	2	0	0	0	0	19
	Subtotal	5	9	7	5	17	9	0	2	0	0	0	54
S. Thompson	1					2	3						5
	2	1				4							5
	3		1	1	1	42	5	1	8		1		60
	5		1			1	1						3
	8					4							4
	11					1							1
	20					1							1
	25	1	1		1	33	1	2					39

Organism	Phage type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	NT	Total
	<b>26</b>					4							4
	<b>27</b>	2											2
	<b>Atypical</b>		5										11
	<b>Untypable</b>		1			1							2
	<b>Subtotal</b>	4	9	1	2	97	11	4	8	0	1	0	137
<b>S. Typhi</b>	<b>40</b>	1											1
	<b>A</b>		1				5	3					9
	<b>B2</b>		1					2					1
	<b>D 1</b>						7						2
	<b>D 2</b>						1						7
	<b>DVS</b>												1
	<b>E1</b>	14	7		2	43	7						73
	<b>E 2</b>		1										1
	<b>E9</b>					1							1
	<b>E13</b>		1										1
	<b>E14</b>	8	1			4	1						14
	<b>G3</b>	1	3		1	8	3						16
	<b>J1</b>					3							3
	<b>K1</b>					1							1
	<b>M1</b>						1						1
	<b>N</b>					1							1
	<b>O</b>	1				1							2
	<b>Untypable</b>		3			6	2						11
	<b>UVS</b>					3							3
	<b>UVS I+IV</b>					1							1
	<b>UVS-(I+IV)</b>	3	2	0	4	4							9
	<b>Subtotal</b>	28	20	0	4	88	19	0	0	0	0	0	159
<b>S. Typhimurium</b>	<b>1</b>		4		2	3	2						11
	<b>2</b>		2	2		14	6	2					26
	<b>3</b>					2	1						3
	<b>3 aerogenetic</b>	1				36	16						53
	<b>4</b>		2										2
	<b>8</b>			1		2							3
	<b>10</b>	2	3	2		25	2					1	35
	<b>12</b>				1	6	7		1				15
	<b>12a</b>					1							1
	<b>15a</b>	1		1		1	3						6
	<b>21</b>	3	4			16	2						25
	<b>22</b>	2	2			3	3					1	11
	<b>24</b>		3										3
	<b>26</b>						1						1
	<b>30</b>					1							1
	<b>35</b>	1				10	17	3	1				32
	<b>39</b>					1	1						2
	<b>40</b>		3	1		2	5	1		2			12
	<b>41</b>	3	2		1	2	1						11
	<b>42</b>		1										1

Phage Type Data 2007

Organism	Phage type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	NT	Total
	46					3		1					1
	64	4				1							4
	66					11							3
	66a					1	1						1
	67					1							2
	69					1							11
	76					44	7			2			1
	82	1			2	3							54
	89												2
	94												3
	96	2											2
	97					2	1						3
	99	1	1	1	1	1		1					6
	102							1					1
	104	17	77	5	7	40	6						152
	104a	1	3		1	28	12	1					46
	104b	3			1	19	4		1				28
	106					1							1
	107		2		1	4							7
	108	1	21	5	6	395	30		1	1	1		461
	110b	1				8	3	1	1				14
	120	1	2	1		6	5						15
	124				2	1							3
	124 var.				1		1						2
	131						1						1
	132		3			3	4		2	1	1		14
	135	1	3		2	2	1						9
	143					1							1
	146					1							1
	156						1						1
	160	4	1				1	1					7
	169					1							1
	170					4	1	2					5
	177												2
	191								1				1
	192		1										1
	193	4	15		2	17	14	1		1			54
	195					7	2						9
	197	1											1
	204a					1							1
	204c					1							1
	208					1	1						2
	208 var.		1										1
	UT1	1	1	1	1	6	5		1				16
	UT2		2			1							3
	UT5	8	1	3		4	4						20
	UT 6					1							1
	UT 7		3										3
	UT 8		1										1

Phage Type Data 2007

Organism	Phage type	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	NT	Total
	U284	1	1			3							5
	U284 var.					1							1
	U285					4	3	1					8
	U286						1						1
	U291			1			1						2
	U292						1	1					2
	U297						2						2
	U301							1					1
	U302					19	13						32
	U310		1			2							3
	Atypical	6	11	4		26	14						61
	Untypable		2			2	1						5
	Subtotal	56	192	27	34	805	209	15	10	5	4	0	1357
Total <i>Salmonella</i>		474	790	116	181	2192	670	115	76	18	25	1	4658
<b><i>Shigella</i></b>													
	<i>Shigella boydii</i> 8	13					1						1
	<i>Shigella boydii</i> 19	3		2									2
	<i>Shigella sonnei</i>	1		13			1						14
	Atypical		5				3						16
	S1		32	1			22					3	58
	S2						1						1
	S10						1						1
	S14												1
	S15		3				6						10
	S20		1										1
	Subtotal	54	1	0	0	34	0	0	0	0	13	0	102
Total <i>Shigella</i>		56	1	0	0	35	0	0	0	0	13	0	105
Total Organism		538	1176	139	199	2560	839	136	86\5	29	45	1	5747