# Laboratory Surveillance Data for Enteric Pathogens in Canada

## Annual Summary 2002 and 2003

Public Health Agency of Canada
Agence de santé publique du Canada

Canada

# Laboratory Surveillance Data For Enteric Pathogens In Canada

# Annual Summary 2002 and 2003

Enteric Diseases Program
National Microbiology Laboratory
Public Health Agency of Canada
The Canadian Science Centre for Human and Animal Health
1015 Arlington Street
Winnipeg, Manitoba, Canada
R3E 3R2

Phone: (204) 789-2000
Fax: (204) 789-5012

***"The Enteric Diseases Program is committed to maintaining and improving the health of Canadians by identifying, characterizing and conduction surveillance and research on enteric pathogens for the prevention and control of diarrhoeal diseases."***

Enteric Diseases Program
National Microbiology Laboratory

***"To promote and protect the health of Canadians through leadership, partnership, innovation and action in public health."***

Public Health Agency of Canada

PUBLIC HEALTH AGENCY *of* CANADA
AGENCE DE SANTÉ PUBLIQUE *du* CANADA

This report summarizes the information received from federal, provincial and public health agencies on enteric pathogens identified in Canada for the years 2002 and 2003. The information is intended primarily for those with responsibilities for the control and prevention of enteric food borne disease.

The data contained in this report should not be quoted or used in any publication without the prior approval from the National Microbiology Laboratory.

ISBN: 0-662-41289-3
Catalogue No.: HP57-1/2003E-PDF

# Acknowledgements

**Prepared By:**
Walter Demczuk

**Editors:**
Lai King Ng
David Woodward
Rafiq Ahmed
Clifford Clark
Helen Tabor
Kathryn Dore
Nadia Ciampa
Anne Muckle

**Data Analysis :**
Walter Demczuk
Lori Buller
Michelle Boyd
Marielle Pauze
Carole Scott
Anne Muckle

**Translation:**
Translation Bureau, Public Works and Government Services Canada

**Additional Support and Assistance:**
Provincial Laboratory Contacts:
Ana Paccagnella, Quantine Wong, Marie Louie, Barry Chamberlin, Peter Tilley, Ellen Blewett, Loretta Ball, Dawn Colby, Katherine Brown, Brian Klisko, Cliff Koschik, Robert Terro, Jeremy Wan, Johanne Ismaïl, Jill Rae, Janet Slaunwhite, Allan Ellis, David Haldane, Elroy Mann, John Wylie, Elspeth Nickerson, Janet Reid, Dora Lee, Linda Chui, Yvonne Yaschuk, Evelyn Nagle, Bruce Ciebin, Sheila Cook, Marina Lombos, Suzanne Lombardi, G.J. Hardy and Sandra March.

We also take this time to thank the Directors of the participating Provincial Laboratories and of the Laboratory for Food Borne Zoonoses:
Dr. Judy Isaac-Renton, BC Centre for Disease Control, British Columbia
Dr. Jutta Preiksaitis, Provincial Laboratory of Public Health, Alberta
Dr. Greg Horsman, Department of Saskatchewan Health, Saskatchewan
Dr. Paul Van Caeseele, CADHAM Provincial Laboratory, Manitoba
Dr. Frances Jamieson, Central Public Health Laboratory, Ontario
Dr. Mohamed Karmali, Health Canada, Laboratory for Food Borne Zoonoses, Guelph, Ontario
Dr. Jean Joly, Laboratoire de santé publique du Québec, Québec
Dr. Anne O'Brien, Saint John Regional Hospital, New Brunswick
Dr. Kevin Forward, Queen Elizabeth II Health Sciences Centre, Nova Scotia
Dr. Lewis Abbott, Provincial Health Laboratory, Prince Edward Island
Dr. Sam Ratnam, Newfoundland Public Health Laboratories, Newfoundland

## Table of Contents

## List of Figures

## List of Tables

# Report Highlights

**Major Enteric Pathogen Groups:**

- The total number of isolations of the major pathogens has continued to decline.
- *Campylobacter* continues to be the most prevalent pathogen in Canada distantly followed by *Salmonella* and parasitic infections.

***Salmonella* from Human Sources:**

- 52.5% of all *Salmonella* infections are caused by 3 serovars: *S*. Typhimurium (20%), *S*. Heidelberg (20%) and *S*. Enteritidis (12.5%).
- Each of the remaining most prevalent serovars in the top 10 represent only 2.0% to 3.4% of infections.
- Ontario has the highest number of isolations (n=2316) followed by Quebec (n=1083).
- The national isolation rate has decreased from 24.1 isolations per 100,000 population in 1999 to 17.5 isolations per 100,000 population in 2003.
- Alberta has the highest isolation rate with 23.5 isolates per 100,000 population and Newfoundland has the lowest with 5.4 isolations per 100,000.
- Increases of isolation rates have been observed in New Brunswick, Prince Edward Island and Northwest Territories.
- *S.* Heidelberg has increased in prevalence in all provinces except Prince Edward Island.
- *S.* Heidelberg prevalence in Quebec has risen from 14% of all *Salmonella* isolated in 2002 to 29% in 2003, in New Brunswick from 19% to 41%, and in Newfoundland from 31% to 50%.
- *S*. Enteritidis PT 4 is still most predominant and levels of PT 8 have declined. PT 1 and PT 13 isolations have increased slightly since 2000.
- *S*. Heidelberg PT 19 is most prevalent but levels have declined since 1999.
- *S*. Typhimurium PT104 isolation has decreased from approximately 37% in 1999 to approx. 18% in 2002 and then rebounded slightly in 2003 to approximately 23%.

***Salmonella* from Non-Human Sources:**

- 44% of all non-human *Salmonella* are *S*. Typhimurium (22.6%) and *S*. Heidelberg (21.5%).
- *S*. Kentucky has been increasing in prevalence since 2001 and now ranks a distant third representing 7.4% of all non-human *Salmonella*.
- *S*. Senftenberg is most prevalent in animal feed; *S*. Typhimurium in bovine and porcine sources; and *S*. Heidelberg in most prevalent in chicken and turkey sources.

**Pathogenic *Escherichia coli*:**

- The national *E. coli* O157 isolation rate has decreased from 8.8 isolations per 100,000 population in 1999 to 3.2 isolations per 100,000 population in 2003.
- Prince Edward Island has the highest isolation rate with approx. 9 isolations per 100,000 population and Newfoundland has the lowest rate with 1 per 100,000.
- Increases of isolation rates have been observed in Manitoba and New Brunswick.
- PT 14a is the most predominant phage type constituting approximately 50% of all isolates tested, followed distantly by PT 8 with 14%.

***Campylobacter* :**

- The national *Campylobacter* isolation rate has decreased from 46.8 isolations per 100,000 population in 1998 to 36.7 isolations per 100,000 population in 2002.
- British Columbia has the highest isolation rate with approximately 50 isolations per 100,000 population and Newfoundland has the lowest rate with approximately 9 per 100,000 population.
- Increases of isolation rates have been observed in Alberta, Saskatchewan, Quebec, Nova Scotia, Prince Edward Island and the territories.

***Shigella*:**

- The national *Shigella* isolation rate has decreased from 4.1 isolations per 100,000 population in 1999 to 3.0 isolations per 100,000 population in 2003.
- British Columbia has the highest isolation rate with approximately 6 isolations per 100,000 population and Prince Edward Island has the lowest rate with less than 1 per 100,000 population.
- Increases of isolation rates have been observed in British Columbia, Saskatchewan, Quebec and New Brunswick.

**Parasites:**

- The national parasite (*Cryptosporidium, Cyclospora, Entamoeba* and *Giardia*) isolation rate has decreased from 21.2 isolations per 100,000 population in 2001 to 14.3 isolations per 100,000 population in 2003.
- British Columbia has the highest isolation rate with approximately 22 isolations per 100,000 population and Newfoundland has the lowest rate with approximately 5 per 100,000 population.
- Increases of isolation rates have been observed in Prince Edward Island and Nunavut.

***Yersinia*:**

- The national *Yersinia* isolation rate has decreased slightly from 2.7 isolations per 100,000 population in 1999 to 2.1 isolations per 100,000 population in 2003.
- Ontario has the highest isolation rate with approximately 3 isolations per 100,000 population.
- Increases of isolation rates have been observed in Alberta, Saskatchewan, Manitoba, New Brunswick, Nova Scotia and the Yukon.

**Major Outbreaks of 2002:**

- 189 cases of *S*. Oranienburg PT 1 / PFGE pattern OranXAI.0002 in British Columbia, Alberta, Saskatchewan, Manitoba, Ontario and Nunavut between January to April 2002. German chocolate was reported as a source of salmonellosis in Germany during this time, but PFGE typing ruled out an association and no other sources of infection were identified.
- 45 cases of *E. coli* O157:H7 infections among 250 attendees at a youth bowling league banquet in Ontario in May 2002.
- 12 cases of *E. coli* O157:H7 PT32 / PFGE pattern ECXAI.0756 in November 2002 were linked to salads and sandwiches prepared in a hospital kitchen in Prince Edward Island.
- 87 cases of *E. coli* O157:H7 were identified as part of a multi-provincial cluster with a PFGE pattern of ECXAI.0508 during May and June 2002. The source was traced to ground beef distributed and sold through a large retail chain.
- 426 isolates of *Shigella sonnei* PT 15 / PFGE pattern SSOXAI.0088 were associated with the consumption of a Greek Style Pasta Salad in Ontario in May 2002. It is estimated that over 700 people were ill.

**Major Outbreaks of 2003:**

- 40 cases of *S*. Oranienburg PT 8 / PFGE pattern OranXAI.0020 associated with the consumption of hamburgers from a fast food restaurant in Nova Scotia in August 2003.
- 65 cases of *E. coli* O157:H7 infection among visitors of a petting zoo in British Columbia in November 2003.
- 60 people attending a Robbie Burns party who consumed improperly prepared haggis became infected with *E. coli* O157:H7.
- 44 cases of *E. coli* O157:H7 PT8 were identified in June among attendees of a high school graduation banquet.
- 15 illnesses of *Shigella sonnei* among hospital staff in Quebec in July were associated with the consumption of food from the salad bar of the hospital cafeteria.

# Introduction

Data presented in this report are based on laboratory-confirmed enteric pathogens associated with disease, isolated from humans, food, animal and the environment. Annual data are received from a variety of sources and the most suitable data are selected and developed into an annual summary. In Canada, surveillance data are collected at regional and provincial levels and compiled at the national level. It is recognized that although laboratory surveillance may vary from region to region, the centralized collection of surveillance data at a national level may enhance our understanding of the epidemiology of enteric infection in Canada; these data can be used to target potential preventive measures. The laboratory based surveillance data summarized here can be used for the purposes of detecting emergent and re-emergent pathogens, serovars, phage types, molecular types and increasing or decreasing trends of particular enteric pathogens and should not be used to describe the incidence of disease.

This Annual Summary is a compilation of various data sets that include: 1) those generated by provincial public health laboratories (PPHL); 2) that from the annual report of the Laboratory for Food-borne Zoonoses, Guelph (LFZ); 3) that from the Enteric Disease Program, National Microbiology Laboratory, Winnipeg (NML); 4) the National Enteric Surveillance Program (NESP); and 5) the National Notifiable Diseases Reporting System (NDRS) database.

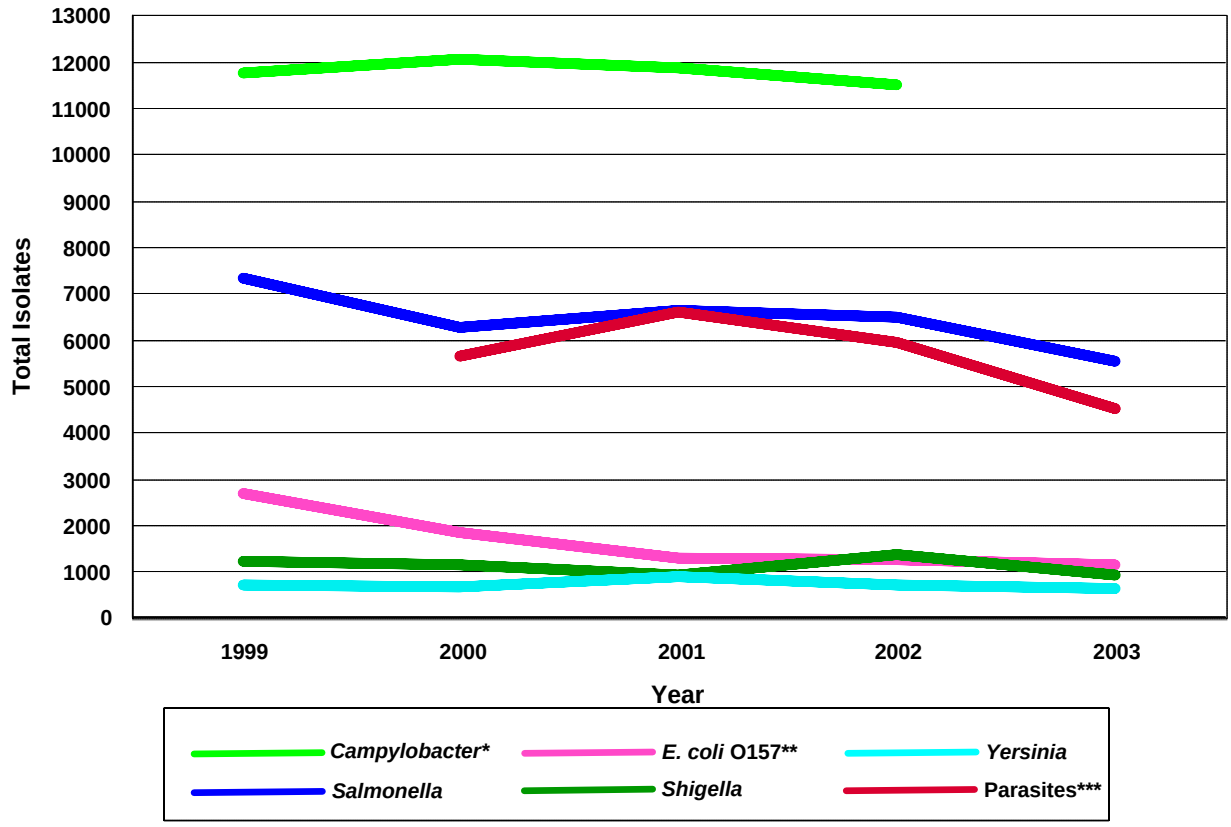
Provincial reports and the NESP database contain summarized aggregated data in the form of weekly, monthly or annual reports of isolates forwarded to the PPHLs for analysis and characterization. The data sets of the LFZ and the NML are acquired through reference services for the confirmation, identification and characterization of enteric pathogens for hazard identification, passive surveillance, surveys and for support in the containment, prevention and control of outbreaks of enteric disease. The NDRS receives data that are collected on a mandatory basis by local health units on a case-by-case basis and is collated by the Division of Surveillance and Risk Assessment, Centre for Infectious Disease Prevention and Control (CIDPC).

It should be noted that there are some inherent limitations of the data and any interpretation should be done with caution. Not all specimens/isolates are referred from the regional and local laboratories to the PPHLs and therefore the provincial reports and NESP may be an under-representation of the true incidence of disease in Canada. An attempt to remedy this shortfall is made by using NDRS data, which itself may be an under-representation as most people exhibiting symptoms of a food-borne infection do not seek medical attention. Although the proportion of specimens forwarded may differ from province to province the subset of data from each province presented in this report remains consistent from year to year and can be useful to establish general trends.

# SECTION 1: MAJOR ENTERIC PATHOGENS

Figure 1 illustrates the isolation trends of the 6 major enteric pathogen groups from 1999 to 2003. *Campylobacter* continues to be the most prevalent pathogen in Canada distantly followed by *Salmonella* and parasitic infections. The total number of isolations of the major enteric pathogens has been declining since 2001.

**Figure 1: Major Enteric Pathogens from Humans in Canada, 1999 to 2003**



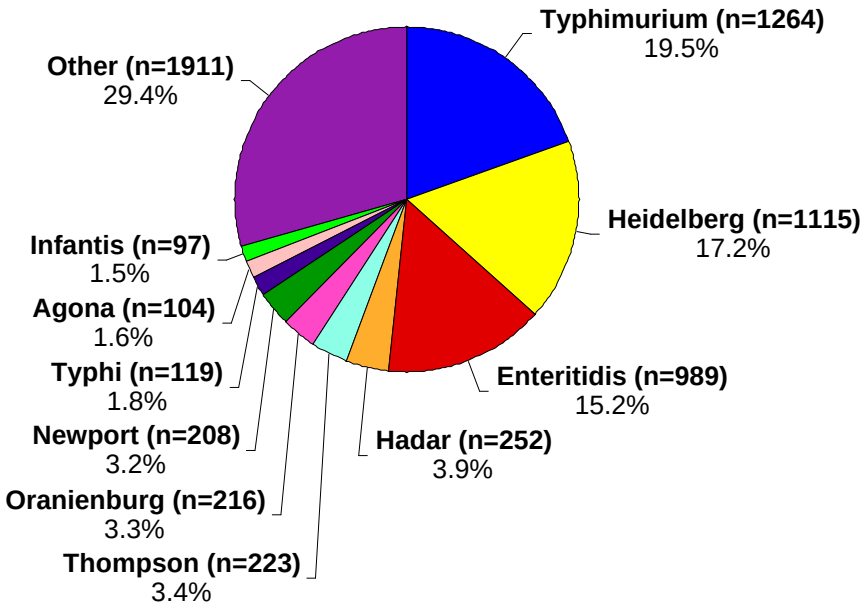

*Totals of *Campylobacter* and parasitic infections are largely based on data supplied by the NDRS database whereas the total number of isolations of other organisms relies on NESP data. The collection of total *Campylobacter* infection data for 2003 by NDRS was not complete at time of publication and will be reported in the 2004 Annual Summary.
** *E. coli* O157 includes *E. coli* O157 VTEC, *E. coli* O157, *E. coli* O157:H7 and *E. coli* O157:NM isolations.
*** *Cryptosporidium* and *Cyclospora* were not nationally notifiable until January 2000. *Entamoeba* is not notifiable and numbers of cases of illness are those reported to the NESP and may be under-reported.

# SECTION 2: *SALMONELLA*

## *Salmonella* Isolations from Human Sources in 2002 and 2003

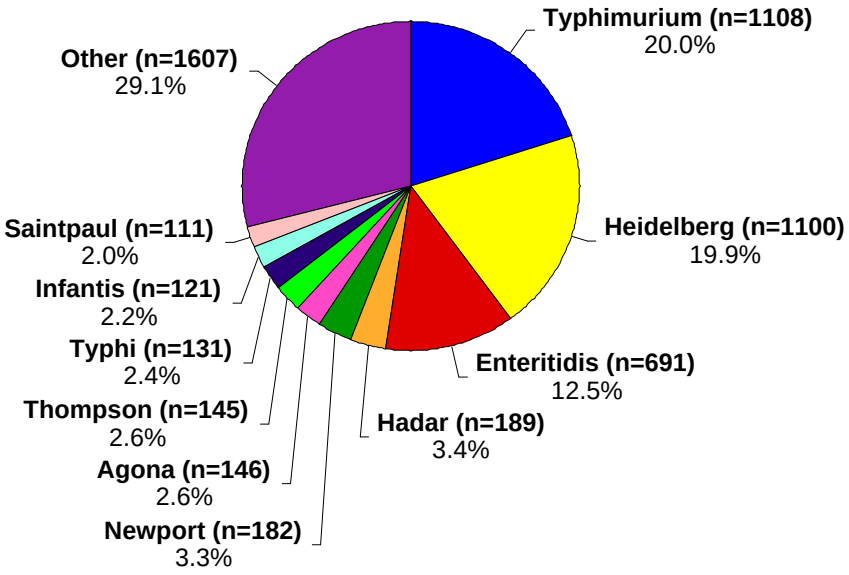
Figures 2 and 3 illustrate the relative frequency of isolation of the ten most prevalent *Salmonella* serovars from patients in Canada in 2002 and 2003. *S*. Typhimurium remained the most prevalent *Salmonella* serovar isolated from humans in Canada for both years accounting for 19.5% (1264 of 6498) of the *Salmonella* reported in 2002 and 20.0% (1108 of 5531) in 2003. *S*. Heidelberg, *S*. Enteritidis and *S*. Hadar represent the second, third and fourth most prevalent serovars identified in both 2002 and 2003. *S*. Heidelberg represented 17.2% (n=1115) of the isolates in 2002 and 19.9% (n=1100) in 2003, *S*. Enteritidis 15.2% (n=989) in 2002 and 12.5% (n=691) in 2003 and *S*. Hadar 3.9% (n=252) in 2002 and 3.4% (n=189) in 2003. *S*. Newport ranked fifth overall in 2003 with 3.3% (n=182) of the isolates and seventh in 2002 with 3.2% (n=208). At sixth in 2003 was *S*. Agona (2.6%, n=146), followed by *S*. Thompson (2.6%, n=145), *S*. Typhi (2.4%, n=131) and *S*. Infantis (2.2%, n=121). New to the top ten list was *S*. Saintpaul ranking tenth with 2.0% (n=111) of the isolates in 2003. In 2002, *S*. Thompson ranked fifth with 3.4% (n=223) of the identified *Salmonella*. Also new to the top ten serovars for 2002 was *S*. Oranienburg (3.3%, n=216) due to a large outbreak associated with an unknown source in Ontario during January to April. *S*. Typhi ranked eighth (1.8%, n=208), *S*. Agona ninth (1.6%, n=104) and *S*. Infantis tenth (1.5%, n=97). Other serovars represented 29.4% (n=1911) of the isolates in 2002 and 29.1% (n=1607) in 2003.

**Figure 2: Most Prevalent *Salmonella* Serovars from Humans in Canada, 2002* (N=6498*)**




*Serovar totals are laboratory confirmed *Salmonella* based on information supplied to the NESP (includes outbreak isolates) and supplemented with identifications from NML reference services.

**Figure 3: Most Prevalent *Salmonella* Serovars from Humans in Canada, 2003* (n=5531)**

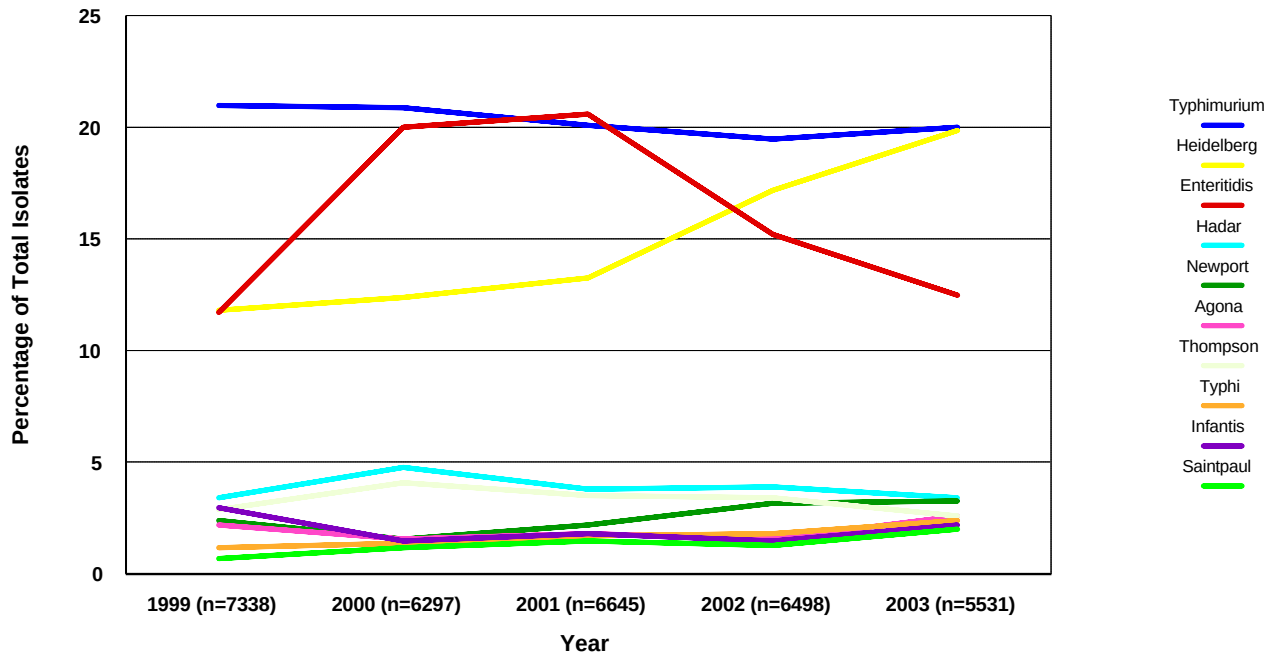



*Serovar totals are laboratory confirmed *Salmonella* based on information supplied to the NESP (includes outbreak isolates) and supplemented with identifications from NML reference services.

## Changes in the Occurrence of *Salmonella* Serovars from Humans in Canada, 1999 to 2003

The relative frequencies of the 10 most prevalent *Salmonella* of human origin from 1999 to 2003 are shown in Figure 4. Although *S*. Typhimurium has ranked as the most prevalent serovar identified in Canada for the last five years, *S*. Heidelberg has been increasing in relative frequency since 1999, surpassing *S*. Enteritidis in 2002 as the second most prevalent serovar isolated form humans in Canada. Numbers of *S*. Enteritidis isolations have declined after an increase during 2000 and 2001, and in 2003 this serovar ranked 3rd after *S*. Heidelberg and *S*. Typhimurium. These 3 serovars form a group that has consistently been elevated above the other top ten serovars over the previous 5 years. Serovars that make up the other seven most prevalent serovars each represent less than 5% of all *Salmonella* isolated and frequencies of isolation remain relatively constant from year to year.

## Figure 4: Ten Most Prevalent *Salmonella* Serovars from Humans in Canada, 1999 to 2003*



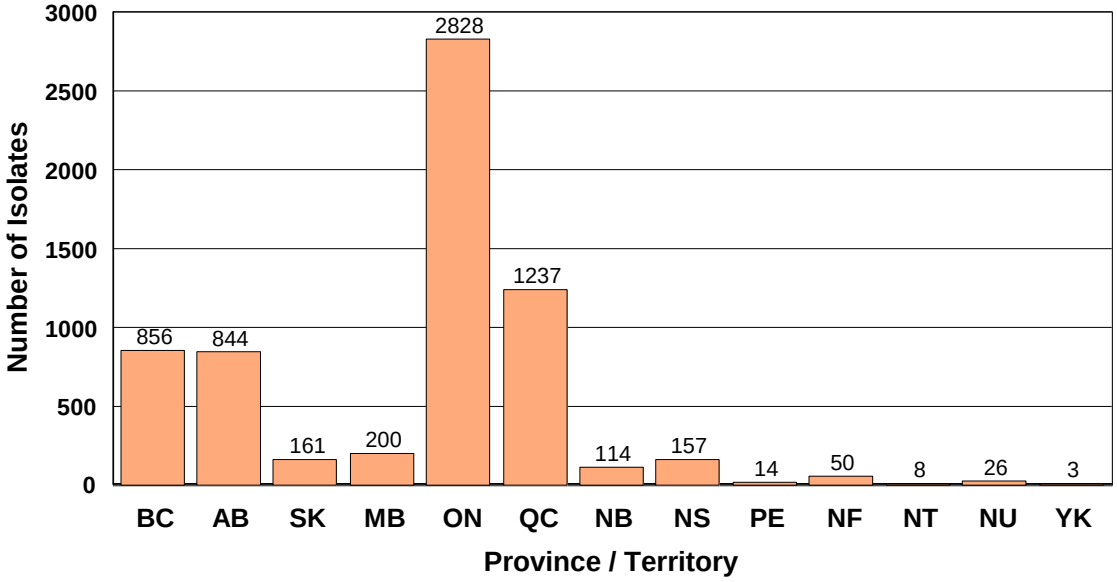

* Totals are laboratory confirmed *Salmonella* based on information supplied to the NESP with supplemented identifications from NML reference work. Total *Salmonella* is adjusted by adding enough *Salmonella* sp to bring totals those of the national notifiable disease data. Data is representative of laboratory confirmed isolates only which is consistently gathered from year to year, and should not be confused with incidence of disease. See Appendix 1 for details.

## Provincial Distribution of *Salmonella* from Humans

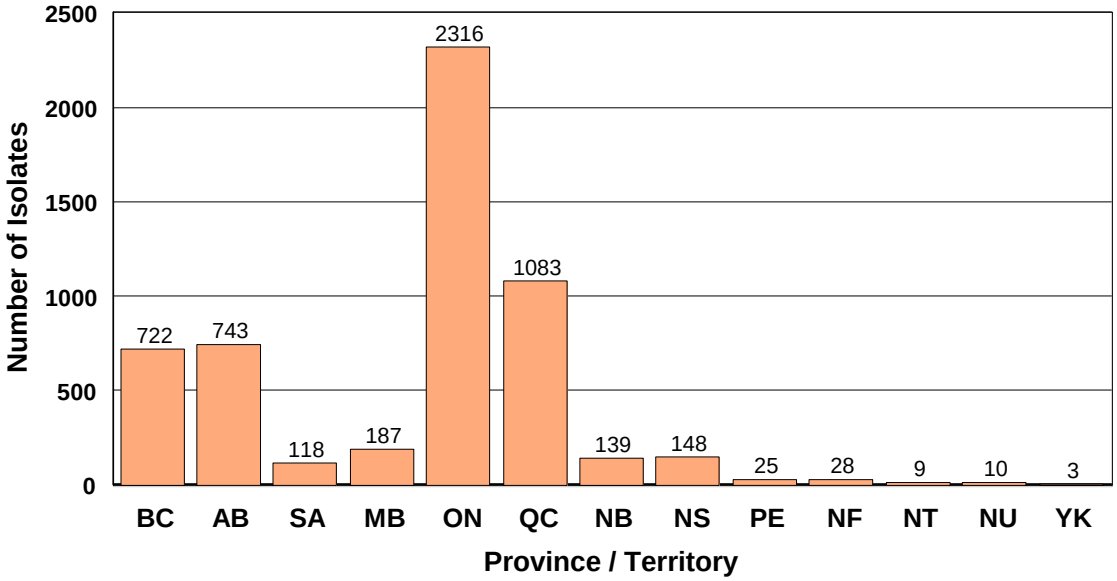
The total number of *Salmonella* isolations from each province for 2002 and 2003 is shown in Figures 5 and 6. Population based rates of *Salmonella* isolation for each province are shown for the years 1999 to 2003 in Figure 7. By representing the data as isolations per 100,000, the data is a more accurate reflection of the relative isolation levels among the provincial population. Although Quebec ranked 2nd among the provinces for the number of *Salmonella* isolated (Figures 5 and 6), the province ranked 11th overall for the population based isolation rate due to a large population. A high isolation rate was seen in Nunavut in 2002 due to 26 isolations reported to the NDRS and a low population within the territory.

Figure 7 shows the rate of *Salmonella* isolation for each province for each of the last 5 years. There have been no major increases in the rates of *Salmonella* isolations in provinces since 2001. Rates of isolation have declined slightly in many provinces with the largest year to year decrease occurring in Prince Edward Island where the rate has declined from 26 to 13 isolations per 100,000 since 2001.

## Figure 5: Number of *Salmonella* Isolations in Canada in 2002

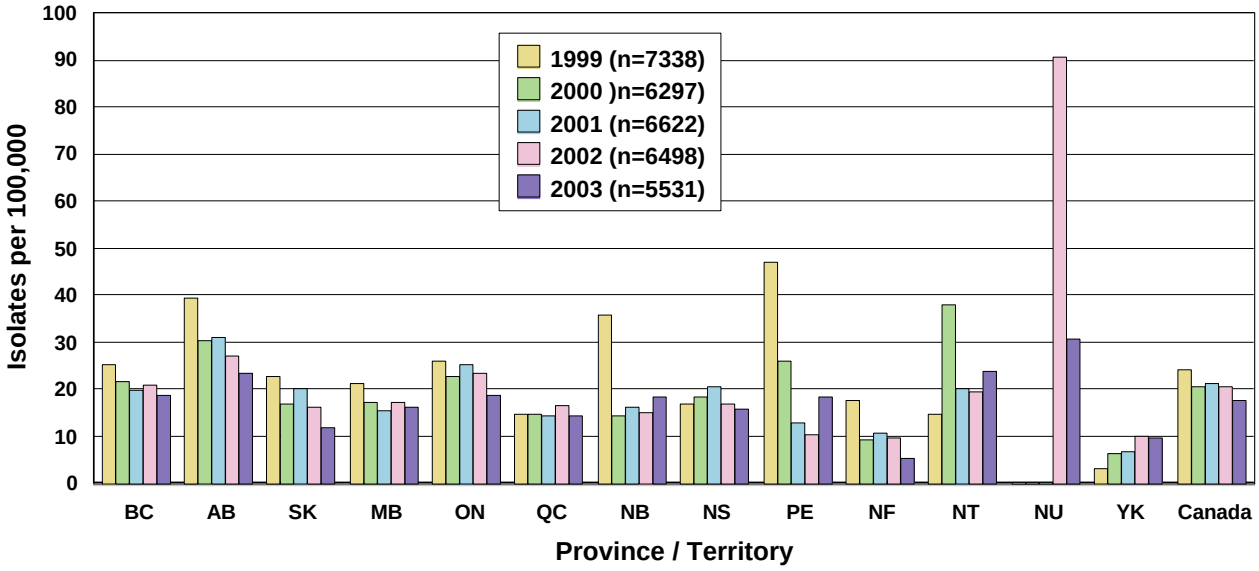



## Figure 6: Number of *Salmonella* Isolations in Canada in 2003




BC = British Columbia, AB = Alberta, SK = Saskatchewan, MB = Manitoba, ON = Ontario, QC = Quebec, NB = New Brunswick, NS = Nova Scotia, PE = Prince Edward Island, NF = Newfoundland, NT = Northwest Territories, NU = Nunavut, YK = Yukon Territory.

**Figure 7: Rate of *Salmonella* Isolation in Canada, 1999 to 2003***




*Provincial population estimates used to calculate isolation rates are taken from the Statistics Canada website. Total *Salmonella* is based largely on NESP reports and includes cluster and outbreak cases but not duplicate isolates from the same patient. High numbers of *Salmonella* isolations may not necessarily reflect a higher incidence of disease, but rather a better sampling and reporting structure for a province. BC = British Columbia, AB = Alberta, SK = Saskatchewan, MB = Manitoba, ON = Ontario, QC = Quebec, NB = New Brunswick, NS = Nova Scotia, PE = Prince Edward Island, NF = Newfoundland and Labrador, NT = Northwest Territories, NU = Nunavut, YK = Yukon Territory.

## Prevalent *Salmonella* Serovars from Humans in Each Province

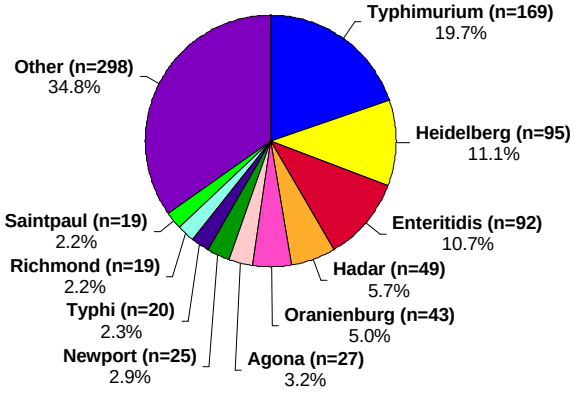
The ten most prevalent human *Salmonella* serovars isolated for each province is illustrated in Figure 8. In 2002, *S*. Typhimurium was the most prevalent serovar in British Columbia accounting for 19.7% (n=169) of all *Salmonella* identified in that province, and in Alberta (24.8%, n=209), Saskatchewan (21.1%, n=34), Manitoba (25.0%, n=50), Ontario (18.3%, n=518), Newfoundland (20.0%, n=10), and in the territories (21.6%, n=8). *S*. Enteritidis was most prevalent in Nova Scotia with 36.9% (n=58) of the human *Salmonella* isolated in that province. *S*. Heidelberg was most common in Quebec (26.8%, n=332) and New Brunswick (23.7%, n=27).

*S*. Typhimurium was also most prevalent in 2003 in British Columbia (17.7%, n=128), Alberta (28.9%, n=215), Saskatchewan (17.8%, n=21), Manitoba (24.6%, n=46), Ontario (19.4%, n=449) and Prince Edward Island (16.0%, n=4). In 2003, *S*. Heidelberg is most prevalent in New Brunswick (41.0%, n=57), Quebec (29.1%, n=315) Newfoundland (50.0%, n=14) and in the territories (45.5%, n=10). The prevalence of *S*. Heidelberg in Quebec has increased dramatically from 14.2% in 2002 to 29.1% in 2003, in New Brunswick from 19.0% to 41.0% and in Newfoundland from 31.0% to 50.0%. In Nova Scotia, *S*. Oranienburg was the prevalent serovar in 2003 because of a large outbreak associated with a fast food hamburger restaurant in August.

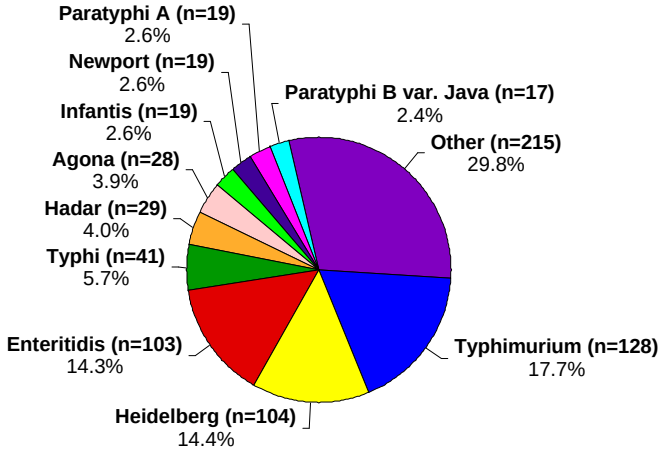
# Figure 8: Ten Most Prevalent *Salmonella* Serovars from Humans in Each Province/Territory, 2002 and 2003

## BRITISH COLUMBIA

### 2002 (N=856)

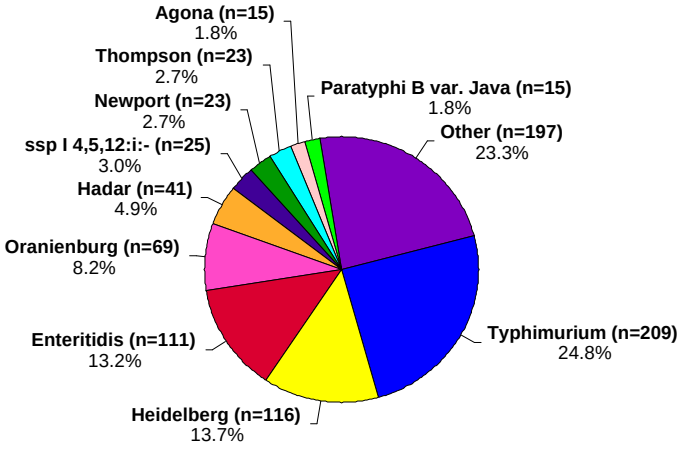



### 2003 (N=722)

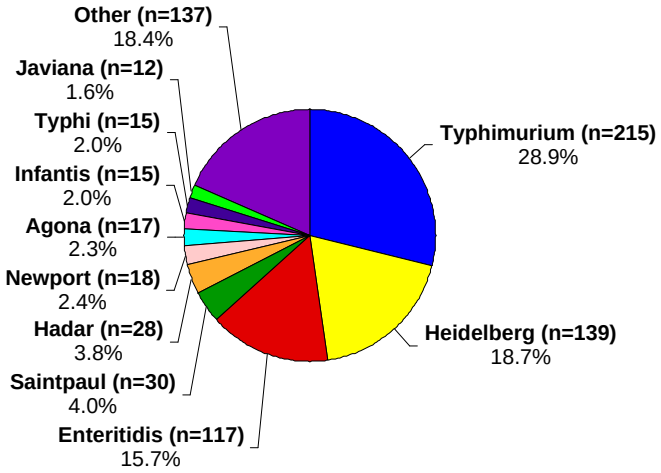



## ALBERTA

### 2002 (N=844)



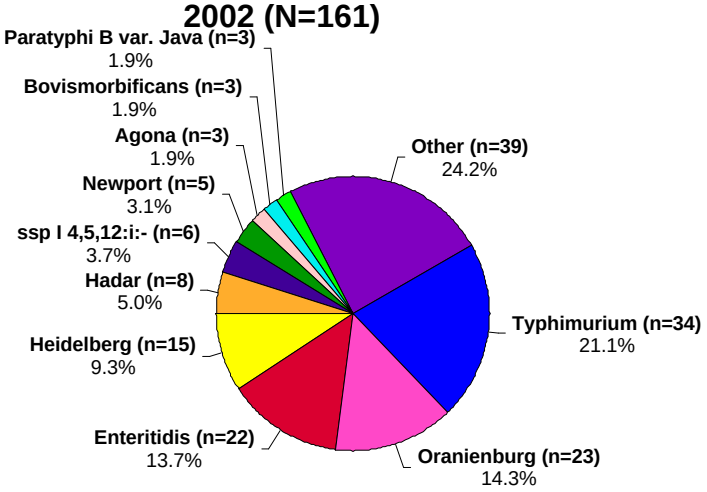

### 2003 (N=743)



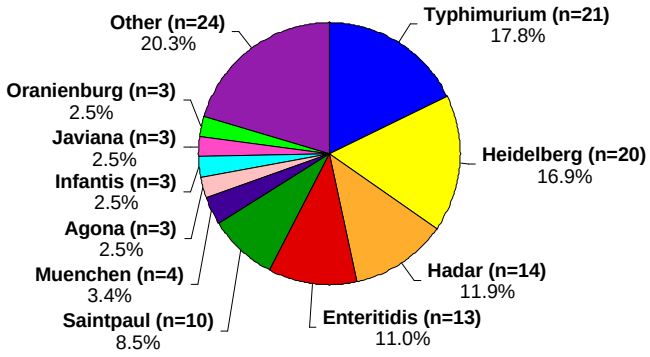

* Serovar totals are laboratory confirmed isolates based on information supplied to the NESP with supplemented identifications from NML reference services. Although this data is representative of laboratory confirmed isolates only and should not be confused with incidence of disease, this subset of data is consistently gathered from year to year and can indicate emerging or re-emerging trends. See Appendix 1 for details.

## SASKATCHEWAN

### 2002 (N=161)

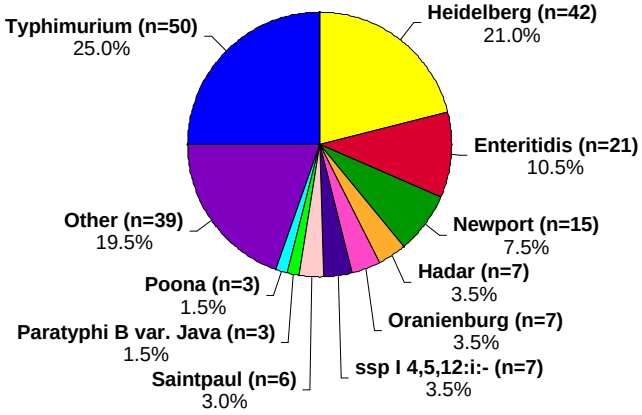



### 2003 (N=118)

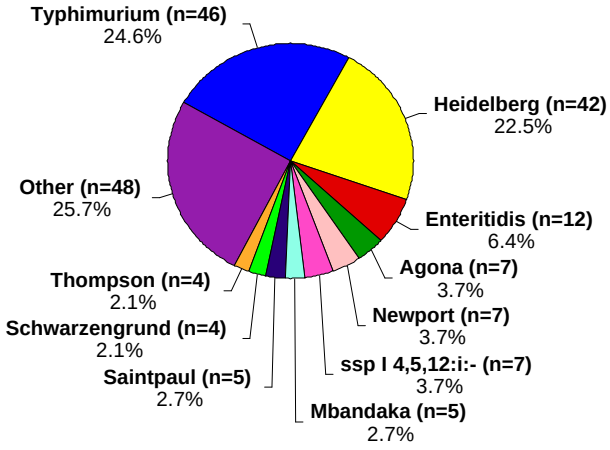



## MANITOBA

### 2002 (N=200)

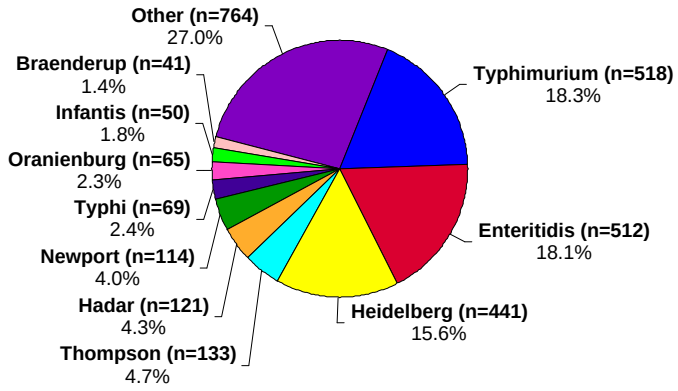



### 2003 (N=197)

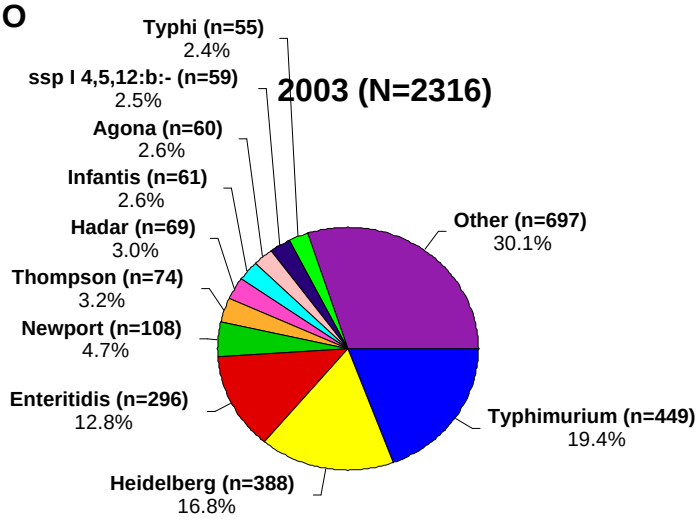



## ONTARIO

### 2002 (N=2828)

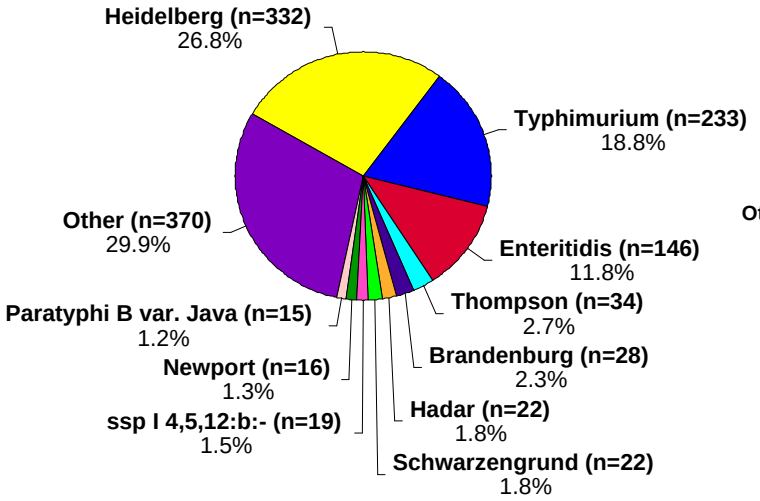



### 2003 (N=2316)

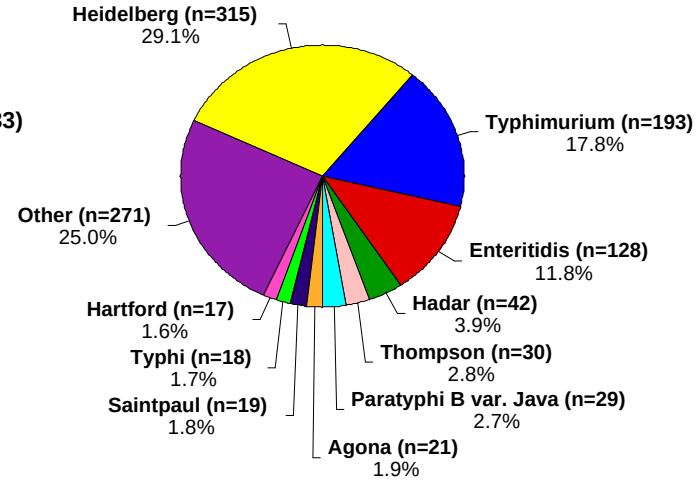


## QUEBEC

### 2002 (N=1237)

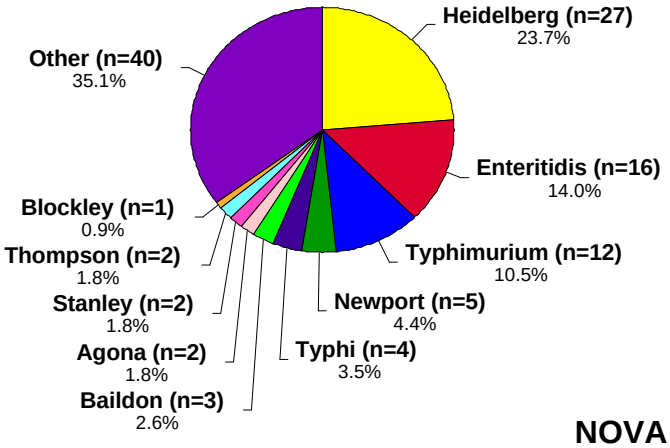



### 2003 (N=1083)

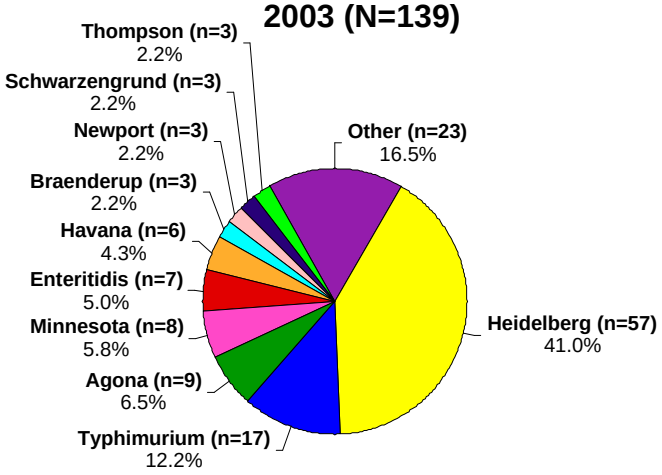



## NEW BRUNSWICK

### 2002 (N=114)

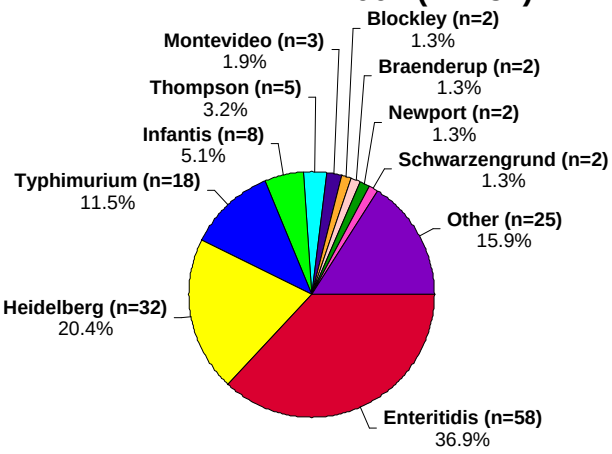



### 2003 (N=139)

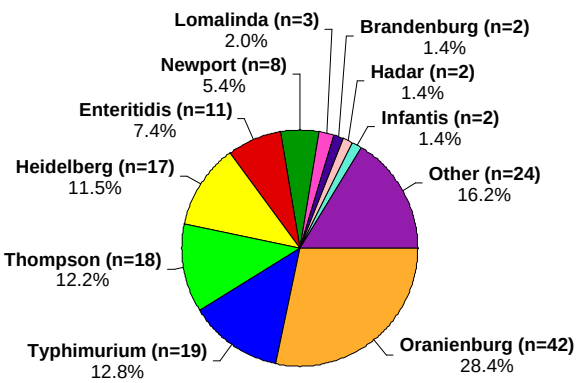



## NOVA SCOTIA

### 2002 (N=157)

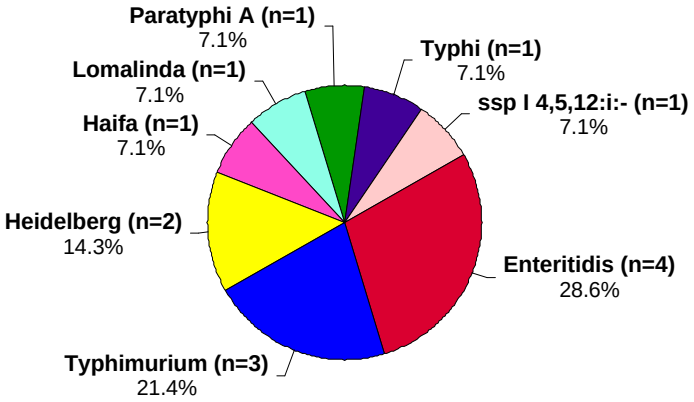



### 2003 (N=148)

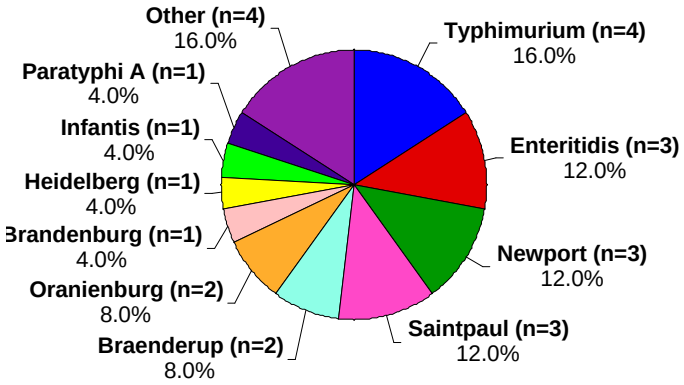


## PRINCE EDWARD ISLAND

### 2002 (N=14)

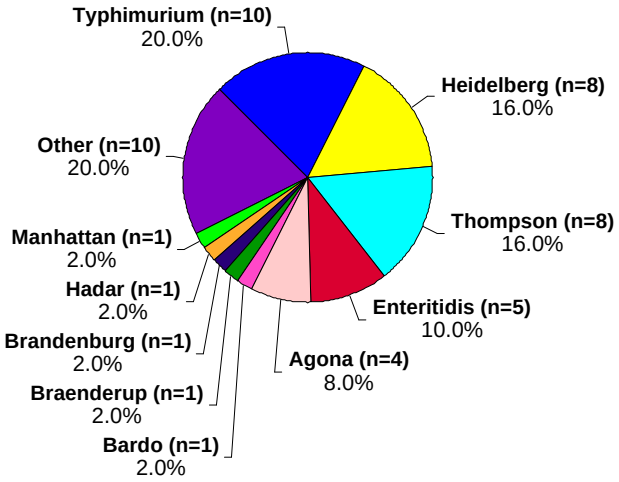



### 2003 (N=25)

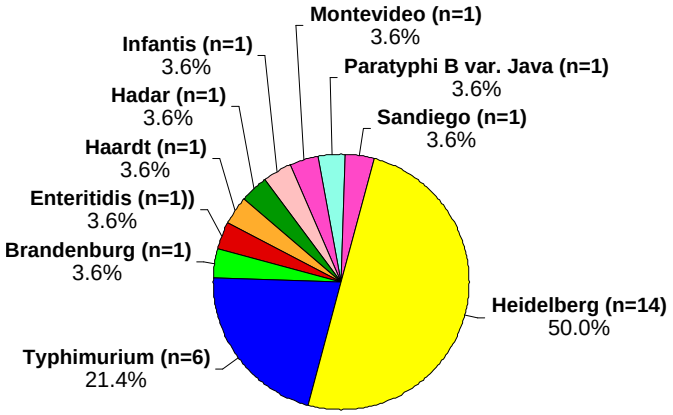



## NEWFOUNDLAND and LABRADOR

### 2002 (N=50)

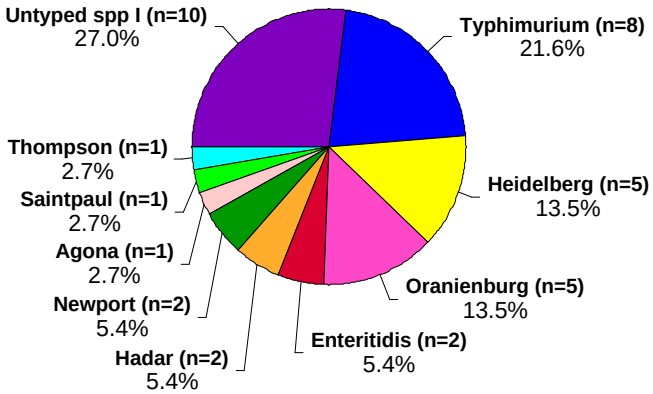



### 2003 (N=28)




## NORTHWEST TERRITORIES, YUKON TERRITORY AND NUNAVUT

### 2002 (N=37)




### 2003 (N=21)

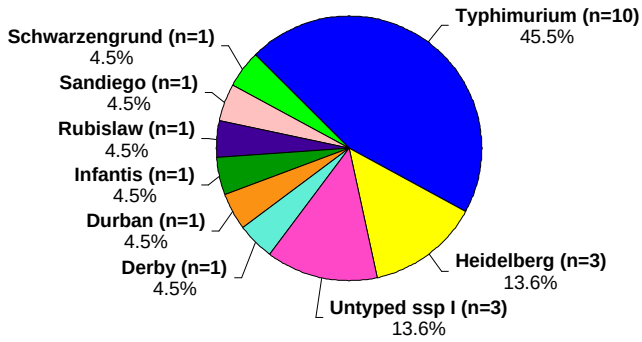
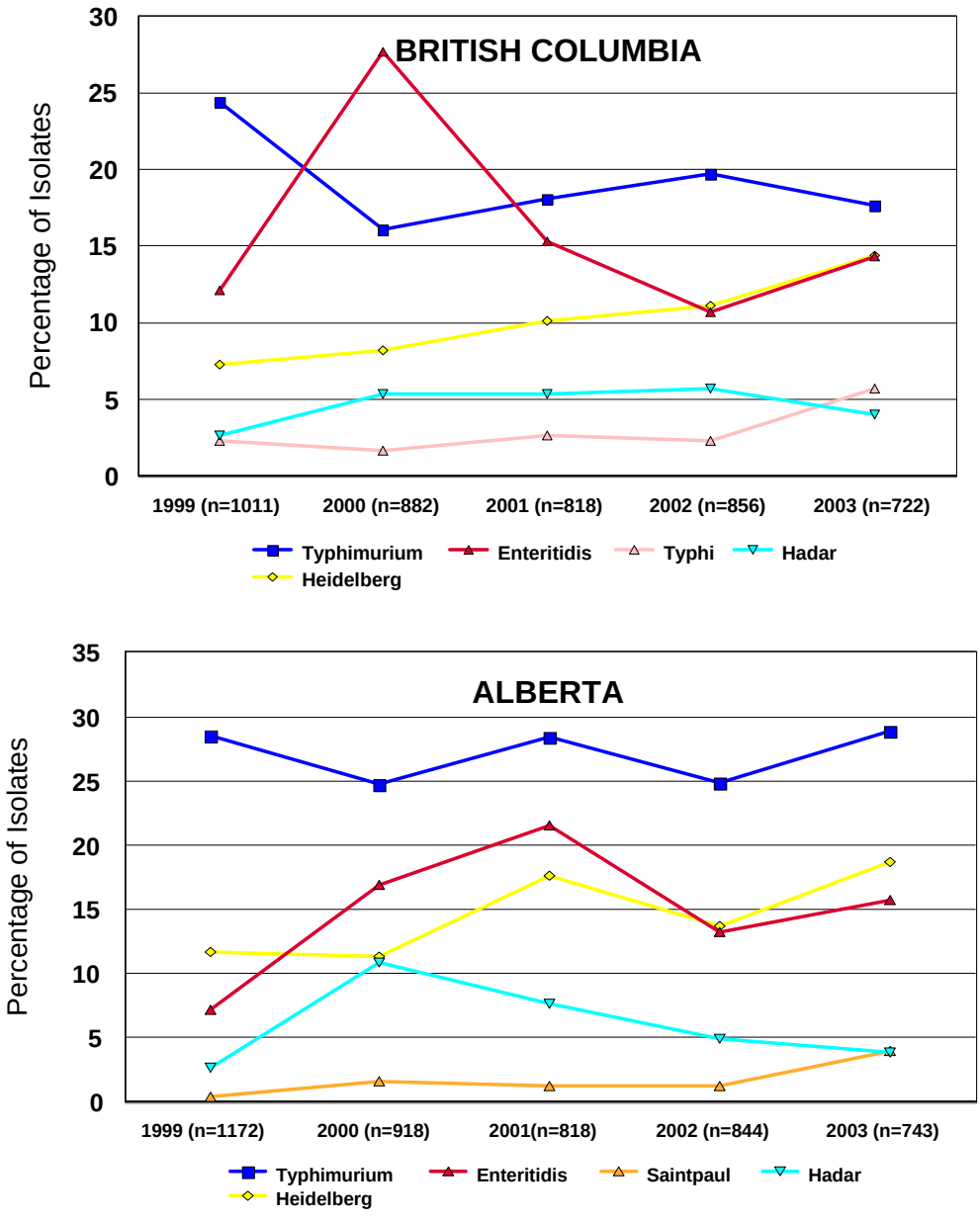
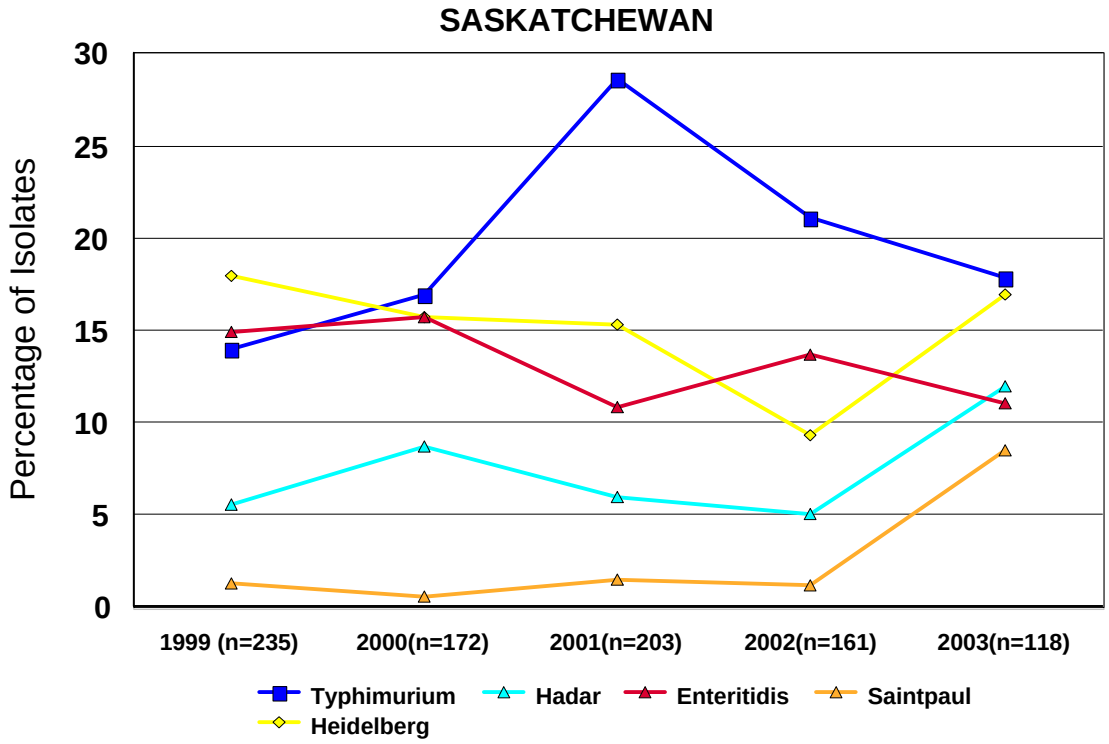
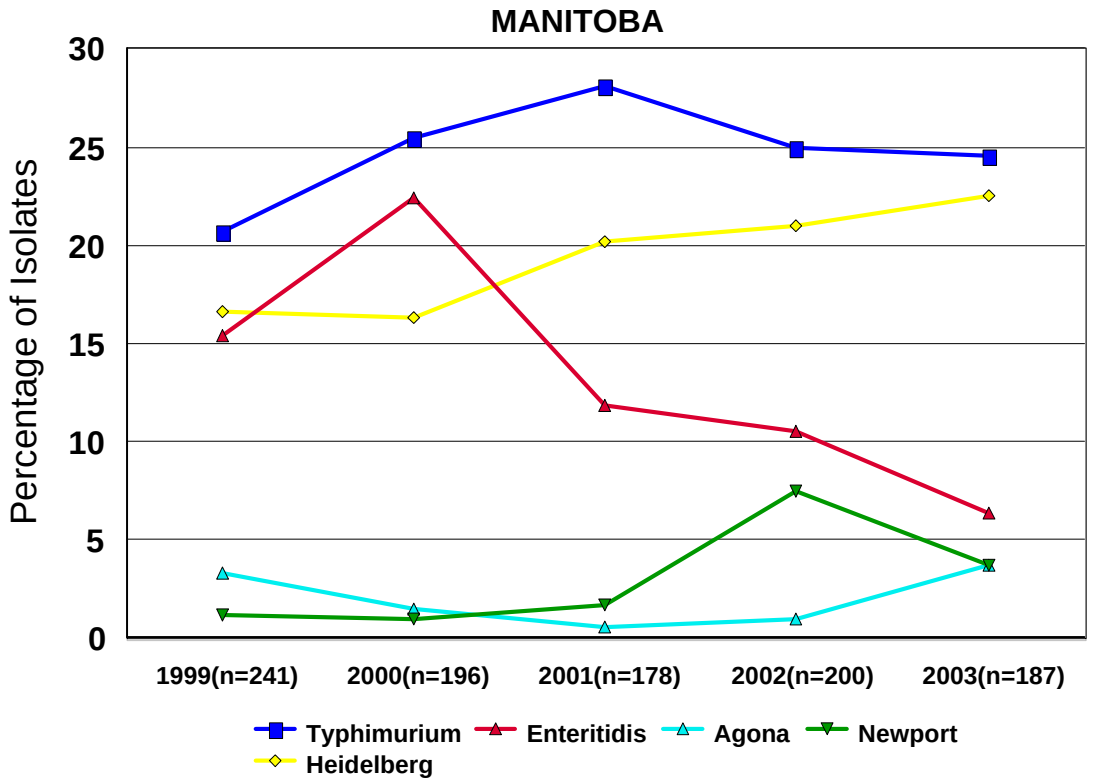


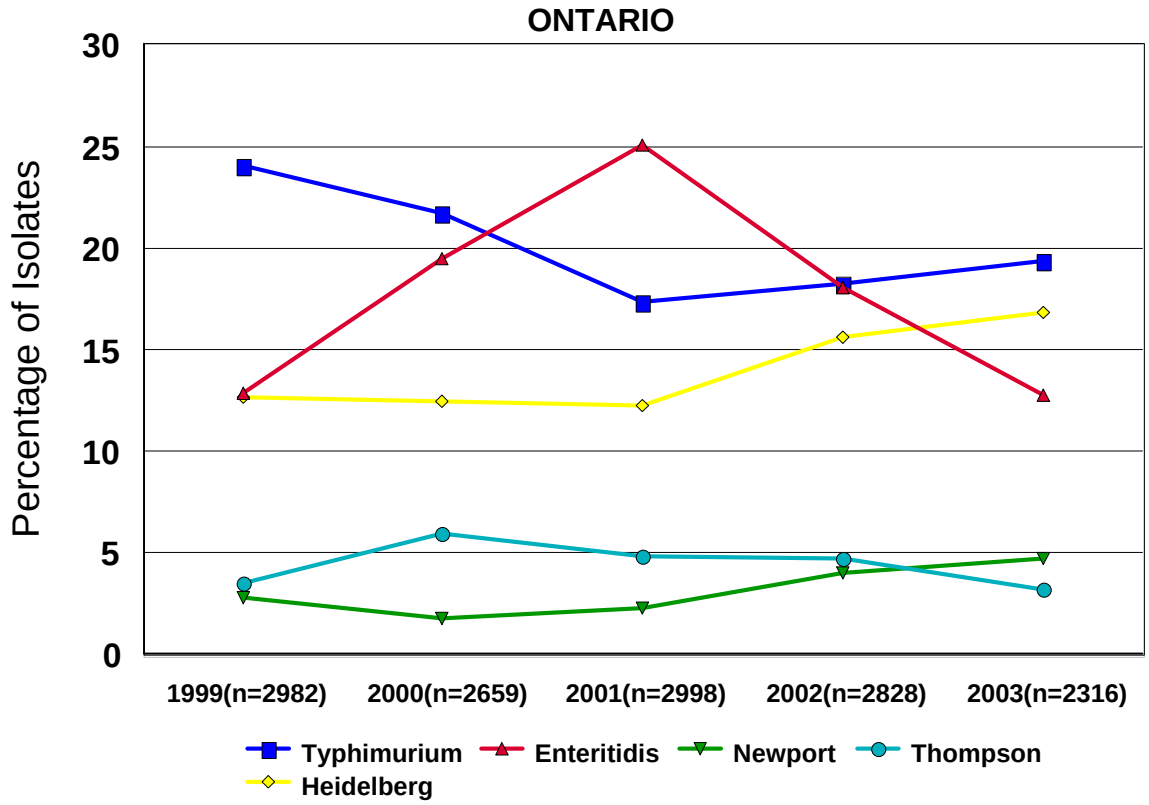
Figure 9 illustrates the variation of the five most prevalent serovars of 2003 from each province/territory for 1999 to 2003. Data for previous years is taken from previous annual summaries, which is based on information supplied to the NESP and supplemented with identifications from the NML reference services. Data is representative of laboratory confirmed isolates only and should not be confused with incidence of disease. This subset of data however is consistently gathered from year to year and can indicate emerging or re-emerging trends. See Appendix 1 for details. The larger year-to-year fluctuations in prevalence can be attributed to outbreaks of gastroenteritis. However, longer trends such as the increases in *S*. Heidelberg in many provinces/territories in 2002 and 2003 may indicate the emergence or recognition of a new pathogen.

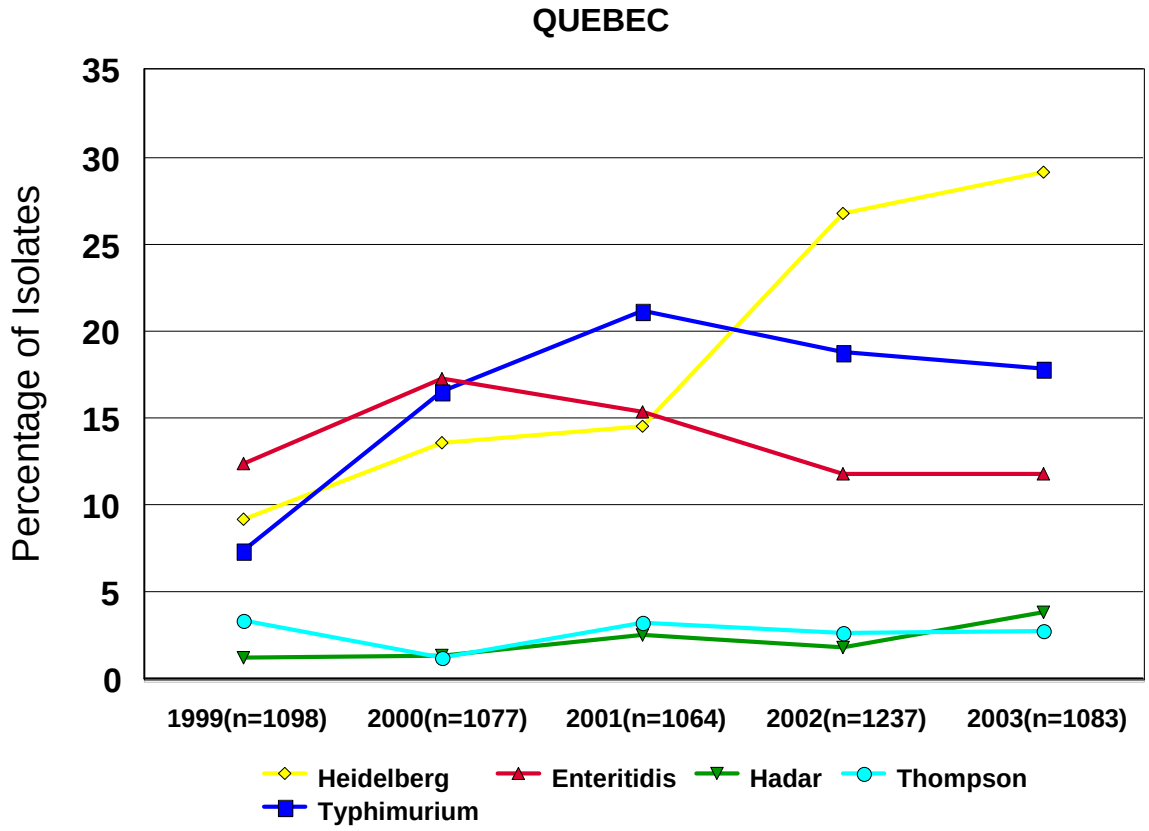
**Figure 9: Five Most Prevalent *Salmonella* Serovars from Humans in Each Province, 1999 to 2003**

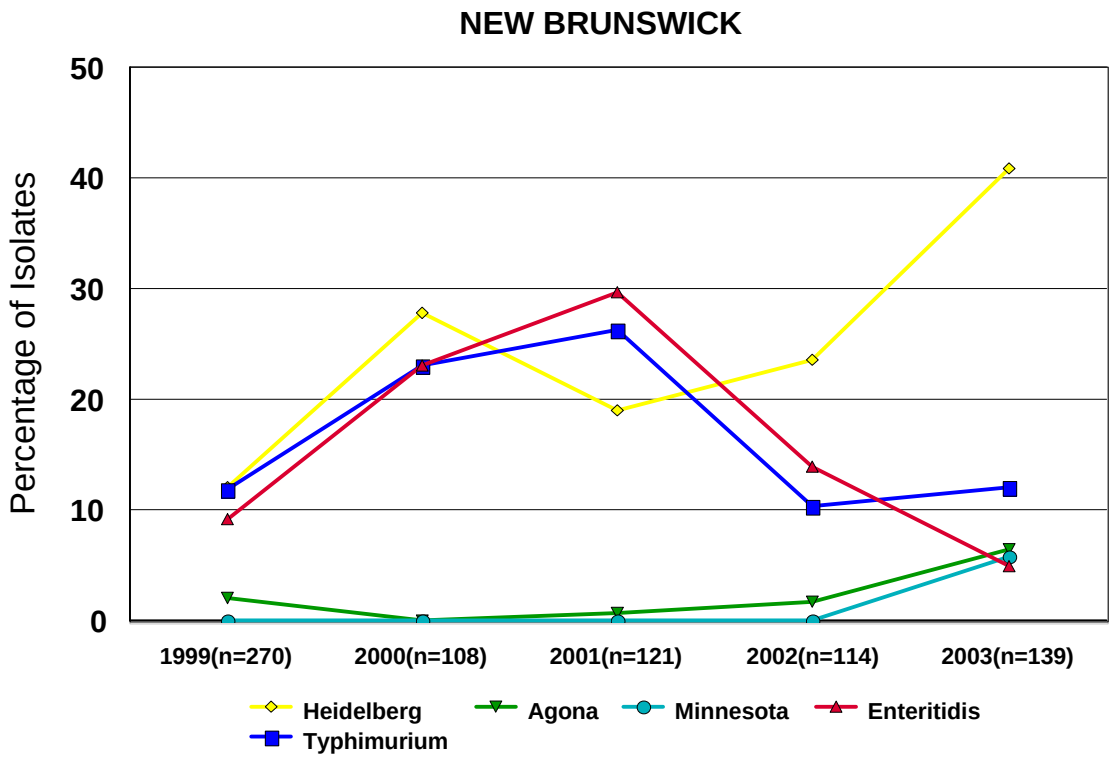


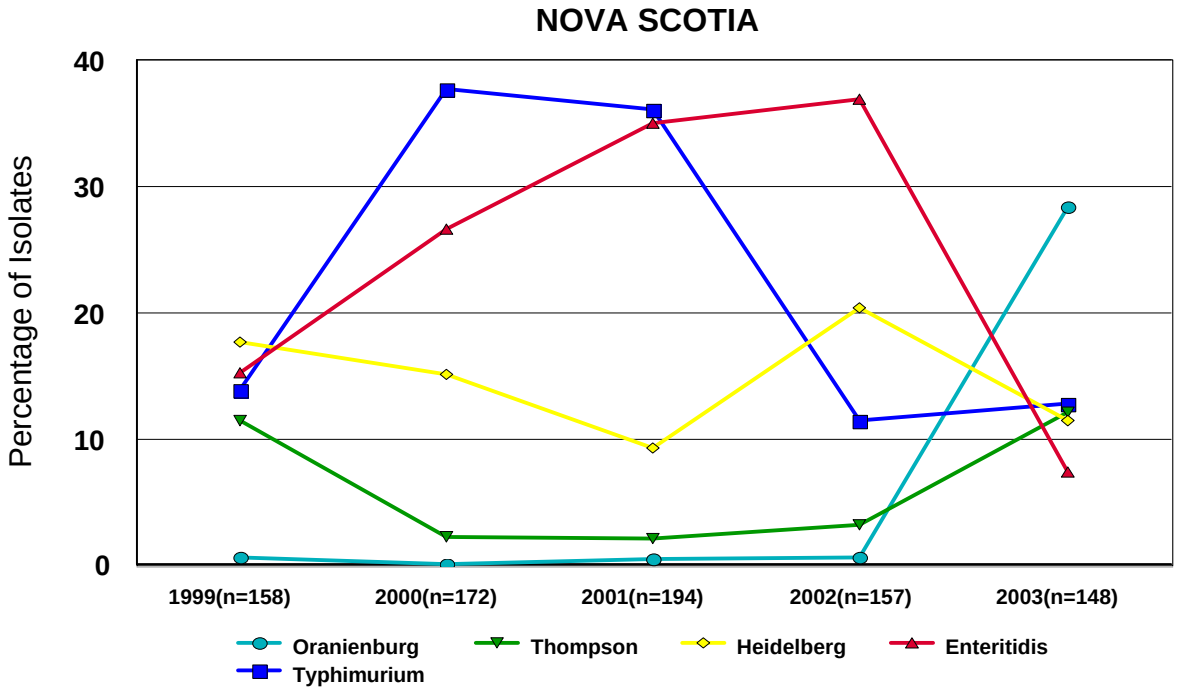

SASKATCHEWAN
Percentage of Isolates
30
25
20
15
10
5
0
1999 (n=235)
2000(n=172)
2001(n=203)
2002(n=161)
2003(n=118)
Typhimurium
Hadar
Enteritidis
Saintpaul
Heidelberg

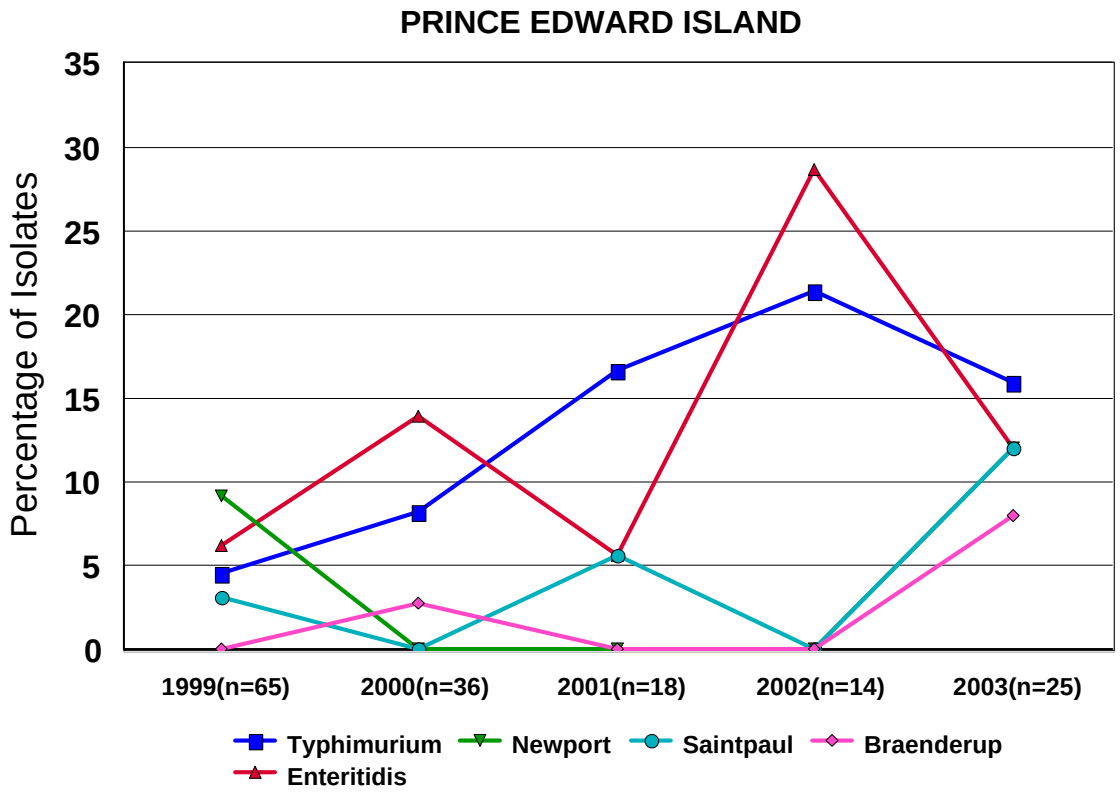

MANITOBA
Percentage of Isolates
30
25
20
15
10
5
0
1999(n=241)
2000(n=196)
2001(n=178)
2002(n=200)
2003(n=187)
Typhimurium
Enteritidis
Agona
Newport
Heidelberg

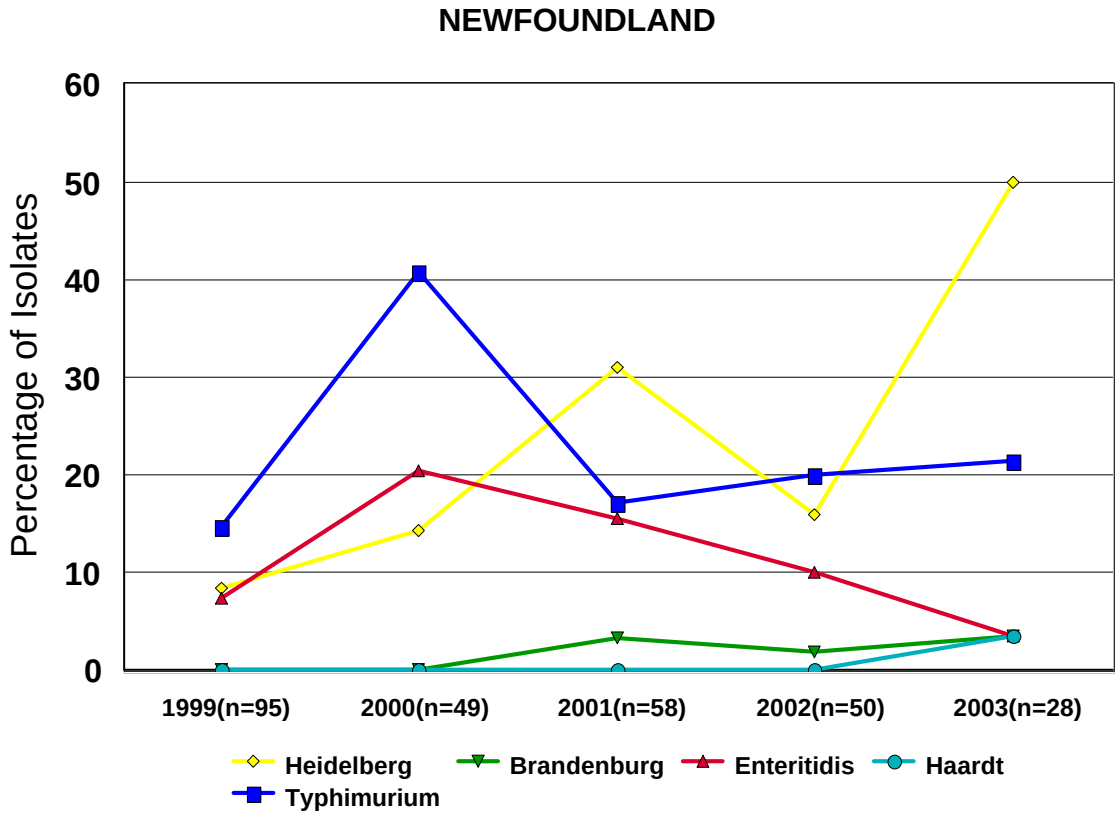

ONTARIO
Percentage of Isolates
30
25
20
15
10
5
0
1999(n=2982)
2000(n=2659)
2001(n=2998)
2002(n=2828)
2003(n=2316)
Typhimurium
Enteritidis
Newport
Thompson
Heidelberg


QUEBEC
Percentage of Isolates
35
30
25
20
15
10
5
0
1999(n=1098)
2000(n=1077)
2001(n=1064)
2002(n=1237)
2003(n=1083)
Heidelberg
Enteritidis
Hadar
Thompson
Typhimurium


NEW BRUNSWICK
Percentage of Isolates
50
40
30
20
10
0
1999(n=270)
2000(n=108)
2001(n=121)
2002(n=114)
2003(n=139)
Heidelberg
Agona
Minnesota
Enteritidis
Typhimurium


NOVA SCOTIA
Percentage of Isolates
40
30
20
10
0
1999(n=158)
2000(n=172)
2001(n=194)
2002(n=157)
2003(n=148)
Oranienburg
Thompson
Heidelberg
Enteritidis
Typhimurium


PRINCE EDWARD ISLAND
Percentage of Isolates
35
30
25
20
15
10
5
0
1999(n=65)
2000(n=36)
2001(n=18)
2002(n=14)
2003(n=25)
Typhimurium
Newport
Saintpaul
Braenderup
Enteritidis


NEWFOUNDLAND
Percentage of Isolates
60
50
40
30
20
10
0
1999(n=95)
2000(n=49)
2001(n=58)
2002(n=50)
2003(n=28)
Heidelberg
Brandenburg
Enteritidis
Haardt
Typhimurium

## New and Unique *Salmonella* Serovars in Canada

| Serovar | Province | Source | Month Isolated |
|---|---|---|---|
| *S.* Carno (ssp I 1,3,19:z:l,w) | Ontario | Human | January, 2002 |
| *S. diarizonae* (ssp IIIb) 47:k:z35 | Saskatchewan | Human | January, 2002 |
| *S. arizonae* (ssp IIIa) 44:z4,z23:- | Ontario | Human | March, 2002 |
| *S. salamae* (ssp II) 30:l,z28:z6 | Alberta | Gecko Lizard | May, 2002 |
| *S*. Goma (ssp I 6,7:z4,z23:z6) | Ontario | Human | September, 2002 |
| *S*. Yoruba (ssp I 16:c:l,w) | British Columbia | Fish | October, 2002 |
| *S. salamae* (ssp II) 1,9,12:b:e,n,x | Alberta | Human | October, 2002 |
| *S*. Hithergreen (ssp I 16:c:e,n,z15) | Ontario | Human | December, 2002 |
| *S*. Woodinville (ssp I 11:c:e,n,x) | Alberta | Human | December, 2002 |
| *S. diarizonae* (ssp IIIb) 60:i:-:Rz50 | Saskatchewan | Human | August, 2002 |
| | | | |
| *S*. Ipswich (ssp I 41:z4,z24:1,5) | Ontario | Human | January, 2003 |
| *S. houtenae* (ssp IV) 1,40:g,t:- | British Columbia | Gecko Lizard | January, 2003 |
| *S*. Barranquilla (ssp I 16:d:e,n,x) | Quebec | Human | February, 2003 |
| *S*. Brazzaville ( ssp I 6,7:b:1,2) | Ontario | Human | February, 2003 |
| *S*. Eschberg (ssp I 9,12:d:1,7) | Alberta | Human | May, 2003 |
| *S*. Apapa (ssp I 45:m,t:-) | Ontario | Human | August, 2003 |
| *S*. Beaudesert (ssp I 6,14:e,h:1,7) | Alberta | Human | August, 2003 |
| *S*. Irenea (ssp I 17:k1,5) | Ontario | Human | August, 2003 |
| *S*. Zega (ssp I 9,12:d:z6) | Alberta | Reptile | August, 2003 |
| *S*. Oldenburg (ssp I 16:d:1,2) | Manitoba | Human | September, 2003 |

# Table 1: *Salmonella* Serovars from Humans in Canada, 2002

| Organism | BC | AB | SK | MB | ON | PQ | NB | NS | PEI | NF | NWT | NU | YK | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S.* Abaetetuba | | | | | 1 | 1 | | | | | | | | **2** |
| *S.* Aberdeen | | | | | 3 | | | | | | | | | **3** |
| *S.* Adelaide | | 1 | | | 4 | 1 | | | | | | | | **6** |
| *S.* Agona | 28 | 17 | 3 | 7 | 60 | 21 | 9 | 1 | | | | | | **146** |
| *S.* Alachua | 1 | | | | 2 | | | | | | | | | **3** |
| *S.* Albany | 2 | 2 | | | 21 | | | | | | | | | **25** |
| *S.* Amager | | | | 1 | | | | | | | | | | **1** |
| *S.* Amsterdam | 3 | | | 1 | | | | | | | | | | **4** |
| *S.* Anatum (a) | 8 | 3 | | 2 | 26 | 2 | 1 | 1 | | | | | | **43** |
| *S.* Apapa | | | | | 1 | | | | | | | | | **1** |
| *S.* Arechavaleta | | 1 | | | 1 | | | | | | | | | **2** |
| *S.* Baildon | | | | | | | | 1 | | | | | | **1** |
| *S.* Bardo | 4 | | | | | | 1 | | | | | | | **5** |
| *S.* Bareilly | 5 | | | 1 | 8 | | | | | | | | | **14** |
| *S.* Barranquilla | | | | | | 1 | | | | | | | | **1** |
| *S.* Beaudesert | | 1 | | | | | | | | | | | | **1** |
| *S.* Bergen | | 1 | | | | | | | | | | | | **1** |
| *S.* Berta | 1 | 1 | | 2 | 33 | 5 | | | | | | | | **42** |
| *S.* Bispebjerg | | | | | 1 | | | | | | | | | **1** |
| *S.* Blockley | 3 | 3 | | | 8 | 2 | | 1 | | | | | | **17** |
| *S.* Bovismorbificans | | 1 | | 2 | 2 | | | | | | | | | **5** |
| *S.* Braenderup | 7 | 2 | 2 | 2 | 34 | 8 | 3 | | 2 | | | | | **60** |
| *S.* Brandenburg | 4 | 1 | | 1 | 13 | 7 | | 2 | 1 | 1 | | | | **30** |
| *S.* Brazzaville | | | | | 1 | | | | | | | | | **1** |
| *S.* Bredeney | 4 | 2 | | | 3 | 4 | | | | | | | | **13** |
| *S.* California | | 1 | | | | | | | | | | | | **1** |
| *S.* Carmel | | 1 | | | | | | | | | | | | **1** |
| *S.* Carrau | 1 | | | | | | | | | | | | | **1** |
| *S.* Cerro | 3 | | | | 3 | 1 | | | | | | | | **7** |
| *S.* Chester | 2 | 1 | | | 2 | | | 1 | | | | | | **6** |
| *S.* Choleraesuis | | | | | 1 | | | | | | | | | **1** |
| *S.* Chomedey | | | | 1 | | | | | | | | | | **1** |
| *S.* Cochin | 1 | | | 1 | | | | | | | | | | **2** |
| *S.* Coeln | | | | | 1 | | | | | | | | | **1** |
| *S.* Colindale | | | | | | 1 | | | | | | | | **1** |
| *S.* Concord | | | | | 2 | | | | | | | | | **2** |
| *S.* Corvallis | | 1 | | | 2 | | | | | | | | | **3** |
| *S.* Cubana | 1 | | | | 2 | | | | | | | | | **3** |
| *S.* Daytona | 2 | | | | | | | | | | | | | **2** |
| *S.* Derby | 4 | 2 | | 1 | 12 | 5 | | | | | | | 1 | **25** |
| *S.* Dublin | 2 | 1 | | | 1 | 2 | 1 | | | | | | | **7** |
| *S.* Durban | | | | | 1 | | | | | | 1 | | | **2** |
| *S.* Ealing | | | | | 1 | | | | | | | | | **1** |
| *S.* Eastbourne | | | | | 2 | 1 | | | | | | | | **3** |
| *S.* Edinburg | | | | | 1 | | | | | | | | | **1** |
| *S.* Emek | 1 | 1 | | | | | | | | | | | | **2** |
| *S.* Enteritidis | 103 | 117 | 13 | 12 | 296 | 128 | 7 | 11 | 3 | 1 | | | | **691** |
| *S.* Eschberg | | 1 | | | | | | | | | | | | **1** |

| Organism | BC | AB | SK | MB | ON | PQ | NB | NS | PEI | NF | NWT | NU | YK | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S.* Falkensee | | | | | | 1 | | | | | | | | **1** |
| *S.* Fluntern | | 1 | | | | 1 | | | | | | | | **2** |
| *S.* Friedenau | | | | | 2 | | | | | | | | | **2** |
| *S.* Gaminara | | 1 | | | 2 | | | | | | | | | **3** |
| *S.* Gatuni | | | | | 3 | | | | | | | | | **3** |
| *S.* Give (a) | 1 | 2 | | | 4 | 3 | | | | | | | | **10** |
| *S.* Glostrup | 1 | 1 | | 1 | 1 | | | | | | | | | **4** |
| *S.* Goverdhan | 1 | | | | | | | | | | | | | **1** |
| *S.* Haardt | 1 | | | | | | | | | 1 | | | | **2** |
| *S.* Hadar | 29 | 28 | 14 | 2 | 69 | 42 | 2 | 2 | | 1 | | | | **189** |
| *S.* Haifa | 1 | | | | 1 | | | 1 | | | | | | **3** |
| *S.* Hartford | | | | | 6 | 17 | | | | | | | | **23** |
| *S.* Havana | | | | | 5 | | 6 | | | | | | | **11** |
| *S.* Heidelberg | 104 | 139 | 20 | 42 | 388 | 315 | 57 | 17 | 1 | 14 | 2 | | 1 | **1100** |
| *S.* Hull | | 1 | | | | | | | | | | | | **1** |
| *S.* Hvittingfoss | 1 | | 1 | | 3 | | | | | | | | | **5** |
| *S.* Indiana | 3 | | | | 6 | 4 | 2 | | | | | | | **15** |
| *S.* Infantis | 19 | 15 | 3 | 2 | 61 | 16 | | 2 | 1 | 1 | 1 | | | **121** |
| *S.* Inverness | | | | 1 | 1 | | | | | | | | | **2** |
| *S.* Ipswich | | | | | 1 | | | | | | | | | **1** |
| *S.* Irenea | | | | | 1 | | | | | | | | | **1** |
| *S.* Irumu | | | | | 1 | | | | | | | | | **1** |
| *S.* Istanbul | 3 | 1 | 1 | | | | 1 | | | | | | | **6** |
| *S.* Jamaica | | 1 | | | | | | | | | | | | **1** |
| *S.* Javiana | 11 | 12 | 3 | 1 | 30 | 8 | | 2 | | | | | | **67** |
| *S.* Johannesburg | | | | | 1 | | | | | | | | | **1** |
| *S.* Kentucky | 1 | | | | 4 | 5 | | | | | | | | **10** |
| *S.* Kiambu | | | | 2 | 8 | 2 | | | | | | | | **12** |
| *S.* Kibusi | | | | | | 1 | | | | | | | | **1** |
| *S.* Kingabwa | | 1 | 1 | | 1 | 1 | | | | | | | | **4** |
| *S.* Kintambo | 1 | | | | 1 | | | | | | | | | **2** |
| *S.* Kottbus | 1 | | | | | | | | | | | | | **1** |
| *S.* Krefeld | | | | 1 | | | | | | | | | | **1** |
| *S.* Lagos | | | | | | 1 | | | | | | | | **1** |
| *S.* Larochelle | | | | | 1 | | | | | | | | | **1** |
| *S.* Lexington | | | 1 | | | | | | | | | | | **1** |
| *S.* Litchfield | 2 | 1 | | | 10 | 3 | | | | | | | | **16** |
| *S.* Livingstone | | | | | 3 | | | | | | | | | **3** |
| *S.* Lomalinda | | | | | | | | 3 | | | | | | **3** |
| *S.* London | | 2 | | | 2 | 2 | | | | | | | | **6** |
| *S.* Manchester | 1 | | | | | | | | | | | | | **1** |
| *S.* Manhattan | 2 | | 1 | | 4 | | | | | | | | | **7** |
| *S.* Mbandaka | 6 | 5 | | 5 | 14 | 2 | | 1 | | | | | | **33** |
| *S.* Meleagridis | | | | | 3 | | | | | | | | | **3** |
| *S.* Miami | | | | | 5 | 3 | 2 | | | | | | | **10** |
| *S.* Mikawasima | | | | | 1 | | | | | | | | | **1** |
| *S.* Minnesota | | | | | 2 | 1 | 8 | | | | | | | **11** |
| *S.* Mississippi | 2 | 3 | | | 3 | | 1 | | | | | | | **9** |
| *S.* Monschaui | | | | 1 | 3 | | | | | | | | | **4** |

| Organism | BC | AB | SK | MB | ON | PQ | NB | NS | PEI | NF | NWT | NU | YK | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S.* Montevideo | 3 | | 1 | 2 | 16 | 2 | 1 | 1 | | 1 | | | | **27** |
| *S.* Mountpleasant | | | | | 2 | | | | | | | | | **2** |
| *S.* Muenchen | 3 | 3 | 4 | 2 | 35 | 6 | 1 | 2 | | | | | | **56** |
| *S.* Muenster | 1 | 1 | | | 3 | 1 | | | | | | | | **6** |
| *S.* Nessziona | | | | | 1 | | | | | | | | | **1** |
| *S.* Newport | 19 | 18 | 2 | 7 | 108 | 14 | 3 | 8 | 3 | | | | | **182** |
| *S.* Nima | | 1 | | | 1 | | | | | | | | | **2** |
| *S.* Ohio | 1 | | 1 | | 1 | 1 | | | | | | | | **4** |
| *S.* Oldenburg | | | | 1 | | | | | | | | | | **1** |
| *S.* Oranienburg | 9 | 7 | 3 | 2 | 21 | 6 | 1 | 42 | 2 | | | | | **93** |
| *S.* Orion (a) | | | | 1 | 1 | | | | | | | | | **2** |
| *S.* Oslo | | | 1 | | 2 | | | | | | | | | **3** |
| *S.* Panama | 3 | | | | 5 | 4 | | | | | | | | **12** |
| *S.* Paratyphi A | 19 | 2 | | 1 | 27 | 4 | 1 | | 1 | | | | | **55** |
| *S.* Paratyphi B | 1 | | | | 2 | | | | | | | | | **3** |
| *S.* Paratyphi B var. Java | 17 | 3 | | 1 | 19 | 29 | 1 | | 1 | 1 | | | | **72** |
| *S.* Plymouth | | 1 | | | | | | | | | | | | **1** |
| *S.* Pomona | 1 | 1 | 2 | | 1 | | | | | | | | | **5** |
| *S.* Poona | | | 1 | | 7 | | | 1 | | | | | | **9** |
| *S.* Potsdam | | | | | | 1 | | | | | | | | **1** |
| *S.* Praha | 1 | | | | 1 | | | | | | | | | **2** |
| *S.* Putten | | | | | 1 | | | | | | | | | **1** |
| *S.* Reading | | | | | 1 | | | | | | | | | **1** |
| *S.* Richmond | 2 | 1 | 1 | | 1 | | | | | | | | | **5** |
| *S.* Rissen | 1 | 2 | | | 1 | 1 | | | | | | | | **5** |
| *S.* Roan | | | | | 1 | | | | | | | | | **1** |
| *S.* Romanby | | | | | 1 | | | | | | | | | **1** |
| *S.* Rubislaw | 2 | 6 | 1 | 1 | | | | | | | 1 | | | **11** |
| *S.* Saintpaul | 13 | 30 | 10 | 5 | 30 | 19 | | 1 | 3 | | | | | **111** |
| *S.* Sandiego | | 1 | | | 5 | 3 | | | | 1 | 1 | | | **11** |
| *S.* Schwarzengrund | 3 | 7 | 2 | 4 | 16 | 1 | 3 | 1 | | | 1 | | | **38** |
| *S.* Senftenberg | 3 | | | | 8 | 1 | | | 1 | | | | | **13** |
| *S.* Sombre | | | | | | | | 1 | | | | | | **1** |
| *S.* Stanley | 12 | 7 | 1 | | 22 | 7 | | | | | | | | **49** |
| *S.* Stanleyville | | 2 | | | | | | 1 | | | | | | **3** |
| *S.* Tallahassee | | | | | | 1 | | | | | | | | **1** |
| *S.* Telelkebir | | 2 | | | 1 | 1 | | | | | | | | **4** |
| *S.* Tennessee | | 1 | | | 4 | | | | | | | | | **5** |
| *S.* Thompson | 9 | 7 | | 4 | 74 | 30 | 3 | 18 | | | | | | **145** |
| *S.* Typhi | 41 | 15 | | 1 | 55 | 18 | 1 | | | | | | | **131** |
| *S.* Typhimurium | 128 | 215 | 21 | 46 | 449 | 193 | 17 | 19 | 4 | 6 | 2 | 7 | 1 | **1108** |
| *S.* Uganda | 6 | 2 | | 1 | 8 | 3 | 2 | 2 | | | | | | **24** |
| *S.* Urbana | 3 | | | | 2 | | | | | | | | | **5** |
| *S.* Valdosta | | | | | | 1 | | | | | | | | **1** |
| *S.* Virchow | 9 | 2 | | 3 | 19 | 3 | | 1 | | | | | | **37** |
| *S.* Waycross | | | | | 1 | | | | | | | | | **1** |
| *S.* Weltevreden | 3 | 2 | | | 4 | 2 | | | | | | | | **11** |
| *S.* Weslaco | | | | | 1 | | | | | | | | | **1** |
| *S.* Westhampton | | | | 1 | | | | | | | | | | **1** |

| Organism | BC | AB | SK | MB | ON | PQ | NB | NS | PEI | NF | NWT | NU | YK | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S.* Widemarsh | | | | | 2 | | | | | | | | | **2** |
| *S.* Worthington | | | | 2 | 2 | | | | | | | | | **4** |
| *Salmonella* sp | | | | | | | | | 1 | | | 3 | | **4** |
| *Salmonella* Group A | | | | | | 7 | | | | | | | | **7** |
| *Salmonella* Group B | | | | | | 7 | | | | | | | | **7** |
| *Salmonella* ssp I 4,12:-:e,n,x | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 4,12:b:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 4,12:i:- | 9 | 7 | | 1 | | 1 | | | | | | | | **18** |
| *Salmonella* ssp I 4,12:r:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 4,5,12:-:- | | 2 | | | 2 | 1 | | | | | | | | **5** |
| *Salmonella* ssp I 4,5,12:-:1,2 | | | | | 3 | 1 | | | | | | | | **4** |
| *Salmonella* ssp I 4,5,12:b:- | 5 | | | | 59 | 2 | 1 | | | | | | | **67** |
| *Salmonella* ssp I 4,5,12:d:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 4,5,12:e,h:- | | 1 | | | 1 | | | | | | | | | **2** |
| *Salmonella* ssp I 4,5,12:i:- | 7 | 9 | 2 | 7 | 40 | 13 | 1 | 2 | 1 | | | | | **82** |
| *Salmonella* ssp I 4,5,12:r:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I Group C | | | | | | 9 | | | | | | | | **9** |
| *Salmonella* ssp I Group C1 | | | | | | 26 | | | | | | | | **26** |
| *Salmonella* ssp I 6,7:-:- | | | | | 2 | | | | | | | | | **2** |
| *Salmonella* ssp I 6,7:-:1,6 | 1 | | | | | | | | | | | | | **1** |
| *Salmonella* ssp I 6,7:d:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 6,7:eh:- | | | | | 2 | | | | | | | | | **2** |
| *Salmonella* ssp I 6,7:k:- | | | | | 3 | | | | | | | | | **3** |
| *Salmonella* ssp I 6,7,14:r:- | | | | | | 1 | | | | | | | | **1** |
| *Salmonella* ssp I Group C2 | | | | | | 30 | | | | | | | | **30** |
| *Salmonella* ssp I 6,8:-:e,n,x | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 6,8:-:1,2 | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 6,8:d:- | | | | | 4 | | | | | | | | | **4** |
| *Salmonella* ssp I 6,8:e,h:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 6,8:z10:- | | | | | 2 | | | | | | | | | **2** |
| *Salmonella* ssp I 8,20:i:- | | | | | 4 | | | | | | | | | **4** |
| *Salmonella* ssp I 8,20:r:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 9,12:-:1,5 | | | | | 2 | | | | | | | | | **2** |
| *Salmonella* ssp I 9,12:-:e,n,z15 | | 1 | | | | | | | | | | | | **1** |
| *Salmonella* ssp I 3,10:b:- | | | | | | 1 | | | | | | | | **1** |
| *Salmonella* ssp I 3,10:e,h:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 3,10:r:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 45:-:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I Rough-O:-:- | | | 1 | | 2 | | | | | | | | | **3** |
| *Salmonella* ssp I Rough-O:-:1,2 | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I Rough-O,Vi:d:- | | | | | | | 1 | | | | | | | **1** |
| *Salmonella* ssp I Rough-O:e,h:1,2 | | | 1 | | | | | | | | | | | **1** |
| *Salmonella* ssp I Rough-O:g,m,s:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I Rough-O:m,t:- | | 1 | | | | | | | | | | | | **1** |
| *Salmonella* ssp I Rough-O:r:1,2 | | | | | | 1 | | | | | | | | **1** |
| *Salmonella* spp I Rough-O:r:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I Rough-O:y:1,5 | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp II 48:d:z6 | 1 | | | | | | | | | | | | | **1** |
| *Salmonella* ssp II 58:d:z6 | | | | | 1 | | | | | | | | | **1** |

| Organism | BC | AB | SK | MB | ON | PQ | NB | NS | PEI | NF | NWT | NU | YK | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Salmonella* ssp II 9,12:m,t:- | | | | | | 1 | | | | | | | | **1** |
| *Salmonella* ssp IIIa 40:g,z51:- | | | | | | 1 | | | | | | | | **1** |
| *Salmonella* ssp IIIa 48:g,z51:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp IIIb 48:i:z | | 1 | | | | | | | | | | | | **1** |
| *Salmonella* ssp IIIb 50:k:z | 1 | 1 | | | | | | | | | | | | **2** |
| *Salmonella* ssp IIIb 50:r:z | | | | 1 | | | | | | | | | | **1** |
| *Salmonella* ssp IIIb 60:r:e,n,z15 | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp IIIb 50:z52:z35 | 2 | | | | | | | | | | | | | **2** |
| *Salmonella* ssp IIIb 60:r:z | | 1 | | | | | | | | | | | | **1** |
| *Salmonella* ssp IIIb 61:i:z | 1 | | | | | 1 | | | | | | | | **2** |
| *Salmonella* ssp IIIb 61:k:1,5,7 | | | | | 1 | 8 | | | | | | | | **9** |
| *Salmonella* ssp IV | | 1 | | | | | | | | | | | | **1** |
| *Salmonella* ssp IV 16:z4,z32:- | | | | | 1 | 1 | | 1 | | | | | | **3** |
| *Salmonella* ssp IV 44:z4,z23:- | | 3 | | | | 1 | | | | | | | | **4** |
| *Salmonella* ssp IV 44:z4,z24:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp IV 45:g,z51:- | | | | 1 | 1 | | | | | | | | | **2** |
| *Salmonella* ssp IV 48:g,z51:- | | | | | 3 | | 1 | 1 | | | | | | **5** |
| *Salmonella* ssp IV 50:g,z51:- | 1 | | | | | | | | | | | | | **1** |
| *Salmonella* ssp IV 50:z4,z23:- | | | | | 1 | | | | | | | | | **1** |
| **Total** | **722** | **743** | **118** | **187** | **2316** | **1083** | **139** | **148** | **25** | **28** | **9** | **10** | **3** | **5531** |

Footnotes: (a) = var. 15+ and var. 15+34+ have been combined into a single serovar. (b) = var. 14+ have been combined into parent serovar totals.

## Table 2: *Salmonella* Serovars from Humans in Canada, 2003

| Organism | BC | AB | SK | MB | ON | PQ | NB | NS | PEI | NF | NWT | NU | YK | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S.* Abaetetuba | | | | | 1 | 1 | | | | | | | | **2** |
| *S.* Aberdeen | | | | | 3 | | | | | | | | | **3** |
| *S.* Adelaide | | 1 | | | 4 | 1 | | | | | | | | **6** |
| *S.* Agona | 28 | 17 | 3 | 7 | 60 | 21 | 9 | 1 | | | | | | **146** |
| *S.* Alachua | 1 | | | | 2 | | | | | | | | | **3** |
| *S.* Albany | 2 | 2 | | | 21 | | | | | | | | | **25** |
| *S.* Amager | | | | 1 | | | | | | | | | | **1** |
| *S.* Amsterdam | 3 | | | 1 | | | | | | | | | | **4** |
| *S.* Anatum (a) | 8 | 3 | | 2 | 26 | 2 | 1 | 1 | | | | | | **43** |
| *S.* Apapa | | | | | 1 | | | | | | | | | **1** |
| *S.* Arechavaleta | | 1 | | | 1 | | | | | | | | | **2** |
| *S.* Baildon | | | | | | | | 1 | | | | | | **1** |
| *S.* Bardo | 4 | | | | | | 1 | | | | | | | **5** |
| *S.* Bareilly | 5 | | | 1 | 8 | | | | | | | | | **14** |
| *S.* Barranquilla | | | | | | 1 | | | | | | | | **1** |
| *S.* Beaudesert | | 1 | | | | | | | | | | | | **1** |
| *S.* Bergen | | 1 | | | | | | | | | | | | **1** |
| *S.* Berta | 1 | 1 | | 2 | 33 | 5 | | | | | | | | **42** |
| *S.* Bispebjerg | | | | | 1 | | | | | | | | | **1** |
| *S.* Blockley | 3 | 3 | | | 8 | 2 | | 1 | | | | | | **17** |
| *S.* Bovismorbificans | | 1 | | 2 | 2 | | | | | | | | | **5** |
| *S.* Braenderup | 7 | 2 | 2 | 2 | 34 | 8 | 3 | | 2 | | | | | **60** |
| *S.* Brandenburg | 4 | 1 | | 1 | 13 | 7 | | 2 | 1 | 1 | | | | **30** |
| *S.* Brazzaville | | | | | 1 | | | | | | | | | **1** |
| *S.* Bredeney | 4 | 2 | | | 3 | 4 | | | | | | | | **13** |
| *S.* California | | 1 | | | | | | | | | | | | **1** |
| *S.* Carmel | | 1 | | | | | | | | | | | | **1** |
| *S.* Carrau | 1 | | | | | | | | | | | | | **1** |
| *S.* Cerro | 3 | | | | 3 | 1 | | | | | | | | **7** |
| *S.* Chester | 2 | 1 | | | 2 | | | 1 | | | | | | **6** |
| *S.* Choleraesuis | | | | | 1 | | | | | | | | | **1** |
| *S.* Chomedey | | | | 1 | | | | | | | | | | **1** |
| *S.* Cochin | 1 | | | 1 | | | | | | | | | | **2** |
| *S.* Coeln | | | | | 1 | | | | | | | | | **1** |
| *S.* Colindale | | | | | | 1 | | | | | | | | **1** |
| *S.* Concord | | | | | 2 | | | | | | | | | **2** |
| *S.* Corvallis | | 1 | | | 2 | | | | | | | | | **3** |
| *S.* Cubana | 1 | | | | 2 | | | | | | | | | **3** |
| *S.* Daytona | 2 | | | | | | | | | | | | | **2** |
| *S.* Derby | 4 | 2 | | 1 | 12 | 5 | | | | | | | 1 | **25** |
| *S.* Dublin | 2 | 1 | | | 1 | 2 | 1 | | | | | | | **7** |
| *S.* Durban | | | | | 1 | | | | | | 1 | | | **2** |
| *S.* Ealing | | | | | 1 | | | | | | | | | **1** |
| *S.* Eastbourne | | | | | 2 | 1 | | | | | | | | **3** |
| *S.* Edinburg | | | | | 1 | | | | | | | | | **1** |
| *S.* Emek | 1 | 1 | | | | | | | | | | | | **2** |
| *S.* Enteritidis | 103 | 117 | 13 | 12 | 296 | 128 | 7 | 11 | 3 | 1 | | | | **691** |
| *S.* Eschberg | | 1 | | | | | | | | | | | | **1** |

| Organism | BC | AB | SK | MB | ON | PQ | NB | NS | PEI | NF | NWT | NU | YK | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S.* Falkensee | | | | | | 1 | | | | | | | | **1** |
| *S.* Fluntern | | 1 | | | | 1 | | | | | | | | **2** |
| *S.* Friedenau | | | | | 2 | | | | | | | | | **2** |
| *S.* Gaminara | | 1 | | | 2 | | | | | | | | | **3** |
| *S.* Gatuni | | | | | 3 | | | | | | | | | **3** |
| *S.* Give (a) | 1 | 2 | | | 4 | 3 | | | | | | | | **10** |
| *S.* Glostrup | 1 | 1 | | 1 | 1 | | | | | | | | | **4** |
| *S.* Goverdhan | 1 | | | | | | | | | | | | | **1** |
| *S.* Haardt | 1 | | | | | | | | | 1 | | | | **2** |
| *S.* Hadar | 29 | 28 | 14 | 2 | 69 | 42 | 2 | 2 | | 1 | | | | **189** |
| *S.* Haifa | 1 | | | | 1 | | | 1 | | | | | | **3** |
| *S.* Hartford | | | | | 6 | 17 | | | | | | | | **23** |
| *S.* Havana | | | | | 5 | | 6 | | | | | | | **11** |
| *S.* Heidelberg | 104 | 139 | 20 | 42 | 388 | 315 | 57 | 17 | 1 | 14 | 2 | | 1 | **1100** |
| *S.* Hull | | 1 | | | | | | | | | | | | **1** |
| *S.* Hvittingfoss | 1 | | 1 | | 3 | | | | | | | | | **5** |
| *S.* Indiana | 3 | | | | 6 | 4 | 2 | | | | | | | **15** |
| *S.* Infantis | 19 | 15 | 3 | 2 | 61 | 16 | | 2 | 1 | 1 | 1 | | | **121** |
| *S.* Inverness | | | | 1 | 1 | | | | | | | | | **2** |
| *S.* Ipswich | | | | | 1 | | | | | | | | | **1** |
| *S.* Irenea | | | | | 1 | | | | | | | | | **1** |
| *S.* Irumu | | | | | 1 | | | | | | | | | **1** |
| *S.* Istanbul | 3 | 1 | 1 | | | | 1 | | | | | | | **6** |
| *S.* Jamaica | | 1 | | | | | | | | | | | | **1** |
| *S.* Javiana | 11 | 12 | 3 | 1 | 30 | 8 | | 2 | | | | | | **67** |
| *S.* Johannesburg | | | | | 1 | | | | | | | | | **1** |
| *S.* Kentucky | 1 | | | | 4 | 5 | | | | | | | | **10** |
| *S.* Kiambu | | | | 2 | 8 | 2 | | | | | | | | **12** |
| *S.* Kibusi | | | | | | 1 | | | | | | | | **1** |
| *S.* Kingabwa | | 1 | 1 | | 1 | 1 | | | | | | | | **4** |
| *S.* Kintambo | 1 | | | | 1 | | | | | | | | | **2** |
| *S.* Kottbus | 1 | | | | | | | | | | | | | **1** |
| *S.* Krefeld | | | | 1 | | | | | | | | | | **1** |
| *S.* Lagos | | | | | | 1 | | | | | | | | **1** |
| *S.* Larochelle | | | | | 1 | | | | | | | | | **1** |
| *S.* Lexington | | | 1 | | | | | | | | | | | **1** |
| *S.* Litchfield | 2 | 1 | | | 10 | 3 | | | | | | | | **16** |
| *S.* Livingstone | | | | | 3 | | | | | | | | | **3** |
| *S.* Lomalinda | | | | | | | | 3 | | | | | | **3** |
| *S.* London | | 2 | | | 2 | 2 | | | | | | | | **6** |
| *S.* Manchester | 1 | | | | | | | | | | | | | **1** |
| *S.* Manhattan | 2 | | 1 | | 4 | | | | | | | | | **7** |
| *S.* Mbandaka | 6 | 5 | | 5 | 14 | 2 | | 1 | | | | | | **33** |
| *S.* Meleagridis | | | | | 3 | | | | | | | | | **3** |
| *S.* Miami | | | | | 5 | 3 | 2 | | | | | | | **10** |
| *S.* Mikawasima | | | | | 1 | | | | | | | | | **1** |
| *S.* Minnesota | | | | | 2 | 1 | 8 | | | | | | | **11** |
| *S.* Mississippi | 2 | 3 | | | 3 | | 1 | | | | | | | **9** |
| *S.* Monschaui | | | | 1 | 3 | | | | | | | | | **4** |

| Organism | BC | AB | SK | MB | ON | PQ | NB | NS | PEI | NF | NWT | NU | YK | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S.* Montevideo | 3 | | 1 | 2 | 16 | 2 | 1 | 1 | | 1 | | | | **27** |
| *S.* Mountpleasant | | | | | 2 | | | | | | | | | **2** |
| *S.* Muenchen | 3 | 3 | 4 | 2 | 35 | 6 | 1 | 2 | | | | | | **56** |
| *S.* Muenster | 1 | 1 | | | 3 | 1 | | | | | | | | **6** |
| *S.* Nessziona | | | | | 1 | | | | | | | | | **1** |
| *S.* Newport | 19 | 18 | 2 | 7 | 108 | 14 | 3 | 8 | 3 | | | | | **182** |
| *S.* Nima | | 1 | | | 1 | | | | | | | | | **2** |
| *S.* Ohio | 1 | | 1 | | 1 | 1 | | | | | | | | **4** |
| *S.* Oldenburg | | | | 1 | | | | | | | | | | **1** |
| *S.* Oranienburg | 9 | 7 | 3 | 2 | 21 | 6 | 1 | 42 | 2 | | | | | **93** |
| *S.* Orion (a) | | | | 1 | 1 | | | | | | | | | **2** |
| *S.* Oslo | | | 1 | | 2 | | | | | | | | | **3** |
| *S.* Panama | 3 | | | | 5 | 4 | | | | | | | | **12** |
| *S.* Paratyphi A | 19 | 2 | | 1 | 27 | 4 | 1 | | 1 | | | | | **55** |
| *S.* Paratyphi B | 1 | | | | 2 | | | | | | | | | **3** |
| *S.* Paratyphi B var. Java | 17 | 3 | | 1 | 19 | 29 | 1 | | 1 | 1 | | | | **72** |
| *S.* Plymouth | | 1 | | | | | | | | | | | | **1** |
| *S.* Pomona | 1 | 1 | 2 | | 1 | | | | | | | | | **5** |
| *S.* Poona | | | 1 | | 7 | | | 1 | | | | | | **9** |
| *S.* Potsdam | | | | | | 1 | | | | | | | | **1** |
| *S.* Praha | 1 | | | | 1 | | | | | | | | | **2** |
| *S.* Putten | | | | | 1 | | | | | | | | | **1** |
| *S.* Reading | | | | | 1 | | | | | | | | | **1** |
| *S.* Richmond | 2 | 1 | 1 | | 1 | | | | | | | | | **5** |
| *S.* Rissen | 1 | 2 | | | 1 | 1 | | | | | | | | **5** |
| *S.* Roan | | | | | 1 | | | | | | | | | **1** |
| *S.* Romanby | | | | | 1 | | | | | | | | | **1** |
| *S.* Rubislaw | 2 | 6 | 1 | 1 | | | | | | | 1 | | | **11** |
| *S.* Saintpaul | 13 | 30 | 10 | 5 | 30 | 19 | | 1 | 3 | | | | | **111** |
| *S.* Sandiego | | 1 | | | 5 | 3 | | | | 1 | 1 | | | **11** |
| *S.* Schwarzengrund | 3 | 7 | 2 | 4 | 16 | 1 | 3 | 1 | | | 1 | | | **38** |
| *S.* Senftenberg | 3 | | | | 8 | 1 | | | 1 | | | | | **13** |
| *S.* Sombre | | | | | | | | 1 | | | | | | **1** |
| *S.* Stanley | 12 | 7 | 1 | | 22 | 7 | | | | | | | | **49** |
| *S.* Stanleyville | | 2 | | | | | | 1 | | | | | | **3** |
| *S.* Tallahassee | | | | | | 1 | | | | | | | | **1** |
| *S.* Telelkebir | | 2 | | | 1 | 1 | | | | | | | | **4** |
| *S.* Tennessee | | 1 | | | 4 | | | | | | | | | **5** |
| *S.* Thompson | 9 | 7 | | 4 | 74 | 30 | 3 | 18 | | | | | | **145** |
| *S.* Typhi | 41 | 15 | | 1 | 55 | 18 | 1 | | | | | | | **131** |
| *S.* Typhimurium | 128 | 215 | 21 | 46 | 449 | 193 | 17 | 19 | 4 | 6 | 2 | 7 | 1 | **1108** |
| *S.* Uganda | 6 | 2 | | 1 | 8 | 3 | 2 | 2 | | | | | | **24** |
| *S.* Urbana | 3 | | | | 2 | | | | | | | | | **5** |
| *S.* Valdosta | | | | | | 1 | | | | | | | | **1** |
| *S.* Virchow | 9 | 2 | | 3 | 19 | 3 | | 1 | | | | | | **37** |
| *S.* Waycross | | | | | 1 | | | | | | | | | **1** |
| *S.* Weltevreden | 3 | 2 | | | 4 | 2 | | | | | | | | **11** |
| *S.* Weslaco | | | | | 1 | | | | | | | | | **1** |
| *S.* Westhampton | | | | 1 | | | | | | | | | | **1** |

| Organism | BC | AB | SK | MB | ON | PQ | NB | NS | PEI | NF | NWT | NU | YK | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S.* Widemarsh | | | | | 2 | | | | | | | | | **2** |
| *S.* Worthington | | | | 2 | 2 | | | | | | | | | **4** |
| *Salmonella* sp | | | | | | | | | 1 | | | 3 | | **4** |
| *Salmonella* Group A | | | | | | 7 | | | | | | | | **7** |
| *Salmonella* Group B | | | | | | 7 | | | | | | | | **7** |
| *Salmonella* ssp I 4,12:-:e,n,x | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 4,12:b:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 4,12:i:- | 9 | 7 | | 1 | | 1 | | | | | | | | **18** |
| *Salmonella* ssp I 4,12:r:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 4,5,12:-:- | | 2 | | | 2 | 1 | | | | | | | | **5** |
| *Salmonella* ssp I 4,5,12:-:1,2 | | | | | 3 | 1 | | | | | | | | **4** |
| *Salmonella* ssp I 4,5,12:b:- | 5 | | | | 59 | 2 | 1 | | | | | | | **67** |
| *Salmonella* ssp I 4,5,12:d:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 4,5,12:e,h:- | | 1 | | | 1 | | | | | | | | | **2** |
| *Salmonella* ssp I 4,5,12:i:- | 7 | 9 | 2 | 7 | 40 | 13 | 1 | 2 | 1 | | | | | **82** |
| *Salmonella* ssp I 4,5,12:r:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I Group C | | | | | | 9 | | | | | | | | **9** |
| *Salmonella* ssp I Group C1 | | | | | | 26 | | | | | | | | **26** |
| *Salmonella* ssp I 6,7:-:- | | | | | 2 | | | | | | | | | **2** |
| *Salmonella* ssp I 6,7:-:1,6 | 1 | | | | | | | | | | | | | **1** |
| *Salmonella* ssp I 6,7:d:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 6,7:eh:- | | | | | 2 | | | | | | | | | **2** |
| *Salmonella* ssp I 6,7:k:- | | | | | 3 | | | | | | | | | **3** |
| *Salmonella* ssp I 6,7,14:r:- | | | | | | 1 | | | | | | | | **1** |
| *Salmonella* ssp I Group C2 | | | | | | 30 | | | | | | | | **30** |
| *Salmonella* ssp I 6,8:-:e,n,x | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 6,8:-:1,2 | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 6,8:d:- | | | | | 4 | | | | | | | | | **4** |
| *Salmonella* ssp I 6,8:e,h:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 6,8:z10:- | | | | | 2 | | | | | | | | | **2** |
| *Salmonella* ssp I 8,20:i:- | | | | | 4 | | | | | | | | | **4** |
| *Salmonella* ssp I 8,20:r:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 9,12:-:1,5 | | | | | 2 | | | | | | | | | **2** |
| *Salmonella* ssp I 9,12:-:e,n,z15 | | 1 | | | | | | | | | | | | **1** |
| *Salmonella* ssp I 3,10:b:- | | | | | | 1 | | | | | | | | **1** |
| *Salmonella* ssp I 3,10:e,h:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 3,10:r:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 45:-:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I Rough-O:-:- | | | 1 | | 2 | | | | | | | | | **3** |
| *Salmonella* ssp I Rough-O:-:1,2 | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I Rough-O,Vi:d:- | | | | | | | 1 | | | | | | | **1** |
| *Salmonella* ssp I Rough-O:e,h:1,2 | | | 1 | | | | | | | | | | | **1** |
| *Salmonella* ssp I Rough-O:g,m,s:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I Rough-O:m,t:- | | 1 | | | | | | | | | | | | **1** |
| *Salmonella* ssp I Rough-O:r:1,2 | | | | | | 1 | | | | | | | | **1** |
| *Salmonella* spp I Rough-O:r:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I Rough-O:y:1,5 | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp II 48:d:z6 | 1 | | | | | | | | | | | | | **1** |
| *Salmonella* ssp II 58:d:z6 | | | | | 1 | | | | | | | | | **1** |

Annual Summary 2002 and 2003

| Organism | BC | AB | SK | MB | ON | PQ | NB | NS | PEI | NF | NWT | NU | YK | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Salmonella* ssp II 9,12:m,t:- | | | | | | 1 | | | | | | | | **1** |
| *Salmonella* ssp IIIa 40:g,z51:- | | | | | | 1 | | | | | | | | **1** |
| *Salmonella* ssp IIIa 48:g,z51:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp IIIb 48:i:z | | 1 | | | | | | | | | | | | **1** |
| *Salmonella* ssp IIIb 50:k:z | 1 | 1 | | | | | | | | | | | | **2** |
| *Salmonella* ssp IIIb 50:r:z | | | | 1 | | | | | | | | | | **1** |
| *Salmonella* ssp IIIb 60:r:e,n,z15 | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp IIIb 50:z52:z35 | 2 | | | | | | | | | | | | | **2** |
| *Salmonella* ssp IIIb 60:r:z | | 1 | | | | | | | | | | | | **1** |
| *Salmonella* ssp IIIb 61:i:z | 1 | | | | | 1 | | | | | | | | **2** |
| *Salmonella* ssp IIIb 61:k:1,5,7 | | | | | 1 | 8 | | | | | | | | **9** |
| *Salmonella* ssp IV | | 1 | | | | | | | | | | | | **1** |
| *Salmonella* ssp IV 16:z4,z32:- | | | | | 1 | 1 | | 1 | | | | | | **3** |
| *Salmonella* ssp IV 44:z4,z23:- | | 3 | | | | 1 | | | | | | | | **4** |
| *Salmonella* ssp IV 44:z4,z24:- | | | | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp IV 45:g,z51:- | | | | 1 | 1 | | | | | | | | | **2** |
| *Salmonella* ssp IV 48:g,z51:- | | | | | 3 | | 1 | 1 | | | | | | **5** |
| *Salmonella* ssp IV 50:g,z51:- | 1 | | | | | | | | | | | | | **1** |
| *Salmonella* ssp IV 50:z4,z23:- | | | | | 1 | | | | | | | | | **1** |
| **Total** | **722** | **743** | **118** | **187** | **2316** | **1083** | **139** | **148** | **25** | **28** | **9** | **10** | **3** | **5531** |

Footnotes: (a) = var. 15+ and var. 15+34+ have been combined into a single serovar. (b) = var. 14+ have been combined into parent serovar totals.

## *Salmonella* Isolations from Non-Human Sources in 2002 and 2003

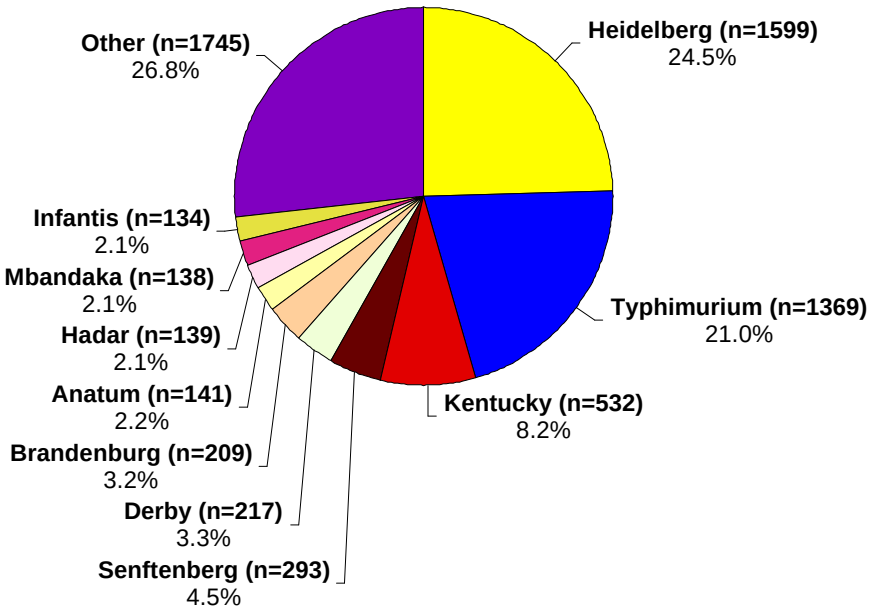
Non-human sources of *Salmonella* include animal, food, environmental or water and were gathered through the passive surveillance systems of the LFZ and NML in the course of reference services, special studies and outbreak investigations. There was no control of the relative numbers forwarded by a province/territory. Figures 10 and 11 show the ten most prevalent serovars isolated from non-human sources in Canada in 2002 and 2003.

*S*. Heidelberg was the most prevalent serovar isolated from non-human sources in Canada in 2002 with 24.5% (1599 of 6516) of the isolates identified, followed closely by *S*. Typhimurium with 21.0% (n=1369) of the isolates. Ranked a distant 3rd was *S*. Kentucky (8.2%, n=532) followed by *S*. Senftenberg (4.5%, n=293), *S*. Derby (3.3%, n=217), *S*. Brandenburg (3.2%, n=209), *S*. Anatum (2.2%, n=141), *S*. Hadar (2.1%, n=139), *S*. Mbandaka (2.1%, n=138) and ranked tenth was *S*. Infantis (2.1%, n=134).

In 2003, *S*. Typhimurium was most prevalent with 22.6% (1154 of 5096) of all *Salmonella* isolated from non-human sources, followed closely by *S*. Heidelberg with 21.5% (n=1095). *S*. Kentucky remained a distant 3rd (7.4%, n=376) and a new serovar to the top ten list, *S*. Newport ranked fourth most prevalent (4.6%, n=232), followed by *S*. Brandenburg (3.2%, n=161), *S*. Derby (2.9%, n=150), *S*. Infantis (2.6 %, n=130), *S*. Hadar (2.2%, n=113), *S*. Montevideo (2.1%, n=108) and *S*. Agona in tenth place (1.9%, n=99).

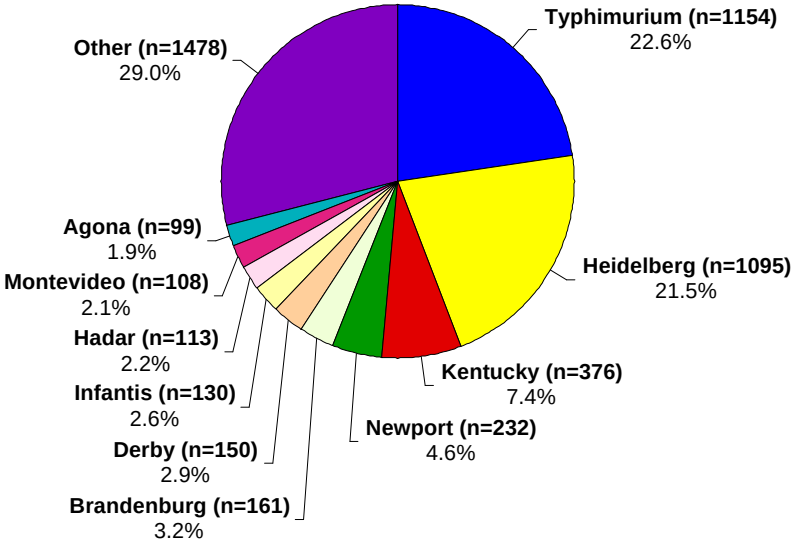
Other serovars accounted for 26.8% (n=1745) of the isolates in 2002 and 29.0% (n=1478) of the isolates in 2003.

### Figure 10: Ten Most Prevalent *Salmonella* Serovars from Non-Human Sources in Canada, 2002 (N=6516*)




*427 *S*. Rubislaw, 36 *S*. ssp I 11:r:-, 81 *S*. ssp IIIb 61:-:1,5 and 61 *S*. ssp IIIb 61:k:1,5 isolates associated with large research projects have been removed from trending totals.

## Figure 11: Ten Most Prevalent *Salmonella* Serovars from Non-Human Sources in Canada, 2003 (N=5096*)

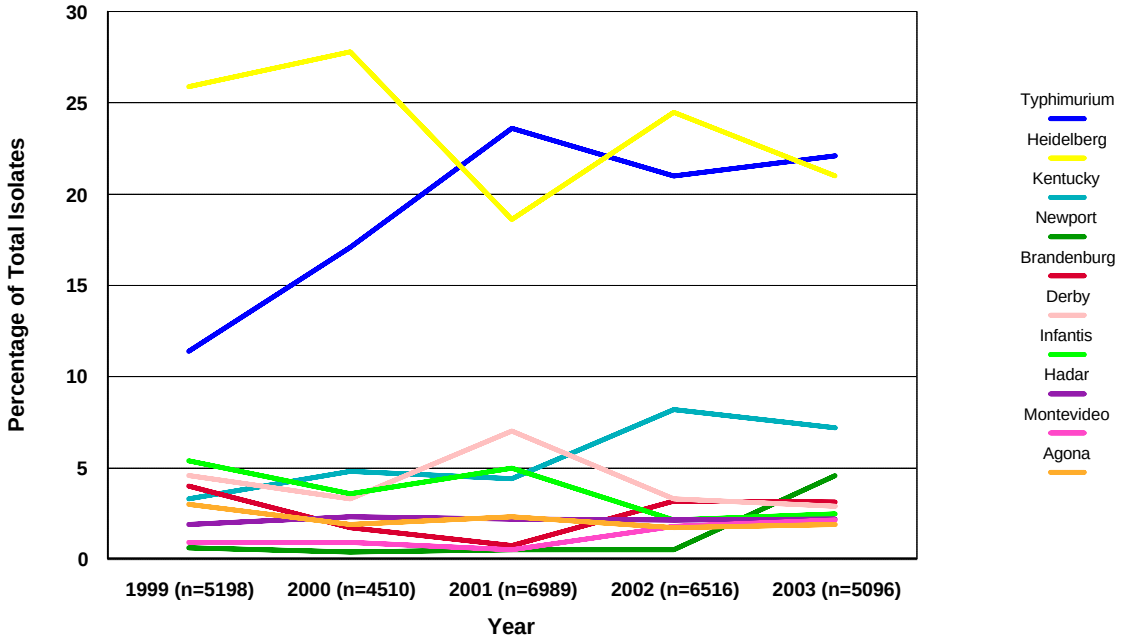



*407 *S*. Rubislaw, 54 *S*. ssp I 11:r:- and 113 *S*. Newport isolates associated with large research projects have been removed from trending totals.

## Changes in the Occurrence of *Salmonella* Serovars From Non-Human Sources in Canada 1999 to 2003

The relative frequencies of the 10 most prevalent *Salmonella* serovars of non-human sources from 1999 to 2003 are shown in Figure 12. After an increase in prevalence in 2001, *S*. Typhimurium isolations levelled off, fluctuating with *S*. Heidelberg as the most prevalent serovar isolated from non-human sources. These two serovars have consistently been the most prevalent serovars isolated between 1999 and 2003. *S*. Kentucky and *S*. Newport, ranked third and fourth respectively, have increased in prevalence in 2002 and 2003, while *S*. Derby and *S*. Infantis isolations have decreased from these rankings in 2001 to rank sixth and seventh most prevalent in 2002 and 2003.

## Figure 12: Ten Most Prevalent *Salmonella* Serovars from Non-Human Sources in Canada, 1999 to 2003




* Non-human sources include food, water, animal and environmental sources. Serovar totals are laboratory confirmed isolates based on information gathered through passive surveillance at the LFZ and NML through routine reference services. Although data is representative of laboratory confirmed isolates only and should not be confused with incidence of disease in animals, this subset of data is consistently gathered and standardized from year to year and can indicate emerging or re-emerging trends. See Appendix 1 for details.

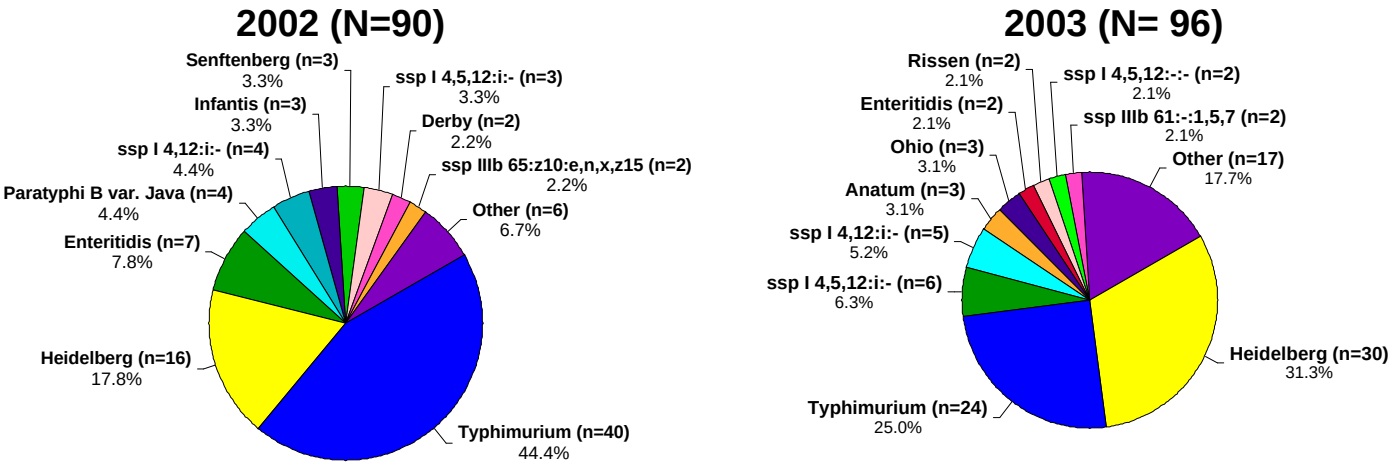
## Provincial Distribution of *Salmonella* Serovars from Non-Human Sources in 2002 and 2003

Non-human data is gathered through passive surveillance systems of the LFZ and NML in the course of reference services, special studies and outbreak investigations. There is no control of the relative numbers forwarded by a province. Large numbers of isolates should not be interpreted as incidence of disease but rather more rigorous passive surveillance practices.

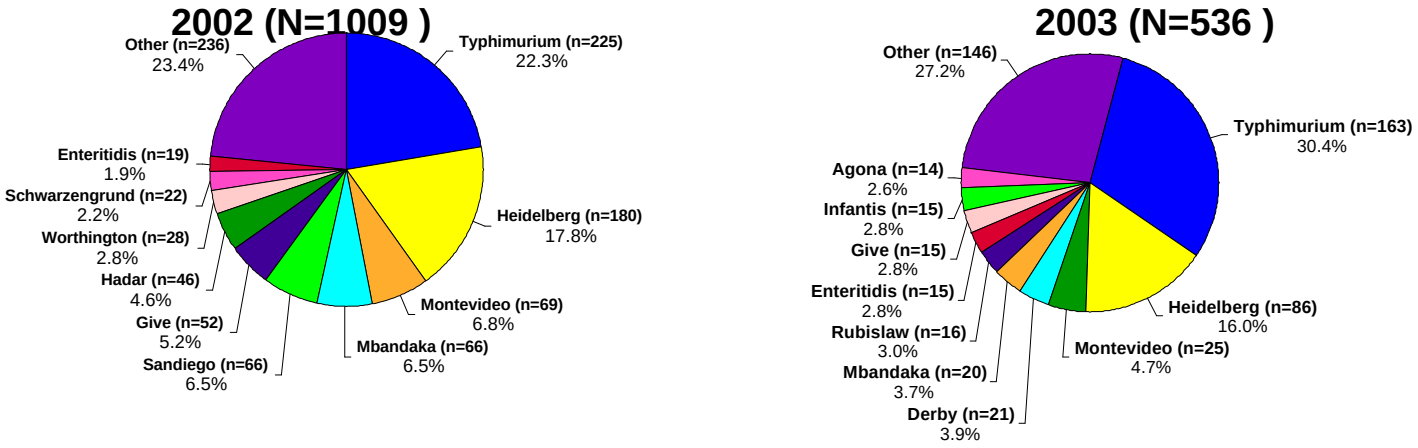
The most common *Salmonella* serovars from non-human origin in each province are shown in Figure 13. In both 2002 and 2003, *S.* Typhimurium ranked first in Alberta, Saskatchewan, Manitoba and Quebec. *S*. Heidelberg ranked first in Ontario and New Brunswick for the two years. In British Columbia and Nova Scotia, *S*. Typhimurium was most prevalent in 2002 but was overtaken by *S*. Heidelberg in 2003. *S*. Braenderup was the most prevalent serovar isolated from non-human sources in Prince Edward Island in both 2002 and 2003.

## Figure 13: Ten Most Prevalent *Salmonella* Serovars of Non-Human Origin in Each Province, 2002 and 2003

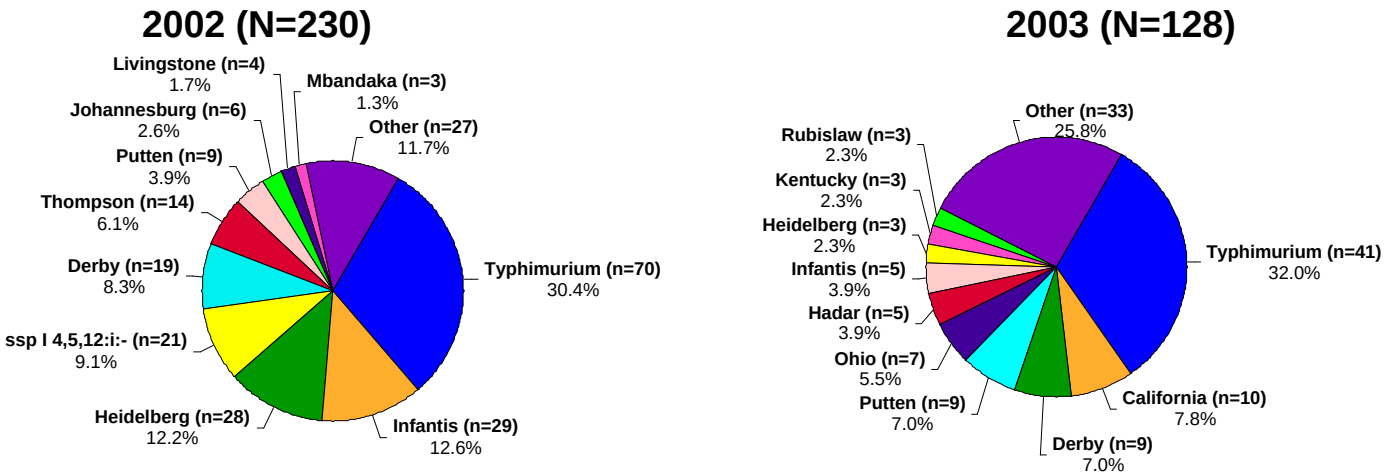
### BRITISH COLUMBIA




### ALBERTA

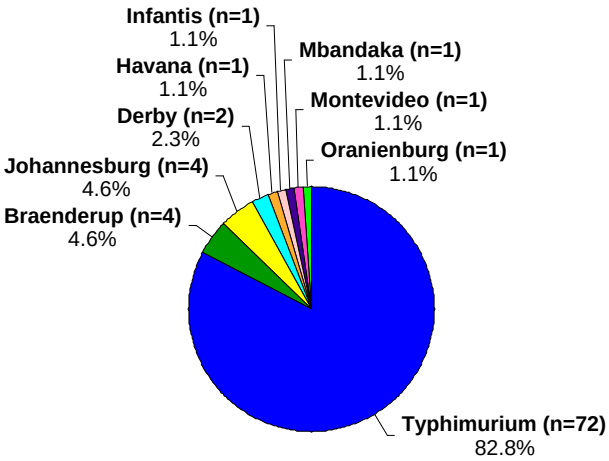



### SASKATCHEWAN

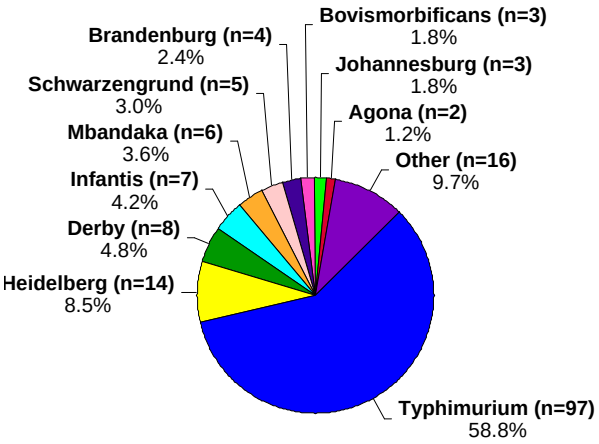


## MANITOBA

### 2002 (N=87)

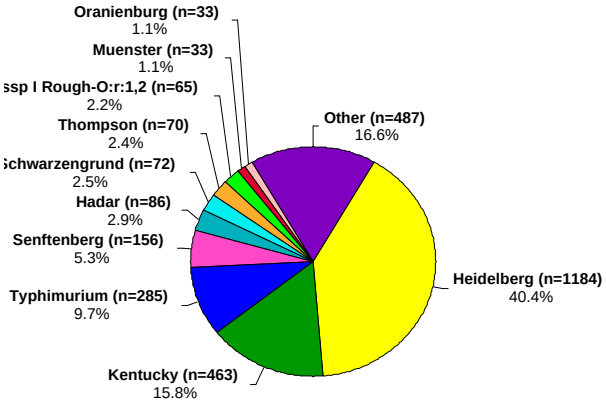



### 2003 (N=165)

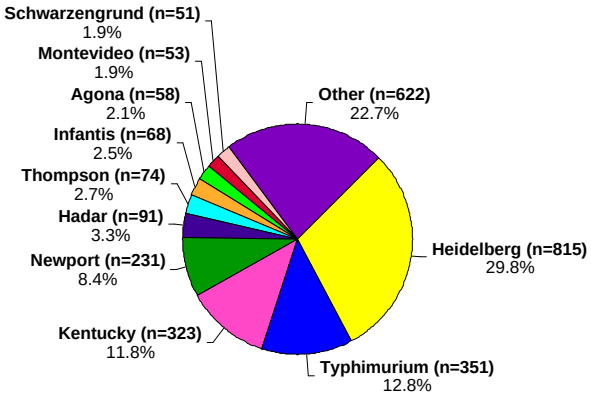



## ONTARIO

### 2002 (N=2934)

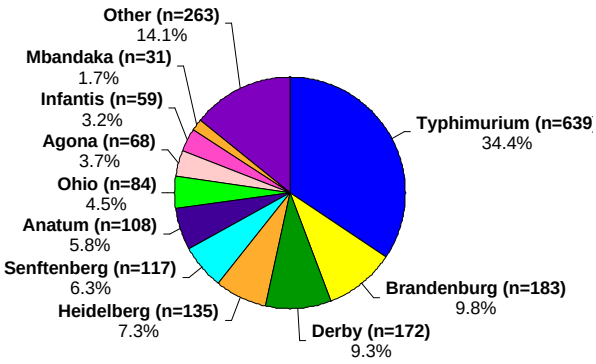



### 2003 (N=2737)

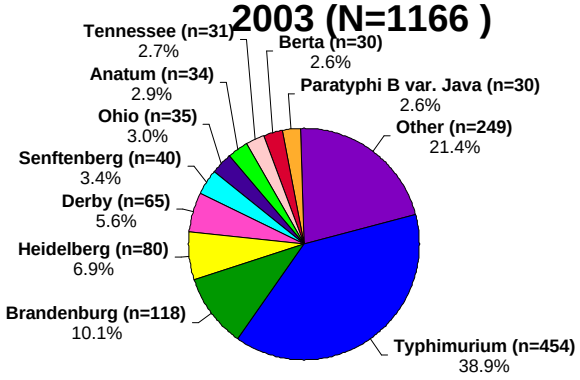



## QUEBEC

### 2002 (N=1859)

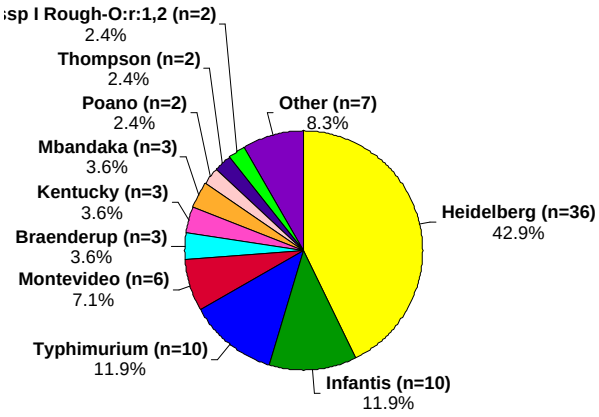



### 2003 (N=1166 )

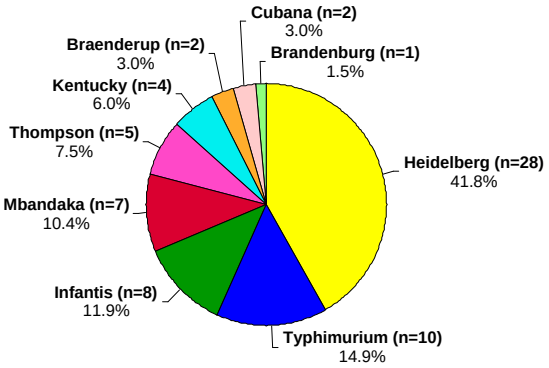


## NEW BRUNSWICK

### 2002 (N=84)

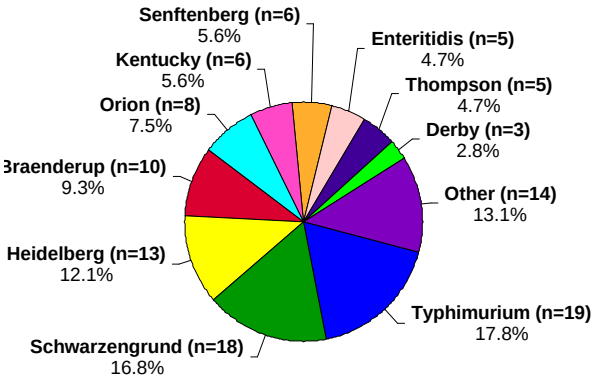



### 2003 (N=67)

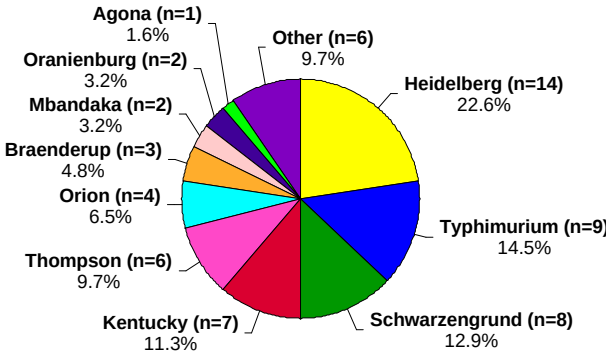



## NOVA SCOTIA

### 2002 (N=84)

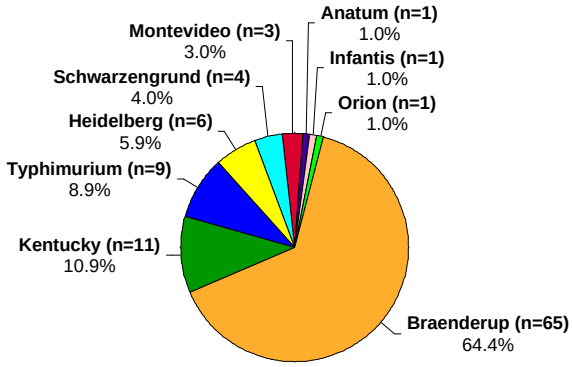



### 2003 (N=62)

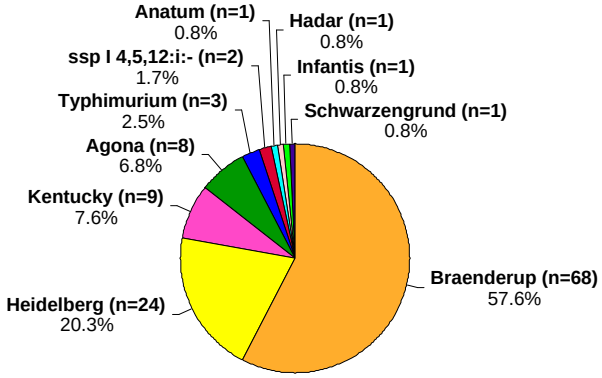



## PRINCE EDWARD ISLAND

### 2002 (N=101)

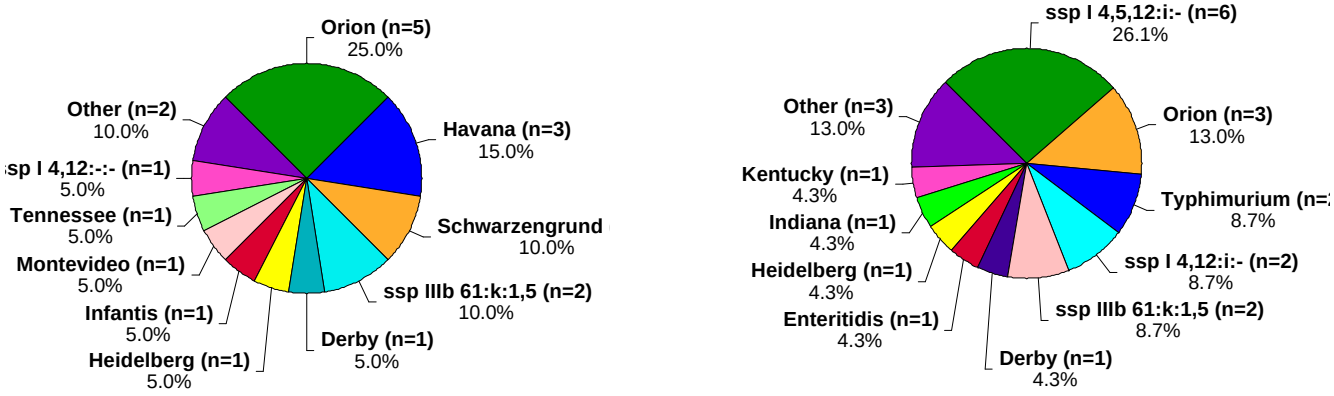



### 2003 (N=118)



**NEWFOUNDLAND and LABRADOR**

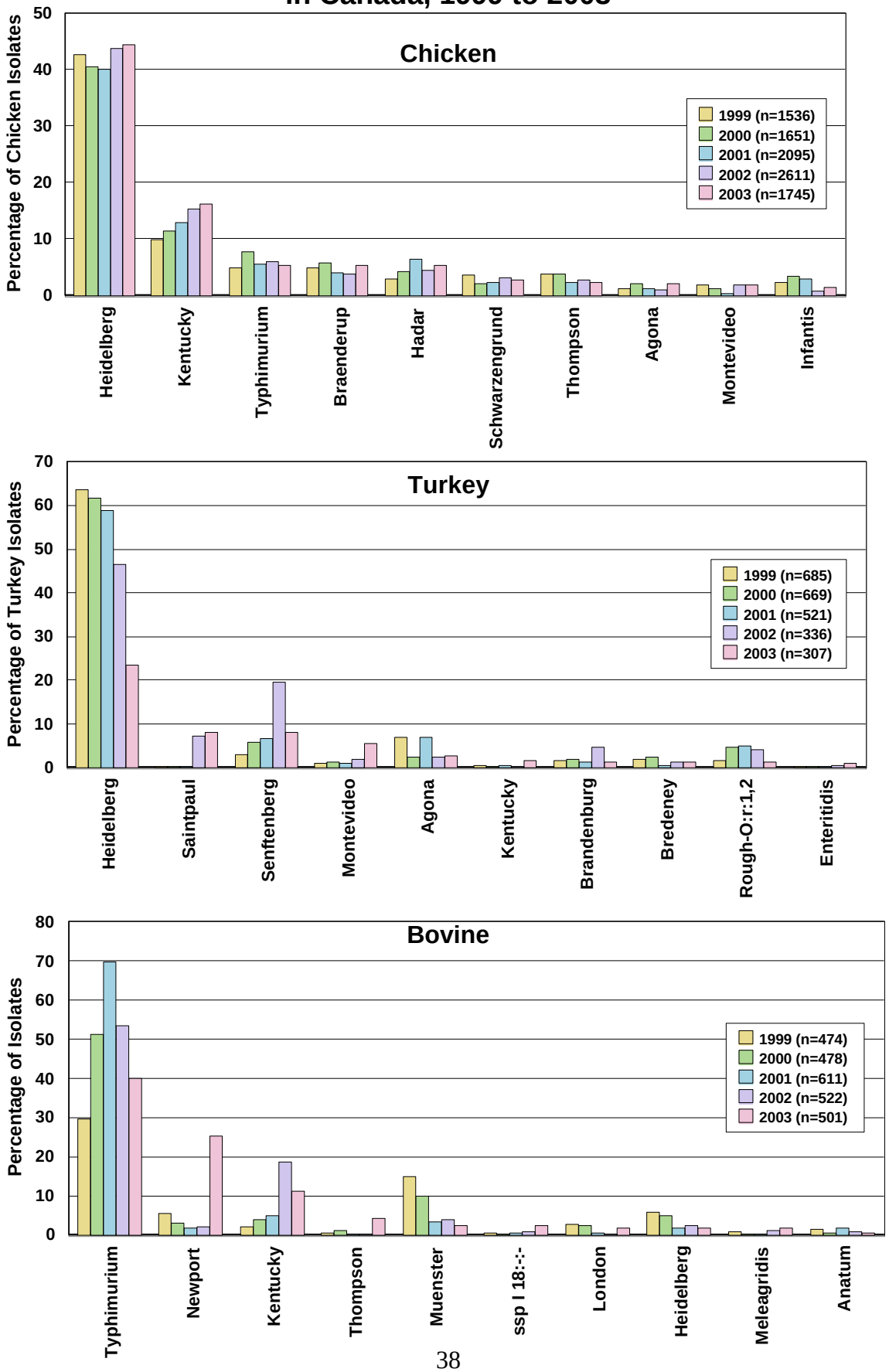
**2002 (N=20)** **2003 (N=23)**

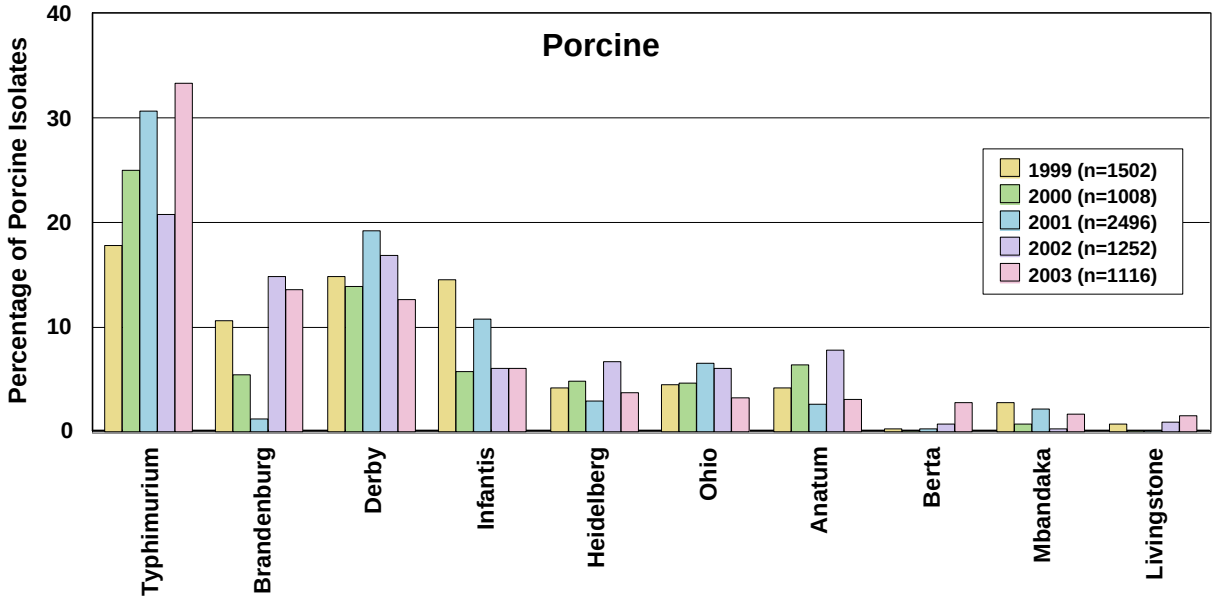


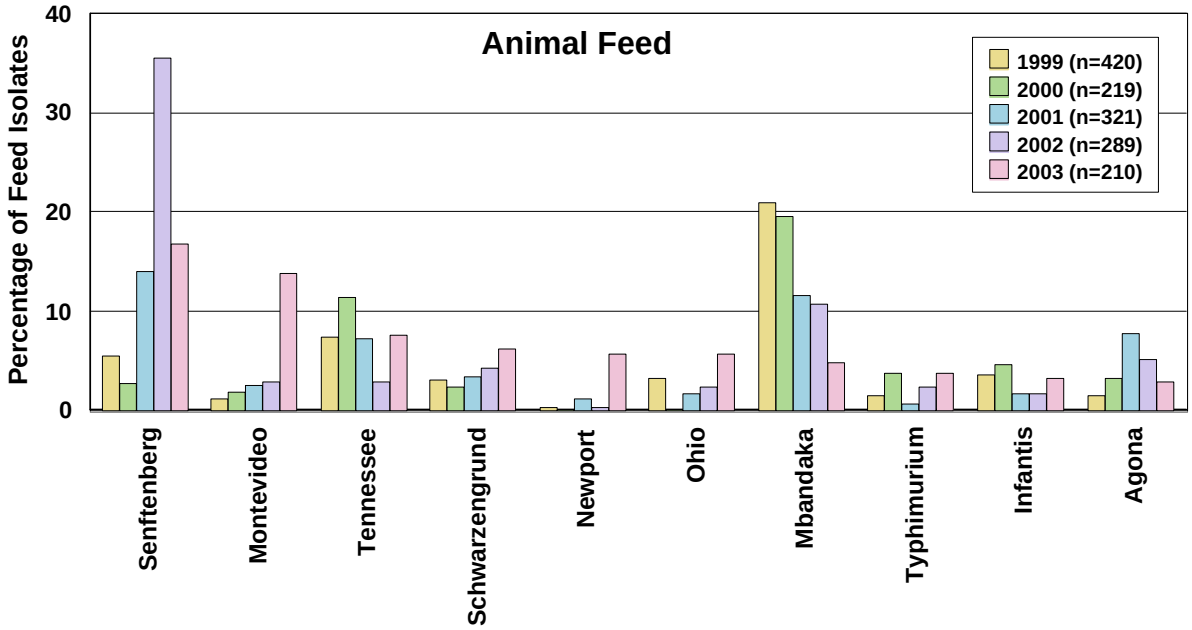

## Source Distribution of *Salmonella* Serovars in Canada, 1999 to 2003

The ten most prevalent *Salmonella* serovars found in bovine, chicken, turkey, porcine and feed sources since 1999 are shown in Figure 14. *S*. Heidelberg continued to be the most prevalent serovar in turkey and chicken sources, whereas *S*. Typhimurium was most prevalent in bovine and porcine sources. *S*. Heidelberg decreased in isolation frequency from turkey sources since 1999 and increases have been observed with *S*. Saintpaul and *S*. Senftenberg. Prevalence of *S*. Heidelberg, *S*. Kentucky and *S*. Typhimurium from chicken sources has remained relatively unchanged. *S*. Typhimurium is decreasing from bovine sources, but *S*. Newport and *S*. Kentucky isolations have increased in 2002 and 2003. In porcine sources, *S*. Typhimurium has been increasing in frequency while *S*. Derby has decreased slightly since 1999. In feed and feed ingredients, *S.* Senftenberg has become the most prevalent serovar and *S*. Montevideo has increased since 1999 to rank second most prevalent.

## Figure 14: Ten Most Prevalent *Salmonella* Serovars from Selected Sources in Canada, 1999 to 2003






* Non-human sources include food, water, animal and environmental samples. Serovar totals are laboratory confirmed isolates based on information gathered through passive surveillance at the LFZ and NML through reference services. Although data is only representative of laboratory confirmed isolates and should not be confused with incidence of disease in animals. The subset of data is consistently gathered and standardized from year to year and can indicate emerging or re-emerging trends. See Appendix 1 for details.

## Table 3: *Salmonella* from Non-Human Sources, 2002

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Abaetetuba | Unknown | | | | | 1 | | | | | | 1 |
| *S*. Abortusequi | Equine | | | | | 1 | | | | | | 1 |
| *S*. Agona | Animal (Unknown) | | | | | 2 | | | | | | 2 |
| | Animal Feed | | 1 | | | 1 | 13 | | | | | 15 |
| | Avian | | | | | 1 | 1 | | | | | 2 |
| | Bovine | | | | | 2 | 1 | | | | | 3 |
| | Chicken | | 13 | | | 8 | 1 | 1 | | | | 23 |
| | Environmental Swab | | | | | 2 | | | | | | 2 |
| | Food (Unspecified) | | | | | 1 | | | | | | 1 |
| | Ovine | | 1 | | | | | | | | | 1 |
| | Porcine | | | | | 4 | 52 | | | | | 56 |
| | Turkey | | | | | 8 | | | | | | 8 |
| | Water | | 1 | | | | | | | | | 1 |
| | **Subtotal** | **0** | **16** | **0** | **0** | **29** | **68** | **1** | **0** | **0** | **0** | **114** |
| *S*. Alachua | Snake | | 1 | | | | | | | | | 1 |
| *S*. Albany | Chicken | | | | | 4 | | | | | | 4 |
| | Food (Chicken) | | | | | 1 | | | | | | 1 |
| | Turkey | | | | | 1 | | | | | | 1 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **6** | **0** | **0** | **0** | **0** | **0** | **6** |
| *S*. Amsterdam (a) | Animal Feed | | | | | 1 | | | | | | 1 |
| | Reptile | | | | | 1 | | | | | | 1 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **2** |
| *S*. Anatum (a) | Animal (Unknown) | | | | | 1 | | | | | | 1 |
| | Animal Feed | | 2 | | | 1 | 12 | | | | | 15 |
| | Avian | | | | | | 1 | | | | | 1 |
| | Bovine | | | | | 4 | | | | | | 4 |
| | Chicken | | | | | 6 | | | 1 | | | 7 |
| | Environmental Swab | | | 1 | | | | | | | | 1 |
| | Equine | | | | | 1 | | | | | | 1 |
| | Fertilizer | | | | | 1 | | | | | | 1 |
| | Food (Bovine) | | | | | | | | | 1 | | 1 |
| | Food (Meat Loaf) | | | | | 2 | | | | | | 2 |
| | Porcine | 1 | | | | 1 | 95 | | | | | 97 |
| | Reptile | | | | | | | | | | | |
| | Turkey | | 1 | | | 1 | | | | | | 2 |
| | Water | | 8 | | | | | | | | | 8 |
| | **Subtotal** | **1** | **11** | **1** | **0** | **18** | **108** | **0** | **1** | **1** | **0** | **141** |
| *S*. Bere | Unknown | | | | | 1 | | | | | | 1 |
| *S*. Berta | Chicken | | | | | 5 | 1 | | | | | 6 |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Porcine | | | | | 3 | 6 | | | | | 9 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **8** | **7** | **0** | **0** | **0** | **0** | **15** |
| *S*. Bispebjerg | Food (Cumin Seeds) | | | | | | 1 | | | | | 1 |
| *S*. Blockley | Chicken | | 1 | | | | | | | | | 1 |
| | Chicken Litter | | 1 | | | | | | | | | 1 |
| | Egg | | | 2 | | | | | | | | 2 |
| | Food (Unspecified) | | 1 | | | | | | | | | 1 |
| | **Subtotal** | **0** | **3** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **5** |
| *S*. Bovismorbificans | Bovine | | | | | 1 | | | | | | 1 |
| *S*. Braenderup | Avian | | | | | | 1 | 3 | | | | 4 |
| | Chicken | | 7 | | 4 | 9 | | | 10 | 65 | | 95 |
| | Chicken Fluff | | | 1 | | | | | | | | 1 |
| | **Subtotal** | **0** | **7** | **1** | **4** | **9** | **1** | **3** | **10** | **65** | **0** | **100** |
| *S*. Brandenburg | Animal (Unknown) | | | | | 3 | | | | | | 3 |
| | Animal Feed | | | | | 1 | 1 | | | | | 2 |
| | Bovine | | 1 | | | 2 | | | | | | 3 |
| | Food (Basil) | | | | | | 1 | | | | | 1 |
| | Porcine | | | | | 4 | 181 | | | | | 185 |
| | Turkey | | | | | 15 | | | | | | 15 |
| | **Subtotal** | **0** | **1** | **0** | **0** | **25** | **183** | **0** | **0** | **0** | **0** | **209** |
| *S*. Bredeney | Animal (Unknown) | | | | | 2 | | | | | | 2 |
| | Bovine | | | | | 1 | | | | | | 1 |
| | Chicken | | | | | 1 | | | | | | 1 |
| | Turkey | | | | | 4 | | | | | | 4 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **8** | **0** | **0** | **0** | **0** | **0** | **8** |
| *S*. California | Water | | 6 | | | | | | | | | 6 |
| *S*. Cerro | Animal Feed | | 1 | | | | 2 | | | | | 3 |
| | Bovine | | 1 | | | 8 | | | | | | 9 |
| | Chicken | | | | | 1 | | | | | | 1 |
| | **Subtotal** | **0** | **2** | **0** | **0** | **9** | **2** | **0** | **0** | **0** | **0** | **13** |
| *S*. Chester | Bovine | | | | | 1 | | | | | | 1 |
| *S*. Corvallis | Unknown | | | | | 1 | | | | | | 1 |
| *S*. Cubana | Animal Feed | | 1 | | | | 1 | | | | | 2 |
| | Chicken | | | | | 1 | | | | | | 1 |
| | Food (Bovine) | 1 | | | | | | | | | | 1 |
| | Food (Celery Seeds) | | | | | | 1 | | | | | 1 |
| | Food (Parsley) | | | | | | 1 | | | | | 1 |
| | Reptile | | | | | 1 | | | | | | 1 |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Subtotal** | **1** | **1** | **0** | **0** | **2** | **3** | **0** | **0** | **0** | **0** | **7** |
| | | | | | | | | | | | | |
| *S*. Derby | Animal (Unknown) | | | | | 1 | | | | | | 1 |
| | Avian | | | 1 | | | | | | | | 1 |
| | Chicken | | | | | 1 | | | | | | 1 |
| | Food (Porcine) | | | | | | | | 2 | | | 2 |
| | Porcine | 2 | 4 | 18 | 2 | 10 | 172 | | 1 | | 1 | 210 |
| | Turkey | | | | | 2 | | | | | | 2 |
| | **Subtotal** | **2** | **4** | **19** | **2** | **14** | **172** | **0** | **3** | **0** | **1** | **217** |
| | | | | | | | | | | | | |
| *S*. Dublin | Bovine | | 1 | 1 | | 1 | | | | | | 3 |
| | | | | | | | | | | | | |
| *S*. Ealing | Animal Feed | | | | | | 1 | | | | | 1 |
| | | | | | | | | | | | | |
| *S*. Enteritidis | Animal (Unknown) | | | | | | 1 | | | | | 1 |
| | Bovine | | | 1 | | | | | | | | 1 |
| | Chicken | 1 | 17 | | | 3 | 2 | | | | | 23 |
| | Environmental Swab | 1 | 1 | | | | | | | | | 2 |
| | Fish | 1 | | | | | | | | | | 1 |
| | Food (Chicken) | 1 | | | | | | | | | | 1 |
| | Food (Pork) | 2 | | | | | | | | | | 2 |
| | Food (Poultry) | 1 | | | | | | | | | | 1 |
| | Hedgehog | | 1 | | | | | | | | | 1 |
| | Porcine | | | | | | | | 3 | | | 3 |
| | Poultry | | | | | | 2 | | | | | 2 |
| | Rodent | | | | | | | | 2 | | | 2 |
| | Turkey | | | | | 1 | | | | | | 1 |
| | Unknown | | | | | 2 | 5 | | | | | 7 |
| | **Subtotal** | **7** | **19** | **1** | **0** | **6** | **10** | **0** | **5** | **0** | **0** | **48** |
| | | | | | | | | | | | | |
| *S*. Fluntern | Gecko | | 1 | | | | | | | | | 1 |
| | | | | | | | | | | | | |
| *S*. Give (a) | Animal Feed | | | | | | 1 | | | | | 1 |
| | Bovine | | | | | 2 | | | | | | 2 |
| | Chicken | | | | | 4 | | | | | | 4 |
| | Duck | | | | | 1 | | | | | | 1 |
| | Porcine | | | 1 | | | | | | | | 1 |
| | Water | | 52 | | | | | | | | | 52 |
| | **Subtotal** | | **52** | **1** | **0** | **7** | **1** | **0** | **0** | **0** | **0** | **61** |
| | | | | | | | | | | | | |
| *S*. Grumpensis | Food (Pepper) | | | | | | 1 | | | | | 1 |
| | | | | | | | | | | | | |
| *S*. Hadar | Animal (Unknown) | | | | | 1 | | | | | | 1 |
| | Avian | | | | | 1 | 2 | | | | | 3 |
| | Bovine | | 2 | | | | | | | | | 2 |
| | Canine | | 2 | 1 | | | | | | | | 3 |
| | Chicken | | 30 | | | 81 | 1 | | | | | 112 |
| | Chicken Fluff | | 1 | 1 | | | | | | | | 2 |
| | Feline | | | | | 1 | | | | | | 1 |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Food (Cabbage) | | | | | 1 | | | | | | 1 |
| | Food (Chicken) | | 2 | | | | | | | | | 2 |
| | Food (Spice) | | | | | 1 | | | | | | 1 |
| | Poultry | | 1 | | | | | | | | | 1 |
| | Turkey | | | | | | | | 2 | | | 2 |
| | Unknown | | 1 | | | | | | | | | 1 |
| | Water | | 7 | | | | | | | | | 7 |
| | **Subtotal** | **0** | **46** | **2** | **0** | **86** | **3** | **0** | **2** | **0** | **0** | **139** |
| | | | | | | | | | | | | |
| *S*. Hartford | Animal Feed | | | | | 1 | | | | | | 1 |
| | Turkey | | | | | 1 | | | | | | 1 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **2** |
| | | | | | | | | | | | | |
| *S*. Havana | Animal Feed | | 2 | | | 1 | 2 | | | | | 5 |
| | Canine | | | | | 1 | | | | | | 1 |
| | Chicken | | | | | | | | | | 3 | 3 |
| | Porcine | | | | 1 | | 4 | | | | | 5 |
| | **Subtotal** | **0** | **2** | **0** | **1** | **2** | **6** | **0** | **0** | **0** | **3** | **14** |
| | | | | | | | | | | | | |
| *S*. Heidelberg | Animal (Unknown) | | | | | 27 | | | | | | 27 |
| | Animal Feed | | | | | 1 | 3 | | | | | 4 |
| | Avian | | 6 | 2 | | 5 | 6 | 25 | | | | 44 |
| | Bovine | | 2 | 1 | | 5 | 2 | 1 | | 1 | | 12 |
| | Camelid | | | | | | | | | | 1 | 1 |
| | Canine | | | 2 | | 1 | | | | | | 3 |
| | Cervid | | | | | 2 | | | | | | 2 |
| | Chicken | 6 | 101 | | | 961 | 16 | 10 | 12 | 5 | | 1111 |
| | Chicken Fluff | 2 | 3 | 13 | | | | | | | | 18 |
| | Chicken Litter | | 13 | | | | | | | | | 13 |
| | Duck | | | | | 2 | | | | | | 2 |
| | Environmental Swab | 4 | 5 | | | 2 | 1 | | | | | 12 |
| | Equine | | | | | 18 | | | | | | 18 |
| | Food (Chicken) | | 1 | | | | | | | | | 1 |
| | Food (Lamb) | | 1 | | | | | | | | | 1 |
| | Food (Lettuce) | | | | | 1 | | | | | | 1 |
| | Food (Mushrooms) | | | | | 1 | | | | | | 1 |
| | Food (Potato) | | | | | 1 | | | | | | 1 |
| | Food (Poultry) | | | | | | | | 1 | | | 1 |
| | Food (Unspecified) | | 1 | | | 1 | | | | | | 2 |
| | Owl | | 1 | | | | | | | | | 1 |
| | Porcine | | 2 | 9 | | 4 | 69 | | | | | 84 |
| | Poultry | | 2 | 1 | | | 13 | | | | | 16 |
| | Turkey | 4 | 3 | | | 149 | | | | | | 156 |
| | Unknown | | 1 | | | 3 | 25 | | | | | 29 |
| | Water | | 38 | | | | | | | | | 38 |
| | **Subtotal** | **16** | **180** | **28** | **0** | **1184** | **135** | **36** | **13** | **6** | **1** | **1599** |
| | | | | | | | | | | | | |
| *S*. Indiana | Chicken | | 8 | | | 3 | | | | | | 11 |
| | Duck | | | | | 5 | | | | | | 5 |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Subtotal** | **0** | **8** | **0** | **0** | **8** | **0** | **0** | **0** | **0** | **0** | **16** |
| | | | | | | | | | | | | |
| *S*. Infantis | Animal (Unknown) | | | | | 1 | | | | | | 1 |
| | Animal Feed | 2 | | | | 1 | 2 | | | | | 5 |
| | Avian | | | | | | 1 | 8 | | | | 9 |
| | Bovine | | 1 | | | 1 | | | | | | 2 |
| | Chicken | | | | 1 | 11 | | 2 | 1 | 1 | 1 | 17 |
| | Chicken Fluff | | | 5 | | | | | | | | 5 |
| | Environmental Swab | | | 6 | | | | | | | | 6 |
| | Food (Chicken) | | | | | 1 | | | | | | 1 |
| | Pet Food | | 1 | | | | | | | | | 1 |
| | Pet Food (Dog Treat) | | 1 | | | | | | | | | 1 |
| | Porcine | 1 | | 18 | | 1 | 56 | | | | | 76 |
| | Water | | 9 | | | 1 | | | | | | 10 |
| | **Subtotal** | **3** | **12** | **29** | **1** | **17** | **59** | **10** | **1** | **1** | **1** | **134** |
| | | | | | | | | | | | | |
| *S*. Javiana | Bovine | | | | | 4 | | | | | | 4 |
| | Chicken | | | | | 4 | | | | | | 4 |
| | Equine | | | | | 1 | | | | | | 1 |
| | Turkey | | | | | 2 | | | | | | 2 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **11** | **0** | **0** | **0** | **0** | **0** | **11** |
| | | | | | | | | | | | | |
| *S*. Johannesburg | Animal (Unknown) | | | | | | 1 | | | | | 1 |
| | Animal Feed | | 1 | | 1 | | | | | | | 2 |
| | Chicken | | | | 3 | | | | | | | 3 |
| | Chicken Fluff | | | 6 | | | | | | | | 6 |
| | Environmental Swab | | | | | | 1 | | | | | 1 |
| | **Subtotal** | **0** | **1** | **6** | **4** | **0** | **2** | **0** | **0** | **0** | **0** | **13** |
| | | | | | | | | | | | | |
| *S*. Kentucky | Animal Feed | | | | | | 1 | | | | | 1 |
| | Avian | | | | | 2 | 1 | | | | | 3 |
| | Bovine | | | | | 91 | 6 | | | | | 97 |
| | Canine | | | | | 1 | | | | | | 1 |
| | Chicken | | 18 | | | 360 | 1 | 3 | 6 | 11 | | 399 |
| | Chicken Litter | | 1 | | | | | | | | | 1 |
| | Equine | | | | | 1 | | | | | | 1 |
| | Food (Basil) | | | | | | 1 | | | | | 1 |
| | Food (Chicken) | | | | | 5 | | | | | | 5 |
| | Food (Milk) | | | | | 1 | | | | | | 1 |
| | Food (Unspecified) | | | | | 1 | | | | | | 1 |
| | Porcine | | | | | 1 | 20 | | | | | 21 |
| | **Subtotal** | **0** | **19** | **0** | **0** | **463** | **30** | **3** | **6** | **11** | **0** | **532** |
| | | | | | | | | | | | | |
| *S*. Kiambu | Chicken | | | | | 3 | | | | | | 3 |
| | | | | | | | | | | | | |
| *S*. Kottbus | Unknown | | | | | 1 | | | | | | 1 |
| | | | | | | | | | | | | |
| *S*. Krefeld | Chicken | | | | | 1 | | | | | | 1 |
| | Porcine | | | | | 1 | | | | | | 1 |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Subtotal** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **2** |
| | | | | | | | | | | | | |
| *S*. Lexington (a) | Animal Feed | | | | | | 10 | | | | | 10 |
| | | | | | | | | | | | | |
| *S*. Livingstone (b) | Chicken | | | | | 7 | | | | | | 7 |
| | Environmental Swab | | | 1 | | | | | | | | 1 |
| | Porcine | | | 3 | | | 8 | | | | | 11 |
| | Turkey | | | | | 3 | | | | | | 3 |
| | **Subtotal** | **0** | **0** | **4** | **0** | **10** | **8** | **0** | **0** | **0** | **0** | **22** |
| | | | | | | | | | | | | |
| *S*. London | Chicken | | | | | 1 | | | | | | 1 |
| | Duck | | | | | 4 | | | | | | 4 |
| | Unknown | | | | | 1 | | | | | | 1 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **6** | **0** | **0** | **0** | **0** | **0** | **6** |
| | | | | | | | | | | | | |
| *S*. Manhattan | Avian | | | 1 | | | | | | | | 1 |
| | Porcine | | | | | | 4 | | | | | 4 |
| | **Subtotal** | **0** | **0** | **1** | **0** | **0** | **4** | **0** | **0** | **0** | **0** | **5** |
| | | | | | | | | | | | | |
| *S*. Matadi | Food (Pepper) | | | | | 1 | | | | | | 1 |
| | | | | | | | | | | | | |
| *S*. Mbandaka | Animal (Unknown) | | | | | 1 | | | | | | 1 |
| | Animal Feed | | | | | 2 | 29 | | | | | 31 |
| | Avian | | | | | | | | 1 | | | 1 |
| | Bovine | | | | | 3 | | | | | | 3 |
| | Caprine | | | | | 1 | | | | | | 1 |
| | Cervid | | | 1 | | | | | | | | 1 |
| | Chicken | | 60 | | 1 | 15 | | 3 | 2 | | | 81 |
| | Environmental Swab | | | 1 | | | | | | | | 1 |
| | Porcine | | | 1 | | 1 | 2 | | | | | 4 |
| | Reptile | | | | | 6 | | | | | | 6 |
| | Turkey | | | | | 2 | | | | | | 2 |
| | Water | | 6 | | | | | | | | | 6 |
| | **Subtotal** | **0** | **66** | **3** | **1** | **31** | **31** | **3** | **3** | **0** | **0** | **138** |
| | | | | | | | | | | | | |
| *S*. Meleagridis | Animal Feed | | 2 | | | 1 | | | | | | 3 |
| | Bovine | | | | | 6 | | | | | | 6 |
| | Equine | | | | | 1 | | | | | | 1 |
| | Porcine | | | | | 1 | | | | | | 1 |
| | **Subtotal** | **0** | **2** | **0** | **0** | **9** | **0** | **0** | **0** | **0** | **0** | **11** |
| | | | | | | | | | | | | |
| *S*. Mikawasima | Food (Spice) | | | | | | 1 | | | | | 1 |
| | | | | | | | | | | | | |
| *S*. Minnesota | Animal (Unknown) | | | | | | 1 | | | | | 1 |
| | Animal Feed | | 1 | | | | | | | | | 1 |
| | **Subtotal** | **0** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **2** |
| | | | | | | | | | | | | |
| *S*. Molade | Animal Feed | | | | | 2 | | | 1 | | | 3 |
| | | | | | | | | | | | | |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Montevideo | Animal (Unknown) | | | | | 2 | 3 | | | | | 5 |
| | Animal Feed | | | | 1 | 1 | 6 | | | | | 8 |
| | Avian | | | | | | | | 1 | | 1 | 2 |
| | Bovine | | | | | 1 | | | | 1 | | 2 |
| | Chicken | | 25 | | | 15 | | 6 | | 2 | | 48 |
| | Food (Basil) | | | | | | 1 | | | | | 1 |
| | Turkey | | | | | 6 | | | | | | 6 |
| | Unknown | | | | | | 1 | | | | | 1 |
| | Water | | 44 | | | | | | | | | 44 |
| | **Subtotal** | **0** | **69** | **0** | **1** | **25** | **11** | **6** | **1** | **3** | **1** | **117** |
| | | | | | | | | | | | | |
| *S*. Muenster (a) | Animal Feed | | 1 | | | | | | | | | 1 |
| | Bovine | | | | | 20 | | | | | | 20 |
| | Chicken | | | | | 2 | 1 | | | | | 3 |
| | Environmental Swab | | | | | 2 | | | | | | 2 |
| | Fertilizer | | | | | 1 | | | | | | 1 |
| | Porcine | | | | | 1 | | | | | | 1 |
| | Turkey | | | | | 6 | | | | | | 6 |
| | Unknown | | | | | 1 | | | | | | 1 |
| | Water | | 6 | | | | | | | | | 6 |
| | **Subtotal** | **0** | **7** | **0** | **0** | **33** | **1** | **0** | **0** | **0** | **0** | **41** |
| | | | | | | | | | | | | |
| *S*. Newport | Animal (Unknown) | | | | | 4 | | | | | | 4 |
| | Animal Feed | | 1 | | | | | | | | | 1 |
| | Bovine | | | | | 10 | | 1 | | | | 11 |
| | Chicken | | | | | 4 | | | | | | 4 |
| | Environmental Swab | | | | | 1 | | | | | | 1 |
| | Food (Unspecified) | | 1 | | | | | | | | | 1 |
| | Pet Food | | 1 | | | | | | | | | 1 |
| | Pet Food (Dog Treat) | | 1 | | | | | | | | | 1 |
| | Reptile | | 1 | | | | | | | | | 1 |
| | Snake | | 1 | | | | | | | | | 1 |
| | Turkey | | | | | 5 | | | | | | 5 |
| | **Subtotal** | **0** | **6** | **0** | **0** | **24** | **0** | **1** | **0** | **0** | **0** | **31** |
| | | | | | | | | | | | | |
| *S*. Ohio (b) | Animal Feed | | 1 | | | 1 | 5 | | | | | 7 |
| | Avian | | | | | | 2 | 1 | | | | 3 |
| | Bovine | | | | | | 4 | | | | | 4 |
| | Chicken | | | | | 2 | | | | | | 2 |
| | Porcine | | | 1 | | 1 | 73 | | | | | 75 |
| | **Subtotal** | **0** | **1** | **1** | **0** | **4** | **84** | **1** | **0** | **0** | **0** | **91** |
| | | | | | | | | | | | | |
| *S*. Oranienburg | Animal (Unknown) | | 1 | | | | | | | | | 1 |
| | Animal Feed | | | | 1 | | 1 | | | | | 2 |
| | Chicken | | | | | | | | 1 | | | 1 |
| | Feline | | | 2 | | | | | | | | 2 |
| | Food (Chocolate) | | | | | 31 | | | | | | 31 |
| | Food (Unspecified) | | | | | 1 | | | | | | 1 |
| | Porcine | | | | | 1 | 1 | | | | | 2 |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Primate | | 2 | | | | | | | | | 2 |
| | Reptile | | 1 | | | | | | | | | 1 |
| | Snake | | 1 | | | | | | | | | 1 |
| | **Subtotal** | **0** | **5** | **2** | **1** | **33** | **2** | **0** | **1** | **0** | **0** | **44** |
| | | | | | | | | | | | | |
| *S*. Orion (a) | Animal (Unknown) | | | | | 1 | | | | | | 1 |
| | Animal Feed | | | | | | 11 | | | | 1 | 12 |
| | Avian | | | | | | | | 1 | | 3 | 4 |
| | Bovine | | | | | 1 | | | | | | 1 |
| | Chicken | | | | | 1 | | | 6 | 1 | 1 | 9 |
| | Equine | | | | | | | | 1 | | | 1 |
| | Pet Food | | 1 | | | | | | | | | 1 |
| | Porcine | | | | | 1 | | | | | | 1 |
| | **Subtotal** | **0** | **1** | **0** | **0** | **4** | **11** | **0** | **8** | **1** | **5** | **30** |
| | | | | | | | | | | | | |
| *S*. Ouakam | Turkey | | | | | 2 | | | | | | 2 |
| | | | | | | | | | | | | |
| *S*. Panama | Python | 1 | | | | | | | | | | 1 |
| | | | | | | | | | | | | |
| *S*. Paratyphi B var. Java | Canine | | | 1 | | | | | | | | 1 |
| | Porcine | | | | | | 14 | | | | | 14 |
| | Poultry | | | | | | 1 | | | | | 1 |
| | Unknown | | 1 | | | | 2 | | | | | 3 |
| | Water | 2 | | | | | 1 | | | | | 3 |
| | Water (Aquarium) | 2 | | | | | 1 | | | | | 3 |
| | **Subtotal** | **4** | **1** | **1** | **0** | **0** | **19** | **0** | **0** | **0** | **0** | **25** |
| | | | | | | | | | | | | |
| *S*. Poano | Environmental Swab | | | | | 1 | | | | | | 1 |
| | Reptile | | | | | | | 2 | | | | 2 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **1** | **0** | **2** | **0** | **0** | **0** | **3** |
| | | | | | | | | | | | | |
| *S*. Pomona | Water | | 3 | | | | | | | | | 3 |
| | | | | | | | | | | | | |
| *S*. Poona | Canine | | | | | 1 | | | | | | 1 |
| | | | | | | | | | | | | |
| *S*. Putten | Chicken | | | | | 3 | | | | | | 3 |
| | Porcine | | | 9 | | | 8 | | | | | 17 |
| | **Subtotal** | **0** | **0** | **9** | **0** | **3** | **8** | **0** | **0** | **0** | **0** | **20** |
| | | | | | | | | | | | | |
| *S*. Reading | Bovine | | | | | 1 | | | | | | 1 |
| | | | | | | | | | | | | |
| *S*. Rissen | Animal Feed | | 1 | | | | | | | | | 1 |
| | Chicken Fluff | | | 1 | | | | | | | | 1 |
| | Unknown | | | | | 1 | | | | | | 1 |
| | **Subtotal** | **0** | **1** | **1** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **3** |
| | | | | | | | | | | | | |
| *S*. Rubislaw | Animal Feed | | | | | | 1 | | | | | 1 |
| | Camelid | | 1 | | | | | | | | | 1 |
| | Chicken | | 11 | | | | | | | | | 11 |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Equine | | 1 | | | | | | | | | 1 |
| | Food (Pepper) | | | | | 1 | | | | | | 1 |
| | Water | | 427 | | | | | | | | | 427 |
| | **Subtotal** | **0** | **440** | **0** | **0** | **1** | **1** | **0** | **0** | **0** | **0** | **442** |
| | | | | | | | | | | | | |
| *S*. Saintpaul | Avian | | | | | | 3 | | | | | 3 |
| | Bovine | | | | | 3 | | | | | | 3 |
| | Turkey | | | | | 24 | | | | | | 24 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **27** | **3** | **0** | **0** | **0** | **0** | **30** |
| | | | | | | | | | | | | |
| *S*. Sandiego | Food (Pepper) | | | | | 3 | | | | | | 3 |
| | Water | | 66 | | | | | | | | | 66 |
| | **Subtotal** | **0** | **66** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **69** |
| | | | | | | | | | | | | |
| *S*. Schwarzengrund | Animal Feed | | | | | 9 | 3 | | | | | 12 |
| | Avian | | | | | 3 | | | | | | 3 |
| | Bovine | | | | | 12 | | | | | | 12 |
| | Chicken | | 21 | | | 42 | | | 15 | 4 | 2 | 84 |
| | Environmental Swab | | | | | 3 | | | | | | 3 |
| | Equine | | | | | 3 | | | | | | 3 |
| | Mink | | | | | | | | 3 | | | 3 |
| | Porcine | | 1 | | | | | | | | | 1 |
| | **Subtotal** | **0** | **22** | **0** | **0** | **72** | **3** | **0** | **18** | **4** | **2** | **121** |
| | | | | | | | | | | | | |
| *S*. Senftenberg | Animal (Unknown) | | | | | 6 | | | | | | 6 |
| | Animal Feed | | 7 | | | 3 | 90 | | 3 | | | 103 |
| | Bovine | | | | | 12 | | | | | | 12 |
| | Chicken | | 3 | | | 72 | | | | | | 75 |
| | Environmental Swab | | 1 | | | | | | | | | 1 |
| | Mollusc | 3 | | | | | | | | | | 3 |
| | Porcine | | | | | | 27 | | | | | 27 |
| | Turkey | | | | | 63 | | | 3 | | | 66 |
| | **Subtotal** | **3** | **11** | **0** | **0** | **156** | **117** | **0** | **6** | **0** | **0** | **293** |
| | | | | | | | | | | | | |
| *S*. Singapore | Reptile | | | | | | 3 | | | | | 3 |
| | | | | | | | | | | | | |
| *S*. Stanleyville | Chicken | | | | | 9 | | | | | | 9 |
| | | | | | | | | | | | | |
| *S*. Tennessee | Animal Feed | | | | | | 8 | | | | | 8 |
| | Bovine | | | | | 12 | | | | | | 12 |
| | Chicken | | 5 | | | 2 | | | | | | 7 |
| | Environmental Swab | | 1 | | | | 2 | | | | | 3 |
| | Fertilizer | | | | | | | | | | 1 | 1 |
| | Porcine | | | | | | 13 | | | | | 13 |
| | Soil | | | | | 1 | | | | | | 1 |
| | Unknown | | | | | 1 | | | | | | 1 |
| | **Subtotal** | **0** | **6** | **0** | **0** | **16** | **23** | **0** | **0** | **0** | **1** | **46** |
| | | | | | | | | | | | | |
| *S*. Thompson | Animal Feed | | | | | 2 | 1 | | | | | 3 |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Avian | | | | | 2 | 3 | | | | | 5 |
| | Bovine | | | | | 1 | | | | | | 1 |
| | Canine | | | 13 | | 1 | | | | | | 14 |
| | Chicken | | 2 | | | 58 | 2 | 2 | 5 | | | 69 |
| | Chicken Fluff | | | 1 | | | | | | | | 1 |
| | Equine | | | | | 2 | | | | | | 2 |
| | Food (Chicken) | | | | | 3 | | | | | | 3 |
| | Poultry | | 1 | | | | | | | | | 1 |
| | Unknown | | | | | 1 | 1 | | | | | 2 |
| | Water | | 4 | | | | | | | | | 4 |
| | **Subtotal** | **0** | **7** | **14** | **0** | **70** | **7** | **2** | **5** | **0** | **0** | **105** |
| | | | | | | | | | | | | |
| *S*. Typhimurium | Animal (Unknown) | | 1 | | | 9 | 5 | | | | | 15 |
| | Animal Feed | 1 | 3 | | | | 3 | | | | | 7 |
| | Avian | 5 | 6 | 24 | 16 | 64 | 29 | 3 | 1 | | | 148 |
| | Bison | | | 1 | | | | | | | | 1 |
| | Bovine | 18 | 113 | 19 | 20 | 56 | 51 | 2 | | | | 279 |
| | Canine | | | | | 3 | | | | | | 3 |
| | Cervid | | 1 | | | | | | | | | 1 |
| | Chicken | 1 | 33 | | 18 | 66 | 4 | 5 | 17 | 9 | | 153 |
| | Chicken Fluff | | | 2 | | | | | | | | 2 |
| | Chicken Litter | | 1 | | | | | | | | | 1 |
| | Compost | | | | | 1 | | | | | | 1 |
| | Cormorant | | | 2 | | | | | | | | 2 |
| | Duck | | | | | 2 | | | | | | 2 |
| | Environmental Swab | 3 | 3 | | | 3 | 1 | | | | | 10 |
| | Equine | | 1 | | | 10 | 2 | | | | | 13 |
| | Feline | | 4 | | | 10 | 7 | | | | | 21 |
| | Ferret | | | | | 1 | | | | | | 1 |
| | Food (Basil) | | | | | | 2 | | | | | 2 |
| | Food (Bean Sprouts) | | | | | | 1 | | | | | 1 |
| | Food (Beef) | | 1 | | | | 3 | | | | | 4 |
| | Food (Bovine) | 1 | 1 | | | | | | | | | 2 |
| | Food (Chicken) | | 2 | | | | | | | | | 2 |
| | Food (Eel) | | | | | 1 | | | | | | 1 |
| | Food (Eggs) | 4 | | | | | | | | | | 4 |
| | Food (Pork) | | | | | | 198 | | | | | 198 |
| | Food (Unspecified) | | | | | | 3 | | | | | 3 |
| | Hedgehog | | 3 | | | | | | | | | 3 |
| | Ovine | 1 | 2 | 1 | | | | | | | | 4 |
| | Pet Food | | 5 | | | 1 | | | | | | 6 |
| | Pet Food (Dog Treat) | | 5 | | | 1 | | | | | | 6 |
| | Pigeon | 3 | | | | | | | | | | 3 |
| | Pine Siskin | 2 | | | | | | | | | | 2 |
| | Porcine | | 4 | 19 | 18 | 54 | 164 | | 1 | | | 260 |
| | Poultry | | | | | | 15 | | | | | 15 |
| | Quail | | | | | | 1 | | | | | 1 |
| | Reptile | | 1 | | | | | | | | | 1 |
| | Snake | | 1 | | | | | | | | | 1 |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sparrow | | 4 | 2 | | | | | | | | 6 |
| | Tiger | 1 | | | | | | | | | | 1 |
| | Turkey | | 2 | | | 2 | | | | | | 4 |
| | Unknown | | 2 | | | 1 | 150 | | | | | 153 |
| | Water | | 26 | | | | | | | | | 26 |
| | **Subtotal** | **40** | **225** | **70** | **72** | **285** | **639** | **10** | **19** | **9** | **0** | **1369** |
| | | | | | | | | | | | | |
| *S*. Uganda | Animal (Unknown) | | | | | 1 | | | | | | 1 |
| | Animal Feed | | | | | | 1 | | | | | 1 |
| | Chicken | | | | | 4 | | | | | | 4 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **5** | **1** | **0** | **0** | **0** | **0** | **6** |
| | | | | | | | | | | | | |
| *S*. Vejle | Pet Food | | 1 | | | | | | | | | 1 |
| | Pet Food (Dog Treat) | | 1 | | | | | | | | | 1 |
| | **Subtotal** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** |
| | | | | | | | | | | | | |
| *S*. Weltevreden | Mollusc | 1 | | | | | | | | | | 1 |
| | | | | | | | | | | | | |
| *S*. Westhampton (a) | Chicken | | | | | 5 | | | | | | 5 |
| | Turkey | | | | | 1 | | | | | | 1 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **6** | **0** | **0** | **0** | **0** | **0** | **6** |
| | | | | | | | | | | | | |
| *S*. Worthington | Animal Feed | | | | | | 1 | | | | | 1 |
| | Bovine | | 1 | | | | | | | | | 1 |
| | Chicken | | 10 | | | 6 | | | | | | 16 |
| | Environmental Swab | | 1 | | | | | | | | | 1 |
| | Porcine | | | 2 | | | 2 | | | | | 4 |
| | Water | | 16 | | | | | | | | | 16 |
| | **Subtotal** | **0** | **28** | **2** | **0** | **6** | **3** | **0** | **0** | **0** | **0** | **39** |
| | | | | | | | | | | | | |
| *S*. Yoruba | Animal Feed | | | | | 1 | | | | | | 1 |
| | Fish | 1 | | | | | | | | | | 1 |
| | **Subtotal** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **2** |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,12:-:- | Aquatic Animal | | | | | | | | | | 1 | 1 |
| | Avian | | | | | | | 1 | | | | 1 |
| | Chicken | | | | | 1 | | | | | | 1 |
| | Equine | | | | | 1 | | | | | | 1 |
| | Porcine | | | | | | 6 | | | | | 6 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **2** | **6** | **1** | **0** | **0** | **1** | **10** |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,5,12:-:- | Chicken | | | | | 3 | | | | | | 3 |
| | Equine | | | | | 2 | | | | | | 2 |
| | Porcine | | | | | | 2 | | | | | 2 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **5** | **2** | **0** | **0** | **0** | **0** | **7** |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,12:-:1,2 | Avian | | 1 | | | | | | | | | 1 |
| | Chicken | | 1 | | | | | | | | | 1 |
| | Porcine | | | | | | 1 | | | | | 1 |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Subtotal** | **0** | **2** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **3** |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,5,12:-:1,2 | Porcine | | | | | | 2 | | | | | 2 |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,12:-:e,n,x | Porcine | | | | | | 1 | | | | | 1 |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,12:-:e,n,z15 | Porcine | | | | | | 2 | | | | | 2 |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,5,12:b:- | Bovine | | | | | 1 | | | | | | 1 |
| | Lizard | | | | | | 2 | | | | | 2 |
| | Mouse | | | | | | 1 | | | | | 1 |
| | Porcine | | | | | | 1 | | | | | 1 |
| | Turkey | | | | | 1 | | | | | | 1 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **2** | **4** | **0** | **0** | **0** | **0** | **6** |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,12:d:- | Chicken | | | | | 8 | | | | | | 8 |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,12:i:- | Avian | | | 1 | | 1 | | | | | 1 | 3 |
| | Bovine | | 5 | | | | | | | | | 5 |
| | Chicken | 1 | | | | | | | | | | 1 |
| | Chicken Fluff | 2 | | | | | | | | | | 2 |
| | Porcine | | 1 | | | 1 | 1 | | | | | 3 |
| | Raccoon | 1 | | | | | | | | | | 1 |
| | Water | | 1 | | | | | | | | | 1 |
| | **Subtotal** | **4** | **7** | **1** | **0** | **2** | **1** | **0** | **0** | **0** | **1** | **16** |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,5,12:i:- | Avian | | | 3 | | 2 | | | | | | 5 |
| | Bovine | | | 13 | | 2 | | | | | | 15 |
| | Chicken | | 6 | 1 | | 2 | | | | | | 9 |
| | Chicken Fluff | | | 1 | | | | | | | | 1 |
| | Chicken Litter | | 1 | | | | | | | | | 1 |
| | Environmental Swab | 2 | 2 | | | | | | | | | 4 |
| | Ovine | | | 1 | | | | | | | | 1 |
| | Porcine | 1 | | 1 | | | | | | | | 2 |
| | Turkey | | | 1 | | 1 | | | | | | 2 |
| | **Subtotal** | **3** | **9** | **21** | **0** | **7** | **0** | **0** | **0** | **0** | **0** | **40** |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,12:r:- | Avian | | 1 | | | | 1 | | | | | 2 |
| | Bovine | | | 1 | | | | | | | | 1 |
| | Chicken | | 1 | | | 3 | | | | | | 4 |
| | Porcine | | | | | | 1 | | | | | 1 |
| | Turkey | | | 1 | | | | | | | | 1 |
| | **Subtotal** | **0** | **2** | **2** | **0** | **3** | **2** | **0** | **0** | **0** | **0** | **9** |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,5,12:r:- | Chicken | | 1 | | | | | | | | | 1 |
| | Porcine | | | | | | 1 | | | | | 1 |
| | Water | | 1 | | | | | | | | | 1 |
| | **Subtotal** | **0** | **2** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **3** |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Salmonella* ssp I 4,12:l,v:- | Porcine | | | | | | 1 | | | | | 1 |
| *Salmonella* ssp I 6,7,14:-:- | Animal Feed | | | | | | 2 | | | | | 2 |
| | Chicken | | | | | | 1 | | | | | 1 |
| | Porcine | | | | | | 1 | | | | | 1 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **0** | **4** | **0** | **0** | **0** | **0** | **4** |
| *Salmonella* ssp I 6,7:-:- | Porcine | | | | | | 1 | | | | | 1 |
| *Salmonella* ssp I 6,7:-:1,5 | Chicken | | | | | 1 | | | | | | 1 |
| *Salmonella* ssp I 6,7:-:l,w | Porcine | | | | | 1 | | | | | | 1 |
| *Salmonella* ssp I 6,7,14:-:l,w | Porcine | | | | | 1 | 2 | | | | | 3 |
| *Salmonella* ssp I 6,7:r:- | Porcine | | | | | | 1 | | | | | 1 |
| *Salmonella* ssp I 6,7:z10:- | Avian | | | | | | | 1 | | | | 1 |
| | Animal Feed | | | | | | 1 | | | | | 1 |
| | Chicken | | 2 | | | | | | 1 | | | 3 |
| | Porcine | | | | | 1 | | | | | | 1 |
| | **Subtotal** | **0** | **2** | **0** | **0** | **1** | **1** | **1** | **1** | **0** | **0** | **6** |
| *Salmonella* ssp I 6,7:z4,z23:- | Animal Feed | | | | | | 1 | | | | | 1 |
| *Salmonella* ssp I 6,8:-:- | Chicken | | | | | 2 | | | | | | 2 |
| *Salmonella* ssp I 6,8:-:1,2 | Water | | 1 | | | | | | | | | 1 |
| *Salmonella* ssp I 6,8:-:e,n,x | Animal (Unknown) | | | | | 1 | | | | | | 1 |
| | Chicken | | | | | 1 | | | | | | 1 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **2** |
| *Salmonella* ssp I 8,20:-:z6 | Chicken | | | | | 2 | | | | | | 2 |
| *Salmonella* ssp I 8,20:i:- | Bovine | | | | | 4 | 1 | | | | | 5 |
| | Chicken | | | | | 3 | | | | | | 3 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **7** | **1** | **0** | **0** | **0** | **0** | **8** |
| *Salmonella* ssp I 11:r:- | Porcine | | | 1 | | | | | | | | 1 |
| | Water | | 36 | | | | | | | | | 36 |
| | **Subtotal** | **0** | **36** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **37** |
| *Salmonella* ssp I 18:-:- | Bovine | | | | | 4 | | | | | | 4 |
| *Salmonella* ssp I 23:-:- | Chicken | | | | | 1 | | | | | | 1 |
| *Salmonella* ssp I 3,10:-:- | Porcine | | | | | | 2 | | | | | 2 |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Salmonella* ssp I 3,10:-:1,6 | Porcine | | | | | | 7 | | | | | 7 |
| *Salmonella* ssp I 3,15:l,v:- | Chicken | | | | | 1 | | | | | | 1 |
| *Salmonella* ssp I 3,15:z10:- | Animal Feed | | | | | | | 1 | | | | 1 |
| *Salmonella* ssp I 3,19:-:- | Animal Feed | | | | | 2 | 1 | | | | | 3 |
| | Mollusc | 1 | | | | | | | | | | 1 |
| | **Subtotal** | **1** | **0** | **0** | **0** | **2** | **1** | **0** | **0** | **0** | **0** | **4** |
| *Salmonella* ssp I 40:-:e,n,x | Animal Feed | | 1 | | | | | | | | | 1 |
| *Salmonella* ssp I 42:z4,z23:- | Animal Feed | | | | | | 1 | | | | | 1 |
| *Salmonella* ssp I 47:z4,z23:- | Animal Feed | | | | | 1 | 1 | | | | | 2 |
| *Salmonella* ssp I Rough-O:-:- | Animal Feed | | | | | 1 | | | | | | 1 |
| | Bovine | | | | | 4 | | | | | | 4 |
| | Chicken | | 2 | | | 6 | | | | | | 8 |
| | Equine | | | | | 1 | | | | | | 1 |
| | Porcine | | | | | 1 | 3 | | | | | 4 |
| | Turkey | | | | | 2 | | | | | | 2 |
| | **Subtotal** | **0** | **2** | **0** | **0** | **15** | **3** | **0** | **0** | **0** | **0** | **20** |
| *Salmonella* ssp I Rough-O:-:l,w | Chicken | | | | | 1 | | | | | | 1 |
| | Porcine | | | | | | 3 | | | | | 3 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **1** | **3** | **0** | **0** | **0** | **0** | **4** |
| *Salmonella* ssp I Rough-O:b:l,w | Porcine | | | | | | 3 | | | | | 3 |
| *Salmonella* ssp I Rough-O:d:- | Chicken | | | | | 1 | | | | | | 1 |
| *Salmonella* ssp I Rough-O:d:1,7 | Chicken | | | | | | | | 1 | | | 1 |
| *Salmonella* ssp I Rough-O:d:l,w | Chicken | | | | | 1 | | | | | | 1 |
| | Porcine | | | | | | 2 | | | | | 2 |
| | Turkey | | | | | 1 | | | | | | 1 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **2** | **2** | **0** | **0** | **0** | **0** | **4** |
| *Salmonella* ssp I Rough-O:e,h:1,2 | Turkey | | | | | 1 | | | | | | 1 |
| *Salmonella* ssp I Rough-O:e,h:1,6 | Porcine | | | | | | 2 | | | | | 2 |
| *Salmonella* ssp I Rough-O:g,m,s:- | Chicken | | 1 | | | | | | | | | 1 |
| | Water | | 1 | | | | | | | | | 1 |
| | **Subtotal** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** |
| *Salmonella* ssp I Rough-O:i:- | Bovine | | 1 | | | | | | | | | 1 |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Salmonella* ssp I Rough-O:i:1,2 | Avian | | | | | | 1 | | | | | 1 |
| | Bovine | | | | | 1 | | | | | | 1 |
| | Chicken | | | | | 1 | | | | | | 1 |
| | Food (Pork) | | | | | | 1 | | | | | 1 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **2** | **2** | **0** | **0** | **0** | **0** | **4** |
| *Salmonella* ssp I Rough-O:i:z6 | Chicken | | | | | 3 | | | | | | 3 |
| | Chicken Litter | | 1 | | | | | | | | | 1 |
| | **Subtotal** | **0** | **1** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **4** |
| *Salmonella* ssp I Rough-O:k:1,5 | Chicken | | | | | 1 | | | | | | 1 |
| | Unknown | | | | | | 1 | | | | | 1 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **1** | **1** | **0** | **0** | **0** | **0** | **2** |
| *Salmonella* ssp I Rough-O:r:- | Avian | | 1 | | | | | 1 | | | | 2 |
| | Chicken | | | | | 1 | | | | | | 1 |
| | Porcine | | | | | | 1 | | | | | 1 |
| | **Subtotal** | **0** | **1** | **0** | **0** | **1** | **1** | **1** | **0** | **0** | **0** | **4** |
| *Salmonella* ssp I Rough-O:r:1,2 | Avian | | | | | 1 | | | | | | 1 |
| | Chicken | | 8 | | | 50 | | 2 | 1 | | | 61 |
| | Chicken Litter | | 1 | | | | | | | | | 1 |
| | Owl | | 1 | | | | | | | | | 1 |
| | Porcine | | | | | | 2 | | | | | 2 |
| | Poultry | | | 1 | | | | | | | | 1 |
| | Turkey | | | | | 14 | | | | | | 14 |
| | Water | | 7 | | | | | | | | | 7 |
| | **Subtotal** | **0** | **17** | **1** | **0** | **65** | **2** | **2** | **1** | **0** | **0** | **88** |
| *Salmonella* ssp I Rough-O:r:1,5 | Porcine | | | 1 | | | | | | | | 1 |
| *Salmonella* ssp I Rough-O:z10:e,n,x | Chicken | | 1 | | | 2 | | | | | | 3 |
| | Chicken Litter | | 2 | | | | | | | | | 2 |
| | **Subtotal** | **0** | **3** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **5** |
| *S.* ssp I Rough-O:z10:e,n,z15 | Avian | | | | | | | | 1 | | | 1 |
| *Salmonella* ssp I Rough-O:z29:- | Animal Feed | | | | | | 1 | | | | | 1 |
| *Salmonella* ssp I Rough-O:z4,z23:- | Bovine | | | | | 2 | | | | | | 2 |
| *Salmonella* ssp I Rough-O:z:- | Food (Pepper) | | | | | | 1 | | | | | 1 |
| *Salmonella* ssp I Rough-O:g,s,t:- | Chicken | | | | | 2 | | | | | | 2 |
| *Salmonella* ssp I Rough-O:g,s,t:- | Turkey | | | | | 1 | | | | | | 1 |
| | **Subtotal** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **3** |
| *Salmonella* ssp I Rough-O:l,v:e,n,z15 | Porcine | | | | | | 2 | | | | | 2 |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Salmonella* ssp II 30:l,z28:z6 | Gecko | | 1 | | | | | | | | | 1 |
| | | | | | | | | | | | | |
| *Salmonella* ssp IIIa 38:-:- | Food (Alfalfa Sprouts) | | | | | 1 | | | | | | 1 |
| *Salmonella* ssp IIIa 41:z4,z23:- | Water | | 1 | | | | | | | | | 1 |
| *Salmonella* ssp IIIa 42:g,z51:- | Water | | 8 | | | | | | | | | 8 |
| | | | | | | | | | | | | |
| *Salmonella* ssp IIIb | Porcine | | | 1 | | | | | | | | 1 |
| *Salmonella* ssp IIIb | Poultry | | | | | | 1 | | | | | 1 |
| *Salmonella* ssp IIIb 11:k:z53 | Water | | 1 | | | | | | | | | 1 |
| *Salmonella* ssp IIIb 16:z10:e,n,x | Water | | 1 | | | | | | | | | 1 |
| *Salmonella* ssp IIIb 16:z10:e,n,x,z15 | Water | | 1 | | | | | | | | | 1 |
| *Salmonella* ssp IIIb 60:r:e,n,x,z15 | Water | | 1 | | | | | | | | | 1 |
| *Salmonella* ssp IIIb 61:-:1,5 | Ovine | | 81 | | | | | | | | | 81 |
| *Salmonella* ssp IIIb 61:-:1,5 | Porcine | | 1 | | | | | | | | | 1 |
| *Salmonella* ssp IIIb 61:k:1,5 | Environmental Swab | | | | | 1 | | | | | | 1 |
| *Salmonella* ssp IIIb 61:k:1,5 | Ovine | | 85 | | | | | | | | 2 | 87 |
| *Salmonella* ssp IIIb 61:k:1,5,7 | Ovine | | | 2 | | | | | | | | 2 |
| *Salmonella* ssp IIIb 65:z10:e,n,x,z15 | Snake | 2 | | | | | | | | | | 2 |
| | | | | | | | | | | | | |
| *Salmonella* ssp IV 44:z4,z23:- | Reptile | | | | | | | | | | | |
| *Salmonella* ssp IV 44:z4,z32:- | Reptile | | | 1 | | | | | | | 1 | 2 |
| *Salmonella* ssp IV 50:g,z51:- | Reptile | | | | | 1 | | | | | | 1 |
| *Salmonella* ssp IV Rough-O:-:- | Porcine | | | | | | 2 | | | | | 2 |
| *Salmonella* ssp IV Rough-O:-:l,w | Porcine | | | | | | 3 | | | | | 3 |
| | | | | | | | | | | | | |
| **Total Non Human *Salmonella* 2002** | | **90** | **1633** | **230** | **87** | **2934** | **1859** | **84** | **107** | **101** | **20** | **7145** |

Footnotes: (a) = var. 15+ and var. 15+34+ have been combined into a single serovar. (b) = var. 14+ have been combined into parent serovar totals.

## Table 4 : *Salmonella* from Non-Human Sources, 2003

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S.* Adelaide | Gecko | | | 1 | | | | | | | | **1** |
| | Reptile | | | | | 1 | | | | | | **1** |
| | Unknown | | | | | 1 | | | | | | **1** |
| | **Subtotal** | **0** | **0** | **1** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **3** |
| *S.* Agona | Animal (Unspecified) | | | | | 2 | | | | | | **2** |
| | Animal Feed | | | | 1 | | 5 | | | | | **6** |
| | Avian | | | | | 1 | | | | | | **1** |
| | Chicken | | 11 | | | 15 | 1 | | | 8 | | **35** |
| | Chicken Litter | | 1 | | | | | | | | | **1** |
| | Environmental Swab | | | | | 2 | | | | | | **2** |
| | Equine | | | | | 3 | | | | | | **3** |
| | Food (Bovine) | | 1 | | | 2 | | | | | | **3** |
| | Food (Chicken) | | | | | 2 | | | 1 | | | **3** |
| | Food (Porcine) | | | | | | 1 | | | | | **1** |
| | Food (Turkey) | | | | | 20 | | | | | | **20** |
| | Food (Unspecified) | | | | 1 | | 1 | | | | | **2** |
| | Porcine | | 1 | | | 3 | 8 | | | | | **12** |
| | Turkey | | | | | 8 | | | | | | **8** |
| | **Subtotal** | **0** | **14** | **0** | **2** | **58** | **16** | **0** | **1** | **8** | **0** | **99** |
| *S.* Alachua | Unknown | | | | | 1 | | | | | | **1** |
| *S.* Albany | Food (Unspecified) | | | | | | 1 | | | | | **1** |
| *S.* Amsterdam (a) | Avian | | | 1 | | | | | | | | **1** |
| | Bovine | | | | | 1 | | | | | | **1** |
| | **Subtotal** | **0** | **0** | **1** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **2** |
| *S.* Anatum (a) | Animal Feed | 2 | | | | | 3 | | | | | **5** |
| | Bovine | | | | | 3 | | | | | | **3** |
| | Chicken | | | | | 1 | | | | 1 | | **2** |
| | Fertilizer | | | | | 1 | | | | | | **1** |
| | Food (Bovine) | | | | | 1 | | | | | | **1** |
| | Food (Turkey) | | | | | 5 | | | | | | **5** |
| | Porcine | 1 | | 2 | 1 | | 31 | | | | | **35** |
| | **Subtotal** | **3** | **0** | **2** | **1** | **11** | **34** | **0** | **0** | **1** | **0** | **52** |
| *S.* Bareilly | Chicken | | | | | 1 | | | | | | **1** |
| *S.* Berta | Chicken | | | | | 1 | | | | | | **1** |
| | Porcine | | | | | | 30 | | | | | **30** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **1** | **30** | **0** | **0** | **0** | **0** | **31** |
| *S.* Blockley | Chicken | | | | | 1 | | | | | | **1** |
| | Chicken Litter | | 1 | | | | | | | | | **1** |
| | Food (Chicken) | | | | | 1 | | | | | | **1** |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Food (Dill Weed) | | | | | | 2 | | | | | **2** |
| | **Subtotal** | **0** | **1** | **0** | **0** | **2** | **2** | **0** | **0** | **0** | **0** | **5** |
| *S*. Bovismorbificans | Porcine | | 2 | | 3 | 11 | | | | | | **16** |
| | Water | | 8 | | | | | | | | | **8** |
| | **Subtotal** | **0** | **10** | **0** | **3** | **11** | **0** | **0** | **0** | **0** | **0** | **24** |
| *S*. Braenderup | Animal Feed | | | | | | 1 | | | | | **1** |
| | Avian | | | 1 | | | | | | | | **1** |
| | Chicken | | 2 | | | 10 | 7 | 2 | 3 | 68 | | **92** |
| | Environmental Swab | | | | | | 1 | | | | | **1** |
| | **Subtotal** | **0** | **2** | **1** | **0** | **10** | **9** | **2** | **3** | **68** | **0** | **95** |
| *S*. Brandenburg | Bovine | | | | | 1 | | | | | | **1** |
| | Chicken | | | | | 1 | 1 | | | | | **2** |
| | Environmental Swab | | | | | 1 | | | | | | **1** |
| | Food (Porcine) | | | | | 1 | | | | | | **1** |
| | Porcine | | | 1 | 4 | 29 | 117 | 1 | | | | **152** |
| | Turkey | | | | | 4 | | | | | | **4** |
| | **Subtotal** | **0** | **0** | **1** | **4** | **37** | **118** | **1** | **0** | **0** | **0** | **161** |
| *S*. Bredeney | Food (Bovine) | | | | | | 1 | | | | | **1** |
| | Turkey | | | | | 4 | | | | | | **4** |
| | Subtotal | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | **5** |
| *S*. Budapest | Food (Unspecified) | | | | | 1 | | | | | | **1** |
| *S*. Butantan | Unknown | | | | | 1 | | | | | | **1** |
| *S*. California | Porcine | 1 | | 10 | | 3 | | | | | | **14** |
| *S*. Cerro | Animal Feed | | | | | | 2 | | | | | **2** |
| | Bovine | | | | | 2 | | | | | | **2** |
| | Chicken | | | | | 2 | | | | | | **2** |
| | Chicken Fluff | | | 1 | | | | | | | | **1** |
| | Food (Bovine) | | | | | | 2 | | | | | **2** |
| | Lizard | | 1 | | | | | | | | | **1** |
| | **Subtotal** | **0** | **1** | **1** | **0** | **4** | **4** | **0** | **0** | **0** | **0** | **10** |
| *S*. Chester | Fertilizer | | | | 1 | | | | | | | **1** |
| *S*. Choleraesuis | Porcine | | | 2 | | | | | | | | **2** |
| *S*. Concord | Food (Unspecified) | | | | | 1 | | | | | | **1** |
| *S*. Cubana | Animal Feed | | 1 | | | | 1 | | | | | **2** |
| | Chicken | | | | | | | 2 | | | | **2** |
| | Food (Sesame Seed) | | 2 | | | | | | | | | **2** |
| | Porcine | | | 1 | | | | | | | | **1** |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Subtotal** | **0** | **3** | **1** | **0** | **0** | **1** | **2** | **0** | **0** | **0** | **7** |
| | | | | | | | | | | | | |
| *S.* Derby | Animal Feed | | | | | | 1 | | | | | **1** |
| | Bovine | | | | | 1 | | | | | | **1** |
| | Chicken | | | | | | 1 | | | | | **1** |
| | Porcine | 1 | 18 | 9 | 8 | 40 | 63 | | 1 | | 1 | **141** |
| | Turkey | | | | | 2 | | | | | | **2** |
| | Water | | 3 | | | 1 | | | | | | **4** |
| | **Subtotal** | **1** | **21** | **9** | **8** | **44** | **65** | **0** | **1** | **0** | **1** | **150** |
| | | | | | | | | | | | | |
| *S.* Dublin | Bovine | | 1 | | | | | | | | | **1** |
| | Unknown | | | | | 1 | | | | | | **1** |
| | Water | | 1 | | | | | | | | | **1** |
| | **Subtotal** | **0** | **2** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **3** |
| | | | | | | | | | | | | |
| *S.* Ebrie | Canine | | 1 | | | | | | | | | **1** |
| | | | | | | | | | | | | |
| *S.* Edinburg | Unknown | | | | | 1 | | | | | | **1** |
| | | | | | | | | | | | | |
| *S.* Eko | Porcine | | | 1 | | | | | | | | **1** |
| | | | | | | | | | | | | |
| *S.* Enteritidis | Avian | | | | | | 1 | | | | | **1** |
| | Bovine | | | | | 1 | | | | | | **1** |
| | Cervid | | 1 | | | | | | | | | **1** |
| | Chicken | | 1 | | | 5 | 6 | | | | | **12** |
| | Chicken Fluff | | 1 | | | | | | | | | **1** |
| | Chicken Litter | | 1 | | | | | | | | | **1** |
| | Duck | 1 | | | | | | | | | | **1** |
| | Environmental Swab | 1 | 1 | | | | 1 | | | | | **3** |
| | Equine | | | | | 1 | | | | | | **1** |
| | Food (Chicken) | | | | | | 1 | | | | | **1** |
| | Food (Unspecified) | | | | | | 4 | | | | | **4** |
| | Hedgehog | | 2 | | | | | | | | | **2** |
| | Porcine | | 4 | 1 | 1 | | | | | | | **6** |
| | Poultry | | 1 | | | | | | | | | **1** |
| | Quail | | 1 | | | | | | | | | **1** |
| | Reptile | | | | | | | | | | 1 | **1** |
| | Turkey | | | | | 3 | | | | | | **3** |
| | Unknown | 1 | | | | 1 | 12 | | | | | **14** |
| | Water | | 2 | | | | | | | | | **2** |
| | **Subtotal** | **3** | **15** | **1** | **1** | **11** | **25** | **0** | **0** | **0** | **1** | **57** |
| | | | | | | | | | | | | |
| *S.* Essen | Porcine | | | | | | 1 | | | | | **1** |
| | | | | | | | | | | | | |
| *S.* Fluntern | Unknown | 1 | | | | | | | | | | **1** |
| | | | | | | | | | | | | |
| *S.* Friedenau | Reptile | | | | | 1 | | | | | | **1** |
| | | | | | | | | | | | | |
| *S.* Give (a) | Animal Feed | | 1 | | | | 2 | | | | | **3** |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Chicken | | | | | 2 | 1 | | | | | **3** |
| | Duck | | | | | 8 | | | | | | **8** |
| | Porcine | | 3 | 2 | | 4 | 4 | | | | | **13** |
| | Water | | 11 | | | | | | | | | **11** |
| | **Subtotal** | **0** | **15** | **2** | **0** | **14** | **7** | **0** | **0** | **0** | **0** | **38** |
| | | | | | | | | | | | | |
| *S*. Hadar | Avian | | | | | 1 | | | | | | **1** |
| | Bovine | | | | | 2 | | | | | | **2** |
| | Canine | | | 1 | | 1 | | | | | | **2** |
| | Chicken | 1 | 6 | 4 | | 77 | | | | 1 | | **89** |
| | Chicken Litter | | 3 | | | | | | | | | **3** |
| | Duck | | | | | 4 | | | | | | **4** |
| | Food (Bovine) | | | | | | 1 | | | | | **1** |
| | Food (Chicken) | | | | | | 2 | | | | | **2** |
| | Food (Unspecified) | | 1 | | | | | | | | | **1** |
| | Mink | | | | | 2 | | | | | | **2** |
| | Porcine | | | | | 2 | | | | | | **2** |
| | Poultry | | 1 | | | | | | | | | **1** |
| | Turkey | | 1 | | | 2 | | | | | | **3** |
| | **Subtotal** | **1** | **12** | **5** | **0** | **91** | **3** | **0** | **0** | **1** | **0** | **113** |
| | | | | | | | | | | | | |
| *S*. Havana | Animal Feed | | | | | | 2 | | | | | **2** |
| | Porcine | | | | | 5 | | | | | | **5** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **5** | **2** | **0** | **0** | **0** | **0** | **7** |
| | | | | | | | | | | | | |
| *S*. Heidelberg | Animal (Unspecified) | | 1 | | | | 2 | | | | | **3** |
| | Aquatic Animal | 1 | | | | | | | | | | **1** |
| | Avian | | | | | 17 | 9 | 2 | | | | **28** |
| | Bovine | 1 | 4 | | | | | | 3 | | | **8** |
| | Canine | | 2 | | | | | | | | 1 | **3** |
| | Chicken | 4 | 27 | 2 | 5 | 658 | 15 | 17 | 7 | 22 | | **757** |
| | Chicken Fluff | | 3 | | | | | | | | | **3** |
| | Chicken Litter | | 15 | | | | | | | | | **15** |
| | Duck | | | | | 2 | | | | | | **2** |
| | Environmental Swab | | | | | 13 | | 9 | | | | **22** |
| | Equine | | | | | 8 | | | | 1 | | **9** |
| | Food (Bovine) | | | | | 8 | | | | | | **8** |
| | Food (Chicken) | | | | | 19 | 14 | | | 1 | | **34** |
| | Food (Milk) | | | | | 3 | | | | | | **3** |
| | Food (Pea Sprouts) | | | | | 1 | | | | | | **1** |
| | Food (Turkey) | | 2 | | | 7 | | | | | | **9** |
| | Food (Unspecified) | 7 | 2 | | 4 | 1 | 2 | | | | | **16** |
| | Mink | | | | | | | | 1 | | | **1** |
| | Porcine | 1 | 5 | 1 | 5 | 5 | 24 | | | | | **41** |
| | Poultry | | 10 | | | 4 | 4 | | | | | **18** |
| | Turkey | 1 | 2 | | | 66 | | | 3 | | | **72** |
| | Unknown | 15 | | | | 3 | 10 | | | | | **28** |
| | Water | | 13 | | | | | | | | | **13** |
| | **Subtotal** | **30** | **86** | **3** | **14** | **815** | **80** | **28** | **14** | **24** | **1** | **1095** |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S.* Hofit | Food (Sage) | | | | | | 1 | | | | | **1** |
| *S.* Indiana | Avian | | 1 | | | | | | | | | **1** |
| | Caprine | | | | | | | | | | 1 | **1** |
| | Chicken | | 1 | | | | | | | | | **1** |
| | Duck | | | | | 6 | | | | | | **6** |
| | Unknown | | | | | 1 | | | | | | **1** |
| | **Subtotal** | **0** | **2** | **0** | **0** | **7** | **0** | **0** | **0** | **0** | **1** | **10** |
| *S.* Infantis | Animal (Unspecified) | | | | | 1 | | | | | | **1** |
| | Animal Feed | | | 1 | | | 4 | 1 | 1 | | | **7** |
| | Avian | | | | | 1 | | | | | | **1** |
| | Bovine | | | | | 1 | | | | | | **1** |
| | Chicken | | 1 | 1 | | 25 | | | | | | **27** |
| | Environmental Swab | | | | | 2 | 1 | 6 | | | | **9** |
| | Equine | | | | | 1 | | | | | | **1** |
| | Food (Chicken) | | | | | 3 | | | | 1 | | **4** |
| | Food (Porcine) | | | | | 1 | | | | | | **1** |
| | Porcine | | 4 | 3 | 7 | 33 | 20 | 1 | | | | **68** |
| | Water | | 10 | | | | | | | | | **10** |
| | **Subtotal** | **0** | **15** | **5** | **7** | **68** | **25** | **8** | **1** | **1** | **0** | **130** |
| *S.* Javiana | Chicken | | | | | 26 | | | | | | **26** |
| *S.* Johannesburg | Animal Feed | | 2 | | | | | | | | | **2** |
| | Chicken Fluff | | | 1 | | | | | | | | **1** |
| | Food (Parsley) | | | | | | 4 | | | | | **4** |
| | Food (Unspecified) | | 1 | | | | 1 | | | | | **2** |
| | Porcine | | | | 3 | 2 | | | | | | **5** |
| | Turkey | | | | | 3 | | | | | | **3** |
| | **Subtotal** | **0** | **3** | **1** | **3** | **5** | **5** | **0** | **0** | **0** | **0** | **17** |
| *S.* Kentucky | Avian | | | | | 4 | | | | | | **4** |
| | Bovine | | | | | 55 | | | | | | **55** |
| | Camelid | | | | | | | | | | 1 | **1** |
| | Chicken | | 11 | 2 | | 244 | 6 | | 7 | 9 | | **279** |
| | Chicken Fluff | | | 1 | | | | | | | | **1** |
| | Chicken Litter | | 1 | | | | | | | | | **1** |
| | Environmental Swab | | | | | | | 4 | | | | **4** |
| | Food (Bovine) | | | | | 7 | 6 | | | | | **13** |
| | Food (Chicken) | | | | | 8 | | | | | | **8** |
| | Food (Turkey) | | | | | | 1 | | | | | **1** |
| | Food (Unspecified) | | | | | | 3 | | | | | **3** |
| | Turkey | | | | | 5 | | | | | | **5** |
| | Unknown | 1 | | | | | | | | | | **1** |
| | **Subtotal** | **1** | **12** | **3** | **0** | **323** | **16** | **4** | **7** | **9** | **1** | **376** |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Kiambu | Animal Feed | | | | | 1 | | | | | | **1** |
| | Chicken | | | | | 3 | | | | | | **3** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **4** | **0** | **0** | **0** | **0** | **0** | **4** |
| *S*. Kingabwa | Lizard | | 1 | | | | | | | | | **1** |
| *S*. Krefeld | Porcine | | | | 1 | 3 | | | | | | **4** |
| *S*. Lexington | Chicken Fluff | | | 1 | | | | | | | | **1** |
| | Food (Unspecified) | | 1 | | | | | | | | | **1** |
| | **Subtotal** | **0** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** |
| *S*. Lille | Animal Feed | | | | | 1 | | | | | | **1** |
| | Chicken | | | | | 1 | | | | | | **1** |
| | Food (Sesame Seed) | | 1 | | | | | | | | | **1** |
| | **Subtotal** | **0** | **1** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **3** |
| *S*. Litchfield | Bovine | | | | | 1 | | | | | | **1** |
| | Chicken | | | | | 1 | | | | | | **1** |
| | Food (Porcine) | | | | | 1 | | | | | | **1** |
| | Turkey | | | | | 1 | | | | | | **1** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **4** | **0** | **0** | **0** | **0** | **0** | **4** |
| *S*. Livingstone (b) | Chicken | | | | | 1 | | | | | | **1** |
| | Porcine | | | | | 12 | 5 | | | | | **17** |
| | Turkey | | | | | 1 | | | | | | **1** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **14** | **5** | **0** | **0** | **0** | **0** | **19** |
| *S*. London | Bovine | | | | | 9 | | | | | | **9** |
| | Food (Bovine) | | | | | 3 | | | | | | **3** |
| | Porcine | | | | | 13 | | | | | | **13** |
| | Water | | 1 | | | | | | | | | **1** |
| | **Subtotal** | **0** | **1** | **0** | **0** | **25** | **0** | **0** | **0** | **0** | **0** | **26** |
| *S*. Manhattan | Avian | | | 1 | | | | | | | | **1** |
| | Bovine | | | | | 2 | | | | | | **2** |
| | Porcine | | | 1 | | | | | | | | **1** |
| | **Subtotal** | **0** | **0** | **2** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **4** |
| *S*. Mbandaka | Animal Feed | | | | 3 | | 7 | | | | | **10** |
| | Avian | | | | | | | 1 | | | | **1** |
| | Bovine | | | | | 3 | | | | | | **3** |
| | Chicken | | 8 | | 1 | 13 | | 4 | | | | **26** |
| | Environmental Swab | | | | | 1 | | 1 | | | | **2** |
| | Equine | | | | | 12 | | | | | | **12** |
| | Fertilizer | | | | | 1 | | | | | | **1** |
| | Food (Bovine) | | 1 | | | 4 | | | | | | **5** |
| | Food (Unspecified) | | | | | | 1 | | | | | **1** |
| | Porcine | | | 2 | 2 | 3 | 9 | 1 | 2 | | | **19** |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Unknown | 1 | | | | | | | | | | **1** |
| | Water | | 11 | | | | | | | | | **11** |
| | **Subtotal** | **1** | **20** | **2** | **6** | **37** | **17** | **7** | **2** | **0** | **0** | **92** |
| | | | | | | | | | | | | |
| *S*. Meleagridis | Animal Feed | | | | | 1 | | | | | | **1** |
| | Bovine | | | | | 8 | | | | | | **8** |
| | Food (Bovine) | | | | | 1 | | | | | | **1** |
| | Porcine | | | | | 2 | | | | | | **2** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **12** | **0** | **0** | **0** | **0** | **0** | **12** |
| | | | | | | | | | | | | |
| *S*. Minnesota | Animal Feed | | | | | | 1 | | | | | **1** |
| | Chicken | | | | | 2 | | | | | | **2** |
| | Food (Bovine) | | | | | 1 | | | | | | **1** |
| | Food (Milk) | | | | | | 1 | | | | | **1** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **3** | **2** | **0** | **0** | **0** | **0** | **5** |
| | | | | | | | | | | | | |
| *S*. Molade | Animal Feed | | | | | 1 | | | | | | **1** |
| | Unknown | | | | | 2 | | | | | | **2** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **3** |
| | | | | | | | | | | | | |
| *S*. Monshaui | Canine | | 1 | | | | | | | | | **1** |
| | | | | | | | | | | | | |
| *S*. Montevideo | Animal Feed | | 2 | | 2 | 1 | 24 | | | | | **29** |
| | Chicken | | 20 | | | 14 | | | | | | **34** |
| | Environmental Swab | | | | | 5 | | | | | | **5** |
| | Food (Bovine) | | | | | 12 | | | | | | **12** |
| | Food (Coriander) | | | | | | 1 | | | | | **1** |
| | Food (Oregano) | | | | | | 1 | | | | | **1** |
| | Food (Porcine) | | | | | 1 | | | | | | **1** |
| | Porcine | | | | | 3 | 2 | | | | | **5** |
| | Turkey | | | | | 17 | | | | | | **17** |
| | Water | | 3 | | | | | | | | | **3** |
| | **Subtotal** | **0** | **25** | **0** | **2** | **53** | **28** | **0** | **0** | **0** | **0** | **108** |
| | | | | | | | | | | | | |
| *S*. Muenchen | Bovine | | | | | 1 | | | | | | **1** |
| | Equine | | | | | 1 | | | | | | **1** |
| | Food (Bovine) | | | | | 3 | | | | | | **3** |
| | Porcine | | | | | 9 | | | | | | **9** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **14** | **0** | **0** | **0** | **0** | **0** | **14** |
| | | | | | | | | | | | | |
| *S*. Muenster (a) | Bovine | | | | | 12 | | | | | | **12** |
| | Chicken | | | | | 1 | | | | | | **1** |
| | Food (Bovine) | | | | | 7 | 2 | | | | | **9** |
| | Food (Turkey) | | | | | 5 | | | | | | **5** |
| | Turkey | | | | | 2 | | | | | | **2** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **27** | **2** | **0** | **0** | **0** | **0** | **29** |
| | | | | | | | | | | | | |
| *S*. Mundonobo | Reptile | | | | | 1 | | | | | | **1** |
| | Unknown | | | | | 1 | | | | | | **1** |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Subtotal** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **2** |
| | | | | | | | | | | | | |
| *S*. Newport | Animal (Unspecified) | | | | | 1 | | | | | | **1** |
| | Animal Feed | | | | | 12 | | | | | | **12** |
| | Bovine | | | | | 127 | | | | | | **127** |
| | Caprine | | | | | 1 | | | | | | **1** |
| | Chicken | | | | | 6 | | | | | | **6** |
| | Chicken Litter | | | | | 1 | | | | | | **1** |
| | Environmental Swab | | | | | 29 | | | | | | **29** |
| | Equine | | | | | 10 | | | | | | **10** |
| | Food (Beef) | | | | | 1 | | | | | | **1** |
| | Food (Bovine) | | | | | 2 | | | | | | **2** |
| | Food (Raw Meat) | | | | | 13 | | | | | | **13** |
| | Food (Snail) | | | | | 1 | | | | | | **1** |
| | Food (Turkey) | | | | | 12 | | | | | | **12** |
| | Food (Unspecified) | | | | | 13 | | | | | | **13** |
| | Turkey | | | | | 113 | | | | | | **113** |
| | Unknown | 1 | | | | | | | | | | **1** |
| | Water | | | | | 2 | | | | | | **2** |
| | **Subtotal** | **1** | **0** | **0** | **0** | **344** | **0** | **0** | **0** | **0** | **0** | **345** |
| | | | | | | | | | | | | |
| *S*. Nima | Reptile | | 1 | | | | | | | | | **1** |
| | | | | | | | | | | | | |
| *S*. Ohio (b) | Animal Feed | | 1 | | | | 11 | | | | | **12** |
| | Bovine | | | | | 1 | | | | | | **1** |
| | Chicken | 3 | | | | 4 | 1 | | 1 | | | **9** |
| | Fertilizer | | | | | 1 | | | | | | **1** |
| | Porcine | | 1 | 7 | 2 | 3 | 23 | | | | | **36** |
| | Turkey | | 1 | | | | | | | | | **1** |
| | Unknown | | | | | 1 | | | | | | **1** |
| | **Subtotal** | **3** | **3** | **7** | **2** | **10** | **35** | **0** | **1** | **0** | **0** | **61** |
| | | | | | | | | | | | | |
| *S*. Onderstepoort | Reptile | | | | | 1 | | | | | | **1** |
| | | | | | | | | | | | | |
| *S*. Oranienburg | Animal Feed | | | | | | | | 1 | | | **1** |
| | Chicken | | | | | | | | 1 | | | **1** |
| | Food (Unspecified) | | | | | | 2 | | | | | **2** |
| | Porcine | | | | | | 1 | | | | | **1** |
| | Primate | | 1 | | | | | | | | | **1** |
| | Reptile | | | | | | | | | | 1 | **1** |
| | **Subtotal** | **0** | **1** | **0** | **0** | **0** | **3** | **0** | **2** | **0** | **1** | **7** |
| | | | | | | | | | | | | |
| *S*. Orion (a) | Animal Feed | | | | | | | | 2 | | | **2** |
| | Canine | | | | | 1 | | | | | | **1** |
| | Chicken | | | | | | | | 2 | | 2 | **4** |
| | Environmental Swab | | | | | | | | | | 1 | **1** |
| | Turkey | | | | | 1 | | | | | | **1** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **4** | **0** | **3** | **9** |
| | | | | | | | | | | | | |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Ouakam | Chicken | | | | | 8 | | | | | | **8** |
| *S*. Panama | Animal (Unspecified) | | 1 | | | | | | | | | **1** |
| *S*. Paratyphi B | Unknown | | | | | | 4 | | | | | **4** |
| *S*. Paratyphi B var. Java | Porcine | | | | | | 1 | | | | | **1** |
| | Python | | 1 | | | | | | | | | **1** |
| | Snake | | 1 | | | | | | | | | **1** |
| | Unknown | | | | | | 29 | | | | | **29** |
| | Subtotal | 0 | 2 | 0 | 0 | 0 | 30 | 0 | 0 | 0 | 0 | **32** |
| *S*. Pomona | Animal Feed | | | | | 1 | 1 | | | | | **2** |
| | Bovine | | | | | 1 | | | | | | **1** |
| | Canine | | | 1 | | | | | | | | **1** |
| | Reptile | | 2 | | | | | | | | | **2** |
| | Turkey | | | | | 2 | | | | | | **2** |
| | **Subtotal** | **0** | **2** | **1** | **0** | **4** | **1** | **0** | **0** | **0** | **0** | **8** |
| *S*. Poona | Food (Pepper) | | | | | | 1 | | | | | **1** |
| *S*. Putten | Chicken | | | | | 2 | | | | | | **2** |
| | Porcine | | | 9 | | 2 | 1 | | | | | **12** |
| | **Subtotal** | **0** | **0** | **9** | **0** | **4** | **1** | **0** | **0** | **0** | **0** | **14** |
| *S*. Rissen | Animal Feed | 1 | | | | | 2 | | | | | **3** |
| | Chicken | 1 | | | | | | | | | | **1** |
| | **Subtotal** | **2** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **4** |
| *S*. Rubislaw | Animal Feed | 1 | 1 | 1 | | | 2 | | | | | **5** |
| | Canine | | 1 | | | | | | | | | **1** |
| | Chicken | | 6 | | | | | | | | | **6** |
| | Equine | | 2 | | | | | | | | | **2** |
| | Food (Unspecified) | | 1 | | | | | | | | | **1** |
| | Porcine | | 1 | 2 | | | | | | | | **3** |
| | Poultry | | 2 | | | | | | | | | **2** |
| | Unknown | | 1 | | | 1 | | | | | | **2** |
| | Water | | 407 | | | | | | | | | **407** |
| | **Subtotal** | **1** | **422** | **3** | **0** | **1** | **2** | **0** | **0** | **0** | **0** | **429** |
| *S*. Saintpaul | Environmental Swab | | | | | 3 | | | | | | **3** |
| | Equine | | | | | 2 | | | | | | **2** |
| | Turkey | | | | | 25 | | | | | | **25** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **30** | **0** | **0** | **0** | **0** | **0** | **30** |
| *S*. Sandiego | Animal Feed | | | | | | 2 | | | | | **2** |
| | Poultry | | 1 | | | | | | | | | **1** |
| | Water | | 7 | | | | | | | | | **7** |
| | **Subtotal** | **0** | **8** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **10** |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Schwarzengrund | Animal Feed | | | | | 1 | 12 | | | | | **13** |
| | Bovine | | | | | | | | 1 | | 1 | **2** |
| | Chicken | 1 | | | | 39 | | | 6 | 1 | | **47** |
| | Food (Bovine) | | | | | 7 | 3 | | | | | **10** |
| | Food (Zucchini) | | | | | 1 | | | | | | **1** |
| | Food (Eggplant) | | | | | 1 | | | | | | **1** |
| | Porcine | | 1 | | 5 | 2 | 1 | | 1 | | | **10** |
| | **Subtotal** | **1** | **1** | **0** | **5** | **51** | **16** | **0** | **8** | **1** | **1** | **84** |
| *S*. Senftenberg | Animal Feed | 1 | 1 | | 1 | 1 | 30 | | 1 | | | **35** |
| | Avian | | | | | 1 | | | | | | **1** |
| | Bovine | | | | | 1 | | | | | | **1** |
| | Chicken | | | | | 18 | | | | | | **18** |
| | Food (Celery Seeds) | | | | | | 1 | | | | | **1** |
| | Food (Milk) | | | | | 1 | | | | | | **1** |
| | Porcine | | | | | 1 | 9 | | | | | **10** |
| | Turkey | | | | | 25 | | | | | | **25** |
| | Water | | 6 | | | | | | | | | **6** |
| | **Subtotal** | **1** | **7** | **0** | **1** | **48** | **40** | **0** | **1** | **0** | **0** | **98** |
| *S*. Sorenga | Animal Feed | | | | | | 5 | | | | | **5** |
| *S*. Szentes | Animal Feed | | | | | | 1 | | | | | **1** |
| *S*. Tennessee | Animal Feed | 1 | | | 2 | | 13 | | | | | **16** |
| | Canine | | | 1 | | | | | | | | **1** |
| | Chicken | | | | | | 1 | | | | | **1** |
| | Chicken Fluff | | | 1 | | | | | | | | **1** |
| | Food (Chicken) | | | | | | | | 1 | | | **1** |
| | Food (Sesame Seed) | | 1 | | | | | | | | | **1** |
| | Porcine | | | | | | 17 | | | | | **17** |
| | Water | | 13 | | | | | | | | | **13** |
| | **Subtotal** | **1** | **14** | **2** | **2** | **0** | **31** | **0** | **1** | **0** | **0** | **51** |
| *S*. Thompson | Animal Feed | | | | | 1 | 1 | 1 | | | | **3** |
| | Avian | | | 2 | | 1 | | 1 | 1 | | | **5** |
| | Bovine | | | | | 21 | | | | | | **21** |
| | Canine | | | | | 1 | | | | | | **1** |
| | Chicken | | 1 | | 1 | 30 | 1 | 3 | 3 | | | **39** |
| | Environmental Swab | | | | | 1 | | | | | | **1** |
| | Equine | | | | | 3 | | | | | | **3** |
| | Food (Bovine) | | | | | 15 | 3 | | | | | **18** |
| | Food (Chicken) | | | | | 1 | | | 2 | | | **3** |
| | Food (Unspecified) | | | | | | 1 | | | | | **1** |
| | Porcine | | | | | | 1 | | | | | **1** |
| | **Subtotal** | **0** | **1** | **2** | **1** | **74** | **7** | **5** | **6** | **0** | **0** | **96** |
| *S*. Tokoin | Poultry | | | | | | 1 | | | | | **1** |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |
| *S*. Typhimurium | Animal (Unspecified) | | | | | 3 | 1 | | | | | **4** |
| | Animal Feed | | | | | 1 | 3 | 2 | 2 | | | **8** |
| | Avian | | 1 | 1 | 10 | 7 | 2 | 3 | | 1 | 1 | **26** |
| | Bison | | | | | 1 | | | | | | **1** |
| | Bovine | 4 | 68 | | 48 | 52 | 25 | 2 | 2 | | | **201** |
| | Canine | | | | 2 | | | | | | | **2** |
| | Chicken | 1 | 8 | 1 | 2 | 64 | 7 | 3 | 1 | 2 | | **89** |
| | Chicken Fluff | | | 1 | | | | | | | | **1** |
| | Chicken Litter | | 4 | | | | | | | | | **4** |
| | Duck | | | | | 4 | | | | | | **4** |
| | Environmental Swab | 1 | 4 | | 1 | 13 | 2 | | | | | **21** |
| | Equine | | 1 | | 2 | 21 | | | | | | **24** |
| | Feline | | 3 | | 2 | | 1 | | | | | **6** |
| | Food (Bovine) | | | | | 4 | 1 | | | | | **5** |
| | Food (Broccoli) | | | | | 1 | | | | | | **1** |
| | Food (Cauliflower) | | | | | 2 | | | | | | **2** |
| | Food (Crab) | | | | | | | | 3 | | | **3** |
| | Food (Porcine) | | | | | 3 | | | | | | **3** |
| | Food (Shrimp) | | | | | 1 | | | | | | **1** |
| | Food (Unspecified) | 1 | | | 7 | | 210 | | | | | **218** |
| | Hedgehog | | 1 | | | | | | | | | **1** |
| | Mouse | | 1 | | | | | | | | | **1** |
| | Ovine | | 1 | 5 | 1 | 2 | | | | | | **9** |
| | Porcine | | 14 | 33 | 22 | 171 | 131 | | 1 | | 1 | **373** |
| | Porcupine | | 1 | | | | | | | | | **1** |
| | Poultry | | 2 | | | | 27 | | | | | **29** |
| | Snake | | 1 | | | | | | | | | **1** |
| | Turkey | | | | | 1 | | | | | | **1** |
| | Unknown | 17 | | | | | 44 | | | | | **61** |
| | Water | | 53 | | | | | | | | | **53** |
| | **Subtotal** | **24** | **163** | **41** | **97** | **351** | **454** | **10** | **9** | **3** | **2** | **1154** |
| | | | | | | | | | | | | |
| *S*. Uganda | Bovine | | | | | 3 | | | | | | **3** |
| | | | | | | | | | | | | |
| *S*. Vejle | Food (Unspecified) | | | | | 1 | | | | | | **1** |
| | | | | | | | | | | | | |
| *S*. Westhampton (a) | Animal Feed | | | | | | 1 | | | | | **1** |
| | Turkey | | | | | 2 | | | | | | **2** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **2** | **1** | **0** | **0** | **0** | **0** | **3** |
| | | | | | | | | | | | | |
| *S*. Worthington | Animal Feed | | | | | 1 | 1 | | | | | **2** |
| | Bovine | | | | | 1 | | | | | | **1** |
| | Chicken | | | | | 1 | | | | | | **1** |
| | Environmental Swab | | | | | 9 | | | | | | **9** |
| | Equine | | | | | 1 | | | | | | **1** |
| | Food (Unspecified) | | | | | | 1 | | | | | **1** |
| | Porcine | | | | 2 | | 3 | | | | | **5** |
| | Water | | 9 | | | | | | | | | **9** |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Subtotal** | **0** | **9** | **0** | **2** | **13** | **5** | **0** | **0** | **0** | **0** | **29** |
| | | | | | | | | | | | | |
| *S*. Yoruba | Unknown | | | | | 1 | | | | | | **1** |
| | | | | | | | | | | | | |
| *S*. Zega | Lizard | | 1 | | | | | | | | | **1** |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,12:-:- | Animal (Unspecified) | | | | | 1 | | | | | | **1** |
| | Chicken | | | | | 2 | | | | | | **2** |
| | Equine | | | | | 1 | | | | | | **1** |
| | Porcine | | 2 | 2 | | | | | | | | **4** |
| | Subtotal | | 2 | 2 | | 4 | | | | | | **8** |
| | Chicken | | | | | 1 | | | | | | **1** |
| | Porcine | 2 | | | | | | | | | | **2** |
| | **Subtotal** | **2** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **3** |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,12:-:1,2 | Chicken | | | | | 1 | | | | | | **1** |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,5,12:-:1,2 | Chicken | | | | | 3 | | | | | | **3** |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,12:-:1,7 | Porcine | | | | | 1 | | | | | | **1** |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,12:-:e,n,z15 | Porcine | | 1 | | | | | | | | | **1** |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,5,12:b:- | Turkey | | | | | 2 | | | | | | **2** |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,12:d:- | Chicken | | | | | 6 | | | | | | **6** |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,12:i:- | Avian | 4 | | | | 2 | | | | | 2 | **8** |
| | Chicken Litter | | 1 | | | | | | | | | **1** |
| | Porcine | | 1 | | | | | | | | | **1** |
| | Turkey | | | | | 2 | | | | | | **2** |
| | Unknown | 1 | | | | | | | | | | **1** |
| | Water | | 1 | | | | | | | | | **1** |
| | **Subtotal** | **5** | **3** | **0** | **0** | **4** | **0** | **0** | **0** | **0** | **2** | **14** |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,5,12:i:- | Animal Feed | | 1 | | | | 2 | | | | | **3** |
| | Aquatic Animal | 4 | | | | | | | | | | **4** |
| | Avian | | | | | | | | | | 6 | **6** |
| | Bovine | | | | | 1 | | | | | | **1** |
| | Chicken | 2 | 5 | | | 6 | | | | | | **13** |
| | Equine | | | | | 1 | | | | | | **1** |
| | Feline | | | | | | | | | 1 | | **1** |
| | Food (Bovine) | | | | | 15 | | | | | | **15** |
| | Food (Chicken) | | | | | | | | | 1 | | **1** |
| | Porcine | | 1 | 2 | 1 | | | | | | | **4** |
| | Unknown | | | | | | | | | | | |
| | **Subtotal** | **6** | **7** | **2** | **1** | **23** | **2** | **0** | **0** | **2** | **6** | **49** |
| | | | | | | | | | | | | |
| *Salmonella* ssp I 4,12:l,v:- | Porcine | | | | | | 2 | | | | | **2** |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Salmonella* ssp I 4,12:r:- | Turkey | | | | | 1 | | | | | | **1** |
| *Salmonella* ssp I 4,5,12:r:- | Chicken | | | | | 2 | | | | | | **2** |
| | Porcine | | | | | | 1 | | | | | **1** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **2** | **1** | **0** | **0** | **0** | **0** | **3** |
| *Salmonella* ssp I 6,7:-:- | Animal Feed | | | | | | 1 | | | | | **1** |
| *Salmonella* ssp I 6,7,14:-:- | Animal Feed | | | | | | 1 | | | | | **1** |
| *Salmonella* ssp I 6,7:-:1,5 | Bovine | | | | | 1 | | | | | | **1** |
| | Porcine | | | | | 2 | | | | | | **2** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **3** |
| *Salmonella* ssp I 6,7,14:-:1,5 | Food (Bovine) | | | | | | 1 | | | | | **1** |
| *Salmonella* ssp I 6,7:-:l,w | Porcine | | | | | | 1 | | | | | **1** |
| *Salmonella* ssp I 6,7:z10:- | Bovine | | | | | 1 | | | | | | **1** |
| *Salmonella* ssp I 6,7,14:z10:- | Animal Feed | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I 6,7:z4,z23:- | Animal Feed | | | | | | 1 | | | | | **1** |
| *Salmonella* ssp I 6,14,18:-:- | Bovine | | | | | 2 | | | | | | **2** |
| *Salmonella* ssp I 6,8:-:1,2 | Water | | 3 | | | | | | | | | **3** |
| *Salmonella* ssp I 6,8:-:e,n,x | Avian | | | | | | 1 | | | | | **1** |
| | Chicken | | | | | 2 | | | | | | **2** |
| | Porcine | | | | | 1 | | | | | | **1** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **3** | **1** | **0** | **0** | **0** | **0** | **4** |
| *Salmonella* ssp I 6,8:d:- | Bovine | | | | | 1 | | | | | | **1** |
| *Salmonella* ssp I 8,20:e,h:- | Reptile | | | | | | | | | | 1 | **1** |
| *Salmonella* ssp I 8,20:i:- | Chicken | | | | | 1 | | | | | | **1** |
| *Salmonella* ssp I 9,12:-:- | Chicken | | | | | 1 | | | | | | **1** |
| *Salmonella* ssp I 11:r:- | Water | | 54 | | | | | | | | | **54** |
| *Salmonella* ssp I 17:-:- | Porcine | | | | | 1 | | | | | | **1** |
| *Salmonella* ssp I 18:-:- | Bovine | | | | | 12 | | | | | | **12** |
| | Porcine | | | | | 1 | | | | | | **1** |

| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Subtotal** | **0** | **0** | **0** | **0** | **13** | **0** | **0** | **0** | **0** | **0** | **13** |
| *Salmonella* ssp I 18:z4:z23:- | Bovine | | | | 1 | | | | | | | **1** |
| *Salmonella* ssp I 3,10:e,h:- | Chicken | | | | | 1 | | | | | | **1** |
| | Food (Bovine) | | | | | 1 | | | | | | **1** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **2** |
| *Salmonella* ssp I 3,10:l,v:- | Porcine | | | | | 1 | | | | | | **1** |
| *Salmonella* ssp I 3,15:e,h:- | Bovine | | | | | 1 | | | | | | **1** |
| *Salmonella* ssp I 3,19:-:- | Animal Feed | | | | | | 1 | | | | | **1** |
| | Chicken | | | | | 1 | | | | | | **1** |
| | Environmental Swab | | 1 | | | | | | | | | **1** |
| | Subtotal | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | **3** |
| *Salmonella* ssp I 28:y:- | **Bovine** | | | | | **1** | | | | | | **1** |
| *Salmonella* ssp I 42:z4,z23:- | Animal Feed | | | | | | 2 | | | | | **2** |
| | Porcine | | | | | | 1 | | | | | **1** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **3** |
| *Salmonella* ssp I 47:z4,z23:- | Food (Ovine) | | | | | | | | | | | |
| *Salmonella* ssp I Rough-O:-:- | Bovine | | | | | 1 | | | | | | **1** |
| | Unknown | | 1 | | | | | | | | | **1** |
| | **Subtotal** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **2** |
| *Salmonella* ssp I Rough-O:-:1,5 | Bovine | | | | | 1 | | | | | | **1** |
| *Salmonella* ssp I Rough-O:d:1,2 | Porcine | | | | | 1 | | | | | | **1** |
| *Salmonella* ssp I Rough-O:d:e,n,x | Food (Sage) | | | | | | 1 | | | | | **1** |
| *Salmonella* ssp I Rough-O:d:l,w | Canine | | | | | 1 | | | | | | **1** |
| | Chicken | | | | | 2 | | | | | | **2** |
| | Porcine | | | | | | 4 | | | | | **4** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **3** | **4** | **0** | **0** | **0** | **0** | **7** |
| *Salmonella* ssp I Rough-O:e,h:- | Food (Bovine) | | | | | 1 | | | | | | **1** |
| | Turkey | | | | | 1 | | | | | | **1** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **2** |
| *Salmonella* ssp I Rough-O:e,h:1,2 | Bovine | | | | | 1 | | | | | | **1** |
| *Salmonella* ssp I Rough-O:g,m,s:- | Food (Cumin Seeds) | | | | | | 1 | | | | | **1** |

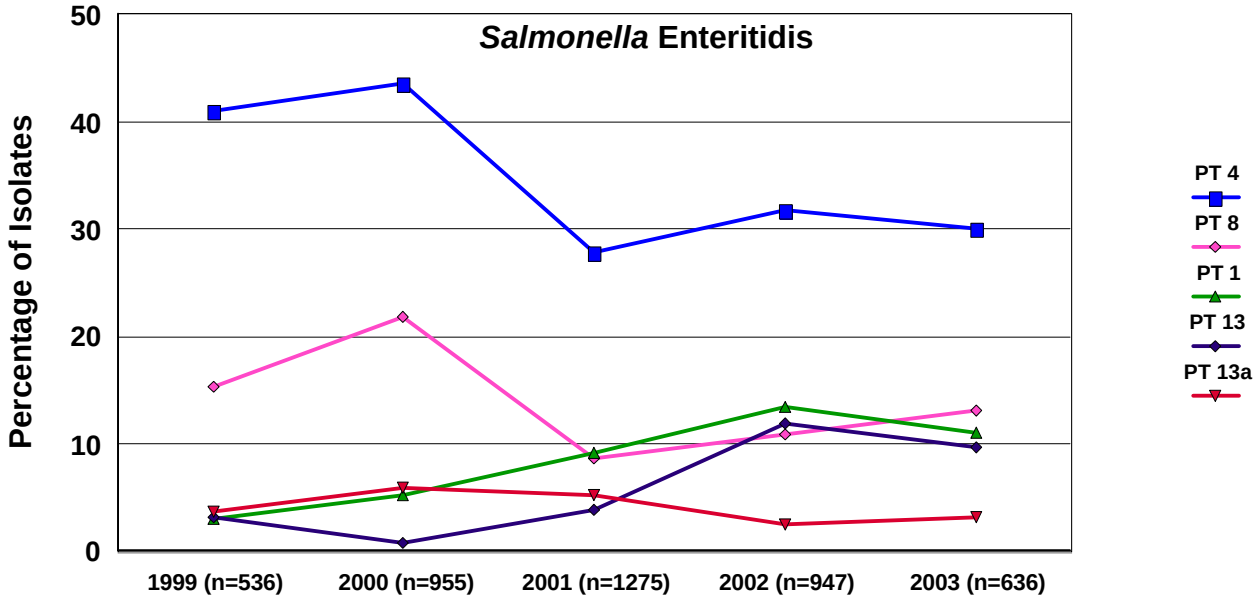
| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Salmonella* ssp I Rough-O:i:- | Food (Crab) | | | | | | | | 1 | | | **1** |
| *Salmonella* ssp I Rough-O:i:1,2 | Bovine | | | | | 2 | | | | | | **2** |
| *Salmonella* ssp I Rough-O:i:z6 | Chicken | | 1 | | | 6 | | | | | | **7** |
| | Chicken Litter | | 1 | | | | | | | | | **1** |
| | **Subtotal** | **0** | **2** | **0** | **0** | **6** | **0** | **0** | **0** | **0** | **0** | **8** |
| *Salmonella* ssp I Rough-O:k:1,5 | Bovine | | | | | 2 | | | | | | **2** |
| | Chicken | | | | | 5 | | | | | | **5** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **7** | **0** | **0** | **0** | **0** | **0** | **7** |
| *Salmonella* ssp I Rough-O:r:- | Chicken | | | | | 2 | | | | | | **2** |
| | Chicken Litter | | 1 | | | | | | | | | **1** |
| | **Subtotal** | **0** | **1** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **3** |
| *Salmonella* ssp I Rough-O:r:1,2 | Chicken | | 3 | | | 9 | | | | | | **12** |
| | Chicken Litter | | 2 | | | | | | | | | **2** |
| | Food (Chicken) | | | | | 1 | | | | | | **1** |
| | Turkey | | | | | 4 | | | | | | **4** |
| | Unknown | 1 | | | | | | | | | | **1** |
| | **Subtotal** | **1** | **5** | **0** | **0** | **14** | **0** | **0** | **0** | **0** | **0** | **20** |
| *Salmonella* ssp I Rough-O:z10-:e,n,z15 | Chicken | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I Rough-O:z10:e,n,x | Chicken | | | | | 1 | | | | | | **1** |
| *Salmonella* ssp I Rough-O:z29:- | Animal Feed | 1 | 1 | | | | | | | | | **2** |
| | Water | | 1 | | | | | | | | | **1** |
| | **Subtotal** | **1** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** |
| *Salmonella* ssp I Rough-O:z4,z23:- | Bovine | | | | | 1 | | | | | | **1** |
| | Chicken | | | | | 1 | | | | | | **1** |
| | **Subtotal** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **2** |
| *Salmonella* ssp I Rough-O:z4,z24:- | Reptile | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp I Rough-O:z:l,w | Environmental Swab | | | | | 1 | | | | | | **1** |
| *Salmonella* ssp I Rough:l,v:e,n,z15 | Porcine | | | | | | 1 | | | | | **1** |
| *Salmonella* ssp II 6,7,14:m,t:- | Food (Unspecified) | | | | | 1 | | | | | | **1** |
| *Salmonella* ssp II 30:g,t:- | Food (Sage) | | | | | | 1 | | | | | **1** |
| *Salmonella* ssp II 50:b:z6 | Reptile | | | 1 | | | | | | | | **1** |
| *Salmonella* ssp IIIa 18:-:- | Turkey | | | | | 1 | | | | | | **1** |
| *Salmonella* ssp IIIa 18:z4,z32:- | Chicken | | | | | 2 | | | | | | **2** |
| *Salmonella* ssp IIIa Rough-O:z4,z23:- | Unknown | 1 | | | | | | | | | | **1** |
| *Salmonella* ssp IIIa Rough-O:z4,z24:- | Unknown | 1 | | | | | | | | | | **1** |

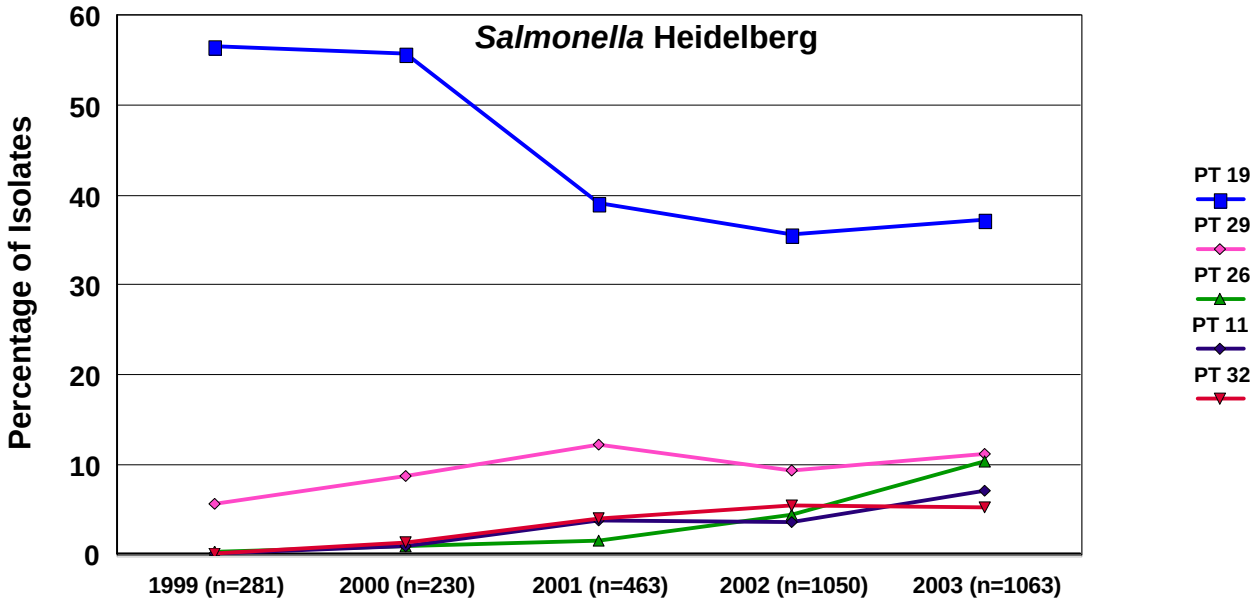
| Serovar | Source | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Salmonella* ssp IIIa Rough-O:z4,z32:- | Chicken | | | | | 2 | | | | | | **2** |
| *Salmonella* ssp IIIa Rough-O:z4,z32:- | Turkey | | | | | 1 | | | | | | **1** |
| | | | | | | | | | | | | |
| *Salmonella* ssp IIIb 60:r:e,n,x,z15 | Water | | 3 | | | | | | | | | **3** |
| *Salmonella* ssp IIIb 60:r:e,n,z15 | Equine | | | 1 | | | | | | | | **1** |
| *Salmonella* ssp IIIb 61:-:1,5,7 | Bovine | | 1 | | | | | | | | | **1** |
| *Salmonella* ssp IIIb 61:-:1,5,7 | Ovine | 1 | | | | | | | | | | **1** |
| *Salmonella* ssp IIIb 61:-:1,5,7 | Unknown | 1 | | | | | | | | | | **1** |
| *Salmonella* ssp IIIb 61:k:1,5 | Bovine | 1 | | | | | | | | | | **1** |
| *Salmonella* ssp IIIb 61:k:1,5 | Ovine | | | | | | | | | | 2 | **2** |
| *Salmonella* ssp IIIb 61:k:1,5,7 | Ovine | | | 1 | | | | | | | | **1** |
| *Salmonella* ssp IIIb:16:z10:e,n,x,z15 | Water | | 2 | | | | | | | | | **2** |
| | | | | | | | | | | | | |
| *Salmonella* ssp IV 21:-:- | Porcine | | | | | 1 | | | | | | **1** |
| | | | | | | | | | | | | |
| *Salmonella* ssp IV 40:g,t:- | Gecko | | | 1 | | | | | | | | **1** |
| *Salmonella* ssp IV 43:z4,z24:- | Reptile | | | | | 1 | | | | | | **1** |
| *Salmonella* ssp IV 44:z4,z24:- | Reptile | | | | | 2 | | | | | | **2** |
| *Salmonella* ssp IV 48:g,z51:- | Water | | 3 | | | | | | | | | **3** |
| *Salmonella* ssp IV 50:z4,z23:- | Unknown | | | | | | | | | | | |
| *Salmonella* ssp IV Rough-O:-:- | Porcine | | | | | 1 | | | | | | **1** |
| | | | | | | | | | | | | |
| *Salmonella* ssp VI 6,14,25:a:e,n,x | Unknown | | | | | | 1 | | | | | **1** |
| | | | | | | | | | | | | |
| **Total Non-Human *Salmonella* 2003** | | **96** | **995** | **128** | **165** | **2850** | **1166** | **67** | **62** | **118** | **23** | **5670** |

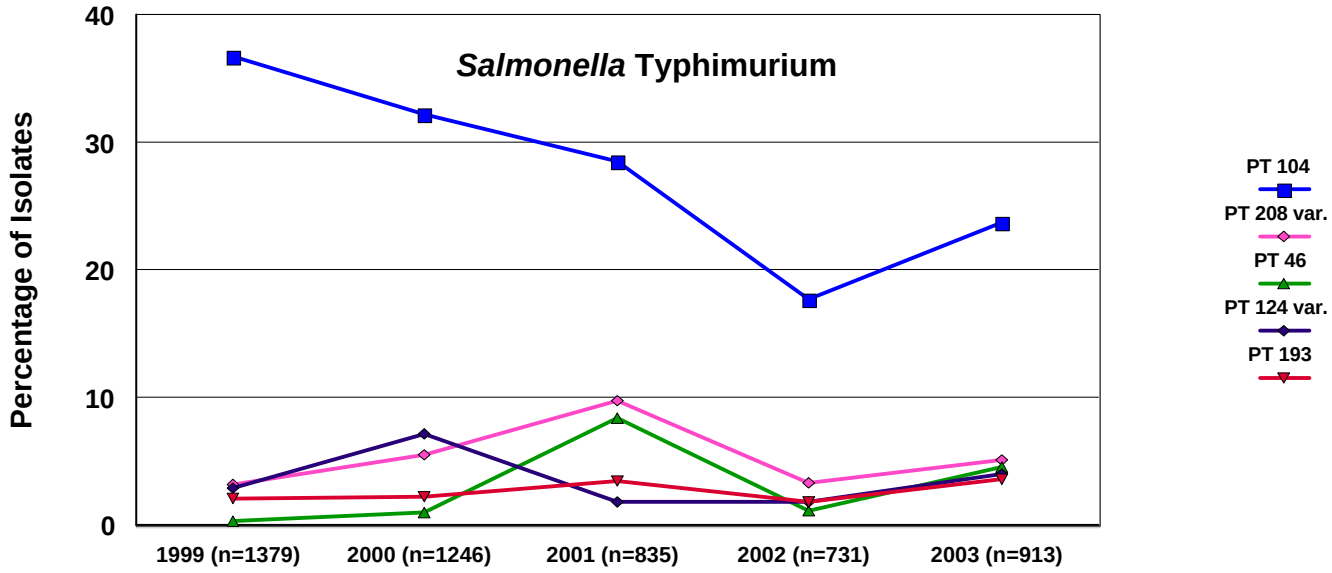
## Phage Types of *Salmonella* Serovars in Canada

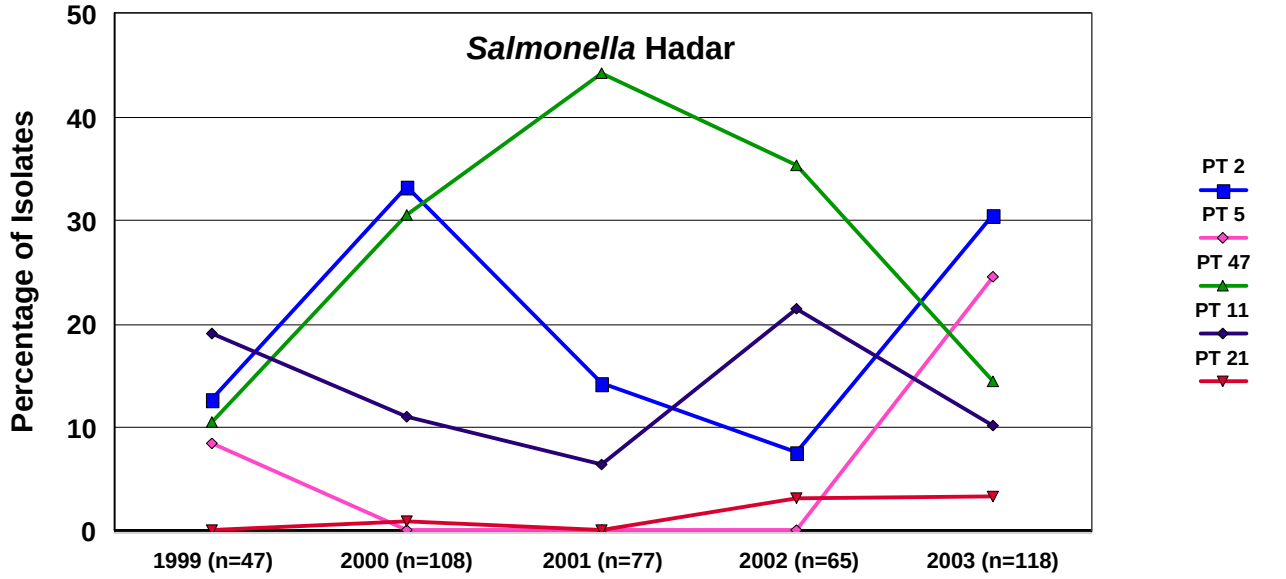
Phage typing data are collected from isolates forwarded to the NML and LFZ by the provincial public health, agriculture, veterinary, university and CFIA laboratories as part of reference requests, passive surveillance, surveys or outbreak and cluster investigations. The proportion of specimens forwarded may differ from province to province and should be interpreted with caution, however the subset of data from each province remains consistent from year to year and can be useful to establish general trends, recognize emerging or re-emerging phage types and to provide an overview of the various subtypes found in Canada. Table 5 lists *Salmonella* phage types identified from human strains forwarded to the NML and non-human strains identified by the LFZ and NML.

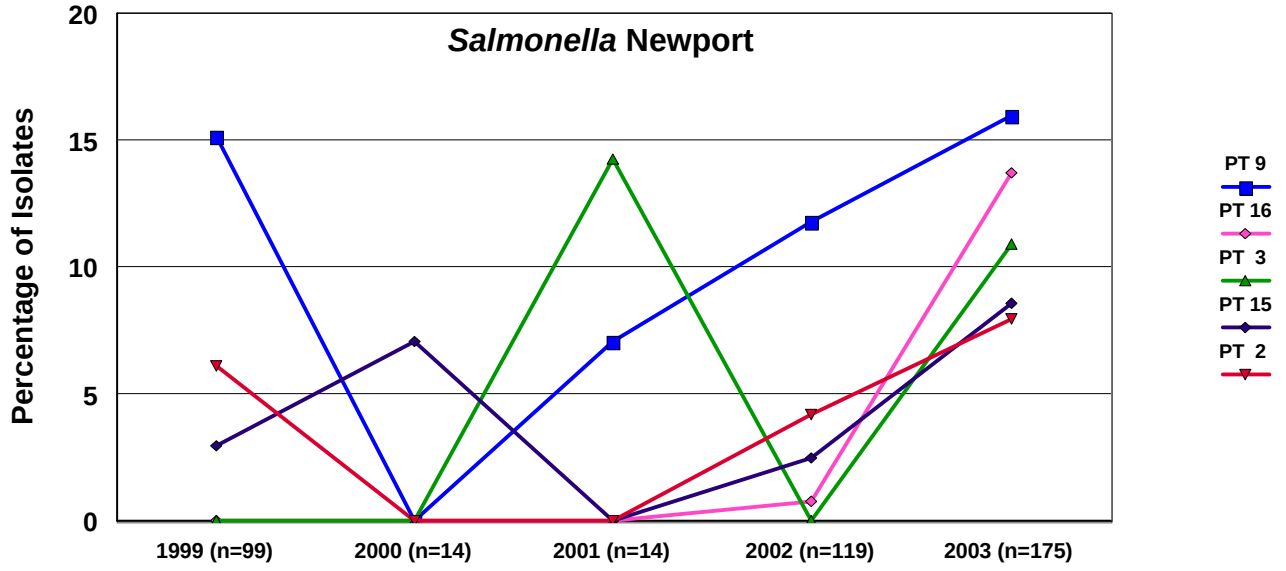
**Figure 15: Five Most Prevalent Phage Types of Various *Salmonella* Serovars Isolated from Humans in Canada, 1999 to 2003**




*Salmonella* Typhimurium
Percentage of Isolates
40
30
20
10
0
1999 (n=1379)
2000 (n=1246)
2001 (n=835)
2002 (n=731)
2003 (n=913)
PT 104
PT 208 var.
PT 46
PT 124 var.
PT 193


*Salmonella* Hadar
Percentage of Isolates
50
40
30
20
10
0
1999 (n=47)
2000 (n=108)
2001 (n=77)
2002 (n=65)
2003 (n=118)
PT 2
PT 5
PT 47
PT 11
PT 21


*Salmonella* Newport
Percentage of Isolates
20
15
10
5
0
1999 (n=99)
2000 (n=14)
2001 (n=14)
2002 (n=119)
2003 (n=175)
PT 9
PT 16
PT 3
PT 15
PT 2

## Table 5: Phage Types of Various *Salmonella* Serovars in Canada, 2002

| Organism | PhageType | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Enteritidis | 1 | Human | 7 | 10 | 2 | 5 | 90 | 13 | | 1 | | | **128** |
| | 1 | Unknown | | | | | 1 | | | | | | **1** |
| | 1a | Human | | | | | | | | 2 | | | **2** |
| | 1b | Human | | | | 1 | 1 | | | | | | **2** |
| | 2 | Human | | 10 | | | 4 | | | 2 | 1 | | **17** |
| | 3 | Human | | 1 | | 2 | | | | | | | **3** |
| | 3 | Unknown | | | | | 1 | | | | | | **1** |
| | 3 var. | Human | | | | | 1 | | | | | | **1** |
| | 4 | Emu | | | | | | 3 | | | | | **3** |
| | 4 | Food (Chicken) | 1 | | | | | | | | | | **1** |
| | 4 | Human | 28 | 51 | 12 | 8 | 144 | 42 | 3 | 12 | 1 | | **301** |
| | 4a | Human | 1 | 3 | 1 | | 13 | 2 | | | | | **20** |
| | 4b | Human | 2 | | | | 2 | | | | | | **4** |
| | 5a | Human | 3 | 1 | | | 5 | | | 1 | | 1 | **11** |
| | 5b | Human | | 2 | | | 33 | 23 | | 5 | | 1 | **64** |
| | 5c | Human | | 1 | | | 3 | 1 | | | | | **5** |
| | 6 | Human | 1 | 1 | 1 | | 13 | 2 | | | | | **18** |
| | 6a | Human | 4 | 4 | | | 9 | | | 1 | | | **18** |
| | 6b | Human | 1 | 1 | | | | 2 | | | | | **4** |
| | 7 | Human | | 1 | | | 1 | 1 | | | | | **3** |
| | 7a | Human | | | | | 2 | | | | | | **2** |
| | 8 | Animal (Unspecified) | | | | | | 1 | | | | | **1** |
| | 8 | Chicken | 1 | 15 | | | 3 | | | | | | **19** |
| | 8 | Environmental Swab | 1 | 1 | | | | | | | | | **2** |
| | 8 | Food (Pork) | 2 | | | | | | | | | | **2** |
| | 8 | Food (Poultry) | 1 | | | | | | | | | | **1** |
| | 8 | Human | 7 | 15 | | 2 | 55 | 17 | 2 | 5 | | | **103** |
| | 8 | Rodent | | | | | | | | 2 | | | **2** |
| | 8 | Turkey | | | | | 1 | | | | | | **1** |
| | 8 | Unknown | | | | | | 2 | | | | | **2** |
| | 8a | Human | | | | | | | | | | | **0** |
| | 9a | Human | | 1 | | | 1 | | | | | | **2** |
| | 9b | Human | 1 | | | | | | | | | | **1** |
| | 9c | Human | | 1 | 1 | | | | | | | | **2** |
| | 11 | Human | | | | | 1 | | | | | | **1** |
| | 11b | Bovine | | | 1 | | | | | | | | **1** |
| | 11b | Human | | 1 | 3 | | | 2 | | | | | **6** |
| | 13 | Chicken | | 1 | | | | 2 | | | | | **3** |
| | 13 | Human | 6 | 4 | 2 | 2 | 55 | 24 | 6 | 17 | 1 | | **117** |
| | 13 | Poultry | | | | | | 2 | | | | | **2** |
| | 13 | Unknown | | | | | | 2 | | | | | **2** |
| | 13a | Chicken | | 1 | | | | | | | | | **1** |
| | 13a | Human | | 1 | | 1 | 19 | 2 | | 1 | | | **24** |
| | 14b | Human | | 3 | | | 5 | 1 | | | | | **9** |
| | 18 | Human | | 1 | | | | | | | | | **1** |
| | 19 | Unknown | | | | | | 1 | | | | | **1** |
| | 20 | Human | | | | 1 | | | | | | | **1** |

| Organism | PhageType | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Enteritidis | 21 | Human | 2 | 1 | | | 7 | 2 | | | | | **12** |
| | 24 | Human | 3 | 2 | | | 2 | | 3 | 4 | 1 | 2 | **17** |
| | 24 var. | Human | | | | | 1 | | | | | | **1** |
| | 24a | Human | 1 | | | | | | | | | | **1** |
| | 28 | Human | | | | | 3 | | | | | | **3** |
| | 29 | Human | | 4 | | | 3 | | | | | | **7** |
| | 29 | Porcine | | | | | | | | 3 | | | **3** |
| | 29a | Human | 1 | | | | | 1 | | | | | **2** |
| | 30 | Human | | 1 | | | 3 | | 2 | | | | **6** |
| | 34 | Human | | | | | 4 | | | | | | **4** |
| | 35 | Human | 1 | | | | | | | | | | **1** |
| | 36 | Human | | | | | 1 | | | | | | **1** |
| | 43 | Human | | 2 | | | | | | | | | **2** |
| | 911 | Human | 1 | | | | 5 | 1 | | | | | **7** |
| | Atypical | Hedgehog | | 1 | | | | | | | | | **1** |
| | Atypical | Human | 4 | 4 | 2 | | 12 | 8 | | | | | **30** |
| | Untypable | Fish | 1 | | | | | | | | | | **1** |
| | Untypable | Human | 2 | 2 | | | 3 | 1 | | | 1 | | **9** |
| | | | | | | | | | | | | | |
| | | Human Total | 76 | 129 | 24 | 22 | 501 | 145 | 16 | 51 | 5 | 4 | **973** |
| | | Non Human Total | 7 | 19 | 1 | 0 | 6 | 13 | 0 | 5 | 0 | 0 | **51** |
| | | | | | | | | | | | | | |
| *S*. Hadar | 2 | Food (Chicken) | | 1 | | | | | | | | | **1** |
| | 2 | Human | 1 | 4 | | | | | | | | | **5** |
| | 4 | Human | | | 1 | | | | | | | | **1** |
| | 10 | Human | | 3 | 2 | | | | | | | | **5** |
| | 11 | Chicken | | | 1 | | | | | | | | **1** |
| | 11 | Chicken Litter | | 1 | | | | | | | | | **1** |
| | 11 | Human | 2 | 11 | 1 | | | | | | | | **14** |
| | 13 | Human | | 2 | | | | | | | | | **2** |
| | 19 | Human | | 1 | | | | | | | | | **1** |
| | 21 | Human | | 2 | | | | | | | | | **2** |
| | 26 | Human | | 1 | | | | | | | | | **1** |
| | 33 | Chicken | | 1 | | | | | | | | | **1** |
| | 33 | Human | | 1 | | | | | | | | | **1** |
| | 40 | Human | | 1 | | | | | | | | | **1** |
| | 43 | Chicken | | 1 | | | | | | | | | **1** |
| | 43 | Human | | 2 | | | 1 | | | | | | **3** |
| | 47 | Bovine | | 1 | | | | | | | | | **1** |
| | 47 | Canine | | 1 | | | | | | | | | **1** |
| | 47 | Food (Chicken) | | 1 | | | | | | | | | **1** |
| | 47 | Human | | 19 | 4 | | | | | | | | **23** |
| | 47 | Poultry | | 1 | | | | | | | | | **1** |
| | 47 | Unknown | | 1 | | | | | | | | | **1** |
| | 56 | Canine | | | 1 | | | | | | | | **1** |
| | 56 | Chicken | | 1 | | | | | | | | | **1** |
| | 56 | Human | | 1 | | | | | | | | | **1** |
| | 58 | Human | | 1 | | | | | | | | | **1** |
| | Atypical | Human | 1 | | | | | | | | | | **1** |

| Organism | PhageType | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Hadar | Untypable | Human | | 2 | | | | | | | 1 | | **3** |
| | | | | | | | | | | | | | |
| | | Human Total | 4 | 51 | 8 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | **65** |
| | | Non Human Total | 0 | 10 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **12** |
| | | | | | | | | | | | | | |
| *S*. Heidelberg | 1 | Human | 1 | | | 1 | 3 | | | | | | **5** |
| | 2 | Human | 2 | 1 | | | | | | | | | **3** |
| | 3 | Chicken | | | | | | | | 1 | | | **1** |
| | 4 | Chicken | | | | | | 6 | | | | | **6** |
| | 4 | Human | 1 | 5 | | | 31 | 67 | 4 | | | | **108** |
| | 4 | Porcine | | | | | | 5 | | | | | **5** |
| | 4 | Poultry | | | | | | 3 | | | | | **3** |
| | 4 | Unknown | | | | | | 3 | | | | | **3** |
| | 5 | Chicken Litter | | 1 | | | | | | | | | **1** |
| | 5 | Human | 15 | 11 | | 3 | 46 | 5 | | 1 | 2 | | **83** |
| | 5 | Water | | 1 | | | | | | | | | **1** |
| | 6 | Animal (Unspecified) | | | | | 2 | | | | | | **2** |
| | 6 | Environmental Swab | | 1 | | | | | | | | | **1** |
| | 6 | Human | 1 | 1 | | | 19 | 21 | | 1 | | | **43** |
| | 6 | Turkey | | 1 | | | 3 | | | | | | **4** |
| | 6 | Unknown | | | | | | 2 | | | | | **2** |
| | 7 | Chicken | | | | | 2 | | | | | | **2** |
| | 7 | Human | | | | | 1 | 1 | | | | | **2** |
| | 8 | Chicken | | | | | 102 | 1 | | | | | **103** |
| | 8 | Human | | | | | 5 | 8 | 2 | | | | **15** |
| | 8 | Porcine | | | | | 1 | | | | | | **1** |
| | 9 | Chicken | | | | | 1 | | | | | | **1** |
| | 9 | Human | | | | | | 1 | | | | | **1** |
| | 9 | Porcine | | | | | | 7 | | | | | **7** |
| | 9 | Poultry | | 1 | | | | 1 | | | | | **2** |
| | 10 | Human | | | 1 | | 6 | | 1 | | | | **8** |
| | 11 | Avian | | 1 | | | | | | | | | **1** |
| | 11 | Human | 2 | 2 | | | 28 | 5 | | | | | **37** |
| | 11 | Porcine | | | | | 1 | | | | | | **1** |
| | 11 | Turkey | | | | | 1 | | | | | | **1** |
| | 12 | Poultry | | | | | | 1 | | | | | **1** |
| | 13 | Chicken | | 3 | | | | | | | | | **3** |
| | 13 | Turkey | | | | | 6 | | | | | | **6** |
| | 17 | Chicken | | 3 | | | | | | | | | **3** |
| | 17 | Chicken Litter | | 3 | | | | | | | | | **3** |
| | 17 | Human | 1 | 1 | | | 1 | 3 | | | | | **6** |
| | 18 | Canine | | | 1 | | | | | | | | **1** |
| | 18 | Chicken | 1 | | | | | | | | | | **1** |
| | 18 | Human | 1 | 1 | | | 2 | 2 | 1 | | | | **7** |
| | 18 | Water | | 1 | | | | | | | | | **1** |
| | 19 | Avian | | 3 | | | | | | | | | **3** |
| | 19 | Bovine | | 2 | 1 | | | 1 | | | | | **4** |
| | 19 | Chicken | 7 | 11 | | | 10 | 3 | 1 | | | | **32** |
| | 19 | Chicken Litter | | 1 | | | | | | | | | **1** |

| Organism | PhageType | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Heidelberg | 19 | Environmental Swab | 1 | 3 | | | | | | | | | **4** |
| | 19 | Food (Chicken) | | 1 | | | | | | | | | **1** |
| | 19 | Food (Lamb) | | 1 | | | | | | | | | **1** |
| | 19 | Food (Unspecified) | | 1 | | | 1 | | | | | | **2** |
| | 19 | Human | 26 | 73 | 9 | 16 | 144 | 96 | 6 | 1 | 4 | | **375** |
| | 19 | Porcine | | | 1 | | | | | | | | **1** |
| | 19 | Poultry | | 1 | | | | 3 | | | | | **4** |
| | 19 | Unknown | | 1 | | | 1 | 4 | | | | | **6** |
| | 19 | Water | | 5 | | | | | | | | | **5** |
| | 20 | Human | | | | 1 | 2 | 2 | | | | | **5** |
| | 20 | Porcine | | | | | | 1 | | | | | **1** |
| | 21 | Environmental Swab | 1 | | | | | | | | | | **1** |
| | 21 | Human | | | | | 1 | 1 | | | | | **2** |
| | 22 | Human | | 7 | | 2 | 1 | 1 | | | | | **11** |
| | 22 | Porcine | | 1 | | | | | | | | | **1** |
| | 23 | Human | | | | 1 | 1 | | | | | | **2** |
| | 23 | Turkey | | | | | 1 | | | | | | **1** |
| | 24 | Human | | | | | | 5 | | | | | **5** |
| | 25 | Human | | 2 | | | | | | | | | **2** |
| | 26 | Chicken | | | | | 1 | | | | | | **1** |
| | 26 | Food (Lettuce) | | | | | 1 | | | | | | **1** |
| | 26 | Food (Potato) | | | | | 1 | | | | | | **1** |
| | 26 | Human | 12 | 3 | 1 | 2 | 20 | 6 | 2 | | | | **46** |
| | 26 | Poultry | | | | | | 2 | | | | | **2** |
| | 26 | Turkey | | | | | 2 | | | | | | **2** |
| | 26 | Unknown | | | | | 1 | | | | | | **1** |
| | 29 | Animal (Unspecified) | | | | | 2 | | | | | | **2** |
| | 29 | Chicken | | 12 | | | 8 | 2 | | | | | **22** |
| | 29 | Chicken Litter | | 4 | | | | | | | | | **4** |
| | 29 | Equine | | | | | 8 | | | | | | **8** |
| | 29 | Human | 7 | 13 | 1 | 2 | 36 | 34 | 4 | 1 | | 1 | **99** |
| | 29 | Porcine | | | | | | 45 | | | | | **45** |
| | 29 | Poultry | | | | | | 2 | | | | | **2** |
| | 29 | Turkey | 1 | | | | 2 | | | | | | **3** |
| | 29 | Unknown | | | | | | 10 | | | | | **10** |
| | 29 | Water | | 7 | | | | | | | | | **7** |
| | 30 | Animal (Unspecified) | | | | | 1 | | | | | | **1** |
| | 30 | Human | | | | | 1 | | | | | | **1** |
| | 30 | Turkey | | 1 | | | 1 | | | | | | **2** |
| | 32 | Animal (Unspecified) | | | | | 14 | | | | | | **14** |
| | 32 | Bovine | | | | | | 1 | | | | | **1** |
| | 32 | Chicken | | | | | 4 | 2 | | | | | **6** |
| | 32 | Human | 2 | 5 | | 4 | 31 | 14 | 1 | | 1 | | **58** |
| | 32 | Poultry | | | | | | 1 | | | | | **1** |
| | 32 | Turkey | 7 | | | | 23 | | | | | | **30** |
| | 32 | Unknown | | | | | | 3 | | | | | **3** |
| | 35 | Camelid | | | | | | | | | 1 | | **1** |
| | 35 | Human | | | | | | 1 | | | | | **1** |
| | 36 | Chicken | | 1 | | | 7 | | | | | | **8** |

Annual Summary 2002 and 2003

| Organism | PhageType | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Heidelberg | 36 | Chicken Litter | | 4 | | | | | | | | | **4** |
| | 36 | Human | | 2 | | | 1 | | | | | | **3** |
| | 36 | Owl | | 1 | | | | | | | | | **1** |
| | 36 | Turkey | | | | | 1 | | | | | | **1** |
| | 37 | Human | | | | | 1 | | | | | | **1** |
| | 37 | Porcine | | | | | | 2 | | | | | **2** |
| | 39 | Human | | 1 | 1 | 2 | | 2 | | | | | **6** |
| | 39 | Poultry | | | 1 | | | | | | | | **1** |
| | 40 | Avian | | | | | | 1 | | | | | **1** |
| | 40 | Human | | | | 1 | | | | | | | **1** |
| | 41 | Avian | | | 2 | | | | | | | | **2** |
| | 41 | Chicken | | | 12 | | | | | | | | **12** |
| | 41 | Environmental Swab | 2 | 1 | | | | | | | | | **3** |
| | 41 | Human | 5 | 1 | | 2 | 6 | 10 | | | | | **24** |
| | 41 | Poultry | | | | | | 1 | | | | | **1** |
| | 41 | Unknown | | | | | | 1 | | | | | **1** |
| | 42 | Human | | | | | 1 | | | | | | **1** |
| | 44 | Canine | | | 1 | | | | | | | | **1** |
| | 44 | Human | | | | | | 1 | | | | | **1** |
| | 45 | Animal (Unspecified) | | | | | 3 | | | | | | **3** |
| | 45 | Human | | | | | 6 | 2 | | | | | **8** |
| | 47 | Animal (Unspecified) | | | | | 1 | | | | | | **1** |
| | 47 | Avian | | | | | | 1 | | | | | **1** |
| | 47 | Chicken | | | | | | 1 | | | | | **1** |
| | 47 | Food (Poultry) | | | | | | | | 1 | | | **1** |
| | 47 | Human | | 1 | | | 7 | | | 5 | | | **13** |
| | 47 | Porcine | | | | | | 1 | | | | | **1** |
| | 47 | Turkey | | | | | 12 | | | | | | **12** |
| | 48 | Human | | | | | 1 | | | | | | **1** |
| | 49 | Human | | 1 | | | | | | | | | **1** |
| | 53 | Unknown | | | | | | 1 | | | | | **1** |
| | 54 | Human | | | | | 1 | | | | | | **1** |
| | 55 | Human | | | | | 2 | | | | | | **2** |
| | Atypical | Avian | | | | | | 1 | | | | | **1** |
| | Atypical | Bovine | | | | | 1 | | | | | | **1** |
| | Atypical | Chicken | | | 1 | | | | | 2 | | | **3** |
| | Atypical | Human | 2 | 6 | | 4 | 23 | 8 | 4 | | 1 | | **48** |
| | Atypical | Porcine | | | 8 | | | 5 | | | | | **13** |
| | Atypical | Turkey | | | | | 4 | | | | | | **4** |
| | Atypical | Unknown | | | | | 1 | | | | | | **1** |
| | Atypical | Water | | 24 | | | | | | | | | **24** |
| | Untypable | Chicken | | 3 | | | 1 | | | | | | **4** |
| | Untypable | Human | 4 | | 1 | | 3 | 3 | 3 | | | | **14** |
| | Untypable | Porcine | | | | | | 1 | | | | | **1** |
| | Untypable | Unknown | | | | | | 1 | | | | | **1** |
| | | | | | | | | | | | | | |
| | | Human Total | 82 | 137 | 14 | 41 | 431 | 299 | 28 | 9 | 8 | 1 | **1050** |
| | | Non Human Total | 20 | 105 | 28 | 0 | 232 | 126 | 1 | 4 | 1 | 0 | **517** |
| | | | | | | | | | | | | | |

| Organism | PhageType | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Infantis | 4 | Chicken | | | 2 | | | | | | | | **2** |
| | 4 | Pet Food | | 1 | | | | | | | | | **1** |
| | 7 | Chicken | | | 3 | | | | | | | | **3** |
| | 7 | Human | | | 1 | | | | | | | | **1** |
| | 13 | Environmental Swab | | | 6 | | | | | | | | **6** |
| | 13 | Porcine | | | 18 | | | | | | | | **18** |
| | 29 | Human | | 1 | | | | | | | | | **1** |
| | | | | | | | | | | | | | |
| | | Human Total | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **2** |
| | | Non Human Total | 0 | 1 | 29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **30** |
| | | | | | | | | | | | | | |
| *S*. Newport | 1 | Human | 1 | | | | 3 | | | | | | **4** |
| | 2 | Food (Unspecified) | | 1 | | | | | | | | | **1** |
| | 2 | Human | | 1 | | | 3 | | 1 | | | | **5** |
| | 4 | Environmental Swab | | | | | 2 | | | | | | **2** |
| | 4 | Human | | 3 | | | 9 | | 3 | | | | **15** |
| | 4 | Unknown | | | | | 1 | | | | | | **1** |
| | 7 | Animal (Unspecified) | | | | | 1 | | | | | | **1** |
| | 7 | Bovine | | | | | 1 | | | | | | **1** |
| | 7 | Environmental Swab | | | | | 1 | | | | | | **1** |
| | 7 | Turkey | | | | | 3 | | | | | | **3** |
| | 7 | Unknown | | | | | 1 | | | | | | **1** |
| | 8 | Human | | 1 | | | | | 1 | | | | **2** |
| | 9 | Human | 2 | 2 | | | 10 | | | | | | **14** |
| | 10 | Human | | 2 | | | | | | 1 | | | **3** |
| | 13 | Human | | 2 | | | 13 | 1 | | | 1 | | **17** |
| | 14 | Human | | 1 | | 1 | 4 | | | 1 | | | **7** |
| | 14a | Bovine | | | | | 9 | | | | | | **9** |
| | 14a | Chicken | | | | | 2 | | | | | | **2** |
| | 14a | Human | 2 | 8 | | | 8 | | | | | | **18** |
| | 14a | Pet Food | | 1 | | | | | | | | | **1** |
| | 14b | Bovine | | | | | 2 | | | | | | **2** |
| | 14b | Human | 1 | | | | | | | | | | **1** |
| | 14c | Chicken | | | | | 2 | | | | | | **2** |
| | 14c | Human | | | | | 1 | 1 | | | | | **2** |
| | 14r | Human | | | | | 18 | | | | | | **18** |
| | 15 | Human | 1 | 2 | | | | | | | | | **3** |
| | 15 | Snake | | 1 | | | | | | | | | **1** |
| | 16 | Human | | | | | 1 | | | | | | **1** |
| | 17 | Human | | | | | 5 | | | | | | **5** |
| | 17a | Human | | | | | 1 | | | | | | **1** |
| | 17c | Human | | | | | 1 | | | | | | **1** |
| | Atypical | Animal (Unspecified) | | | | | 1 | | | | | | **1** |
| | Atypical | Bovine | | | | | 1 | | | | | | **1** |
| | Atypical | Human | 1 | | | | | | | | | | **1** |
| | Atypical | Turkey | | | | | 2 | | | | | | **2** |
| | Untypable | Human | | 1 | | | | | | | | | **1** |
| | | | | | | | | | | | | | |
| | | Human Total | 8 | 23 | 0 | 1 | 77 | 2 | 5 | 2 | 1 | 0 | **119** |

| Organism | PhageType | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Non Human Total | 0 | 3 | 0 | 0 | 29 | 0 | 0 | 0 | 0 | 0 | **32** |
| | | | | | | | | | | | | | |
| *S*. Oranienburg | 1 | Human | 12 | 80 | 25 | 5 | 37 | | | | | | **159** |
| | 4 | Food (Chocolate) | | | | | 28 | | | | | | **28** |
| | 4 | Food (Unspecified) | | | | | 1 | | | | | | **1** |
| | 4a | Food (Chocolate) | | | | | 3 | | | | | | **3** |
| | 4a | Human | | | | | 1 | | | | | | **1** |
| | 5 | Human | | | | | 1 | | | | | | **1** |
| | 6 | Human | | 1 | | | 1 | | | | | | **2** |
| | 8 | Feline | | | 2 | | | | | | | | **2** |
| | 15 | Animal (Unspecified) | | 1 | | | | | | | | | **1** |
| | 15 | Human | | | | | 1 | 1 | | | | | **2** |
| | 16 | Snake | | 1 | | | | | | | | | **1** |
| | 17 | Human | | | | | | | 1 | | | | **1** |
| | Untypable | Human | | | | | | | | 1 | | | **1** |
| | | | | | | | | | | | | | |
| | | Human Total | 12 | 81 | 25 | 5 | 41 | 1 | 1 | 1 | 0 | 0 | **167** |
| | | Non Human Total | 0 | 2 | 2 | 0 | 32 | 0 | 0 | 0 | 0 | 0 | **36** |
| | | | | | | | | | | | | | |
| *S*. Panama | G | Human | | 2 | | | | | | | | | **2** |
| | H | Human | | 1 | | | | | | | | | **1** |
| | H | Python | 1 | | | | | | | | | | **1** |
| | Atypical | Human | 1 | 1 | | | | | 1 | | | | **3** |
| | Untypable | Human | | | | | | | | 1 | | | **1** |
| | | | | | | | | | | | | | |
| *S*. Paratyphi B | Taunton | Human | 1 | | | | | | | | | | **1** |
| | | | | | | | | | | | | | |
| *S*. Paratyphi B | 1 var. 2 | Human | | | | | 1 | | | | | | **1** |
| var. Java | 1 var. 3 | Human | 1 | | | | 1 | | | | | | **2** |
| | 3al var. 4 | Human | | | | | | 1 | | | | | **1** |
| | 3b var. | Human | | | | 1 | | | | | 1 | | **2** |
| | 3b var. 3 | Human | | | | | 3 | | | | | | **3** |
| | 3b var. 7 | Human | | 12 | | | | 1 | | | | | **13** |
| | Battersea | Human | | 1 | 4 | | | | | | | | **5** |
| | Battersea | Unknown | | 1 | | | | | | | | | **1** |
| | Dundee | Human | | | 1 | | 2 | | 1 | | | | **4** |
| | Dundee | Unknown | | | | | | 1 | | | | | **1** |
| | Atypical | Human | 7 | 2 | | | 3 | 13 | | | | | **25** |
| | Atypical | Unknown | | | | | | 1 | | | | | **1** |
| | Atypical | Water | 2 | | | | | 1 | | | | | **3** |
| | Untypable | Human | | | 1 | | | | | | | | **1** |
| | Untypable | Poultry | | | | | | 1 | | | | | **1** |
| | | | | | | | | | | | | | |
| | | Human Total | 8 | 15 | 6 | 1 | 10 | 15 | 1 | 0 | 1 | 0 | **57** |
| | | Non Human Total | 2 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | **7** |
| | | | | | | | | | | | | | |
| *Salmonella* ssp I | 1 var. 6 | Human | | | | | | 1 | | | | | **1** |
| 4,[5],12:b:- | 3b var. 2 | Human | | | | | 5 | 2 | | | | | **7** |
| | 3b var. 3 | Human | | | | | | 1 | | | | | **1** |

| Organism | PhageType | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Salmonella* ssp I | B.A.O.R. | Human | | | | | 2 | | | | | | **2** |
| 4,[5],12:b:- | Battersea | Human | | 2 | | | 11 | 3 | | | | | **16** |
| | Atypical | Human | | 1 | | | | 7 | | | | | **8** |
| | Atypical | Mouse | | | | | | 1 | | | | | **1** |
| | Untypable | Human | 3 | 3 | | | 3 | 7 | | | | | **16** |
| | Untypable | Lizard | | | | | | 2 | | | | | **2** |
| | | | | | | | | | | | | | |
| | | Human Total | 3 | 6 | 0 | 0 | 21 | 21 | 0 | 0 | 0 | 0 | **51** |
| | | Non Human Total | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | **3** |
| | | | | | | | | | | | | | |
| *S*. Thompson | 1 | Human | | 3 | 1 | | 18 | 16 | 1 | 1 | | | **40** |
| | 1 | Unknown | | | | | | 1 | | | | | **1** |
| | 2 | Human | | 11 | | | 2 | | 1 | 1 | | | **15** |
| | 3 | Chicken | | | 1 | | | | | | | | **1** |
| | 3 | Human | | 1 | | | | | | | | | **1** |
| | 4 | Human | | 1 | | | | | | | | | **1** |
| | 5 | Human | | 3 | | | 3 | 3 | | | 1 | | **10** |
| | 5 | Poultry | | 1 | | | | | | | | | **1** |
| | 13 | Human | | 1 | | | | | | | | | **1** |
| | 25 | Human | | 1 | | | 1 | | | | 1 | | **3** |
| | 26 | Human | | 1 | | | 2 | 1 | | | 5 | | **9** |
| | 27 | Human | | 1 | 2 | | | | | | | | **3** |
| | | | | | | | | | | | | | |
| | | Human Total | 0 | 23 | 3 | 0 | 26 | 20 | 2 | 2 | 7 | 0 | **83** |
| | | Non Human Total | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | **3** |
| | | | | | | | | | | | | | |
| *S*. Typhi | A | Human | | | | | 4 | 3 | 6 | | | | **13** |
| | B1 | Human | 1 | | | | 3 | | | | | | **4** |
| | B2 | Human | | | | | 2 | 3 | | | | | **5** |
| | B3 | Human | | | | | 1 | | | | | | **1** |
| | C1 | Human | | | | | | 1 | | | | | **1** |
| | C4 | Human | | | | | | 1 | | | | | **1** |
| | D1 | Human | | | | | 5 | | | | | | **5** |
| | D2 | Human | | | | | 4 | | | | | | **4** |
| | DVS | Human | 1 | | | | 3 | | | | | | **4** |
| | E1 | Human | 6 | 7 | | | 32 | 1 | | | | 1 | **47** |
| | E2 | Human | 1 | | | | | | | | | | **1** |
| | E9 | Human | 1 | | | | 1 | 1 | | | | | **3** |
| | E14 | Human | | | | | 1 | | | | | | **1** |
| | J1 | Human | | | | | 1 | | | | | | **1** |
| | O | Human | 1 | 1 | | | 2 | | | | | | **4** |
| | 28 | Human | 1 | | | | | | | | | | **1** |
| | 45 | Human | | | | | 1 | | | | | | **1** |
| | 46 | Human | 1 | | | | 1 | | | | | | **2** |
| | UVS | Human | 1 | | | | 3 | | | | | | **4** |
| | UVS-(I+IV) | Human | 3 | 1 | | 1 | 5 | 2 | | | | | **12** |
| | Untypable | Human | | | | | 2 | 1 | | | | | **3** |
| | | | | | | | | | | | | | |
| | | Human Total | 17 | 9 | 0 | 1 | 71 | 13 | 6 | 0 | 0 | 1 | **118** |

| Organism | PhageType | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | |
| *S.* Typhimurium | 1 | Avian | | | 1 | | | | | | | | **1** |
| | 1 | Chicken | | 1 | 2 | | | | | | | | **3** |
| | 1 | Human | 1 | 7 | 9 | 6 | | 9 | | | 1 | 1 | **34** |
| | 1 | Poultry | | | | | | 1 | | | | | **1** |
| | 1 | Unknown | | | | | | 1 | | | | | **1** |
| | 2 | Avian | | 1 | | 6 | 5 | 9 | | | | | **21** |
| | 2 | Bovine | 1 | | | | 2 | 2 | | | | | **5** |
| | 2 | Canine | | | | | 1 | | | | | | **1** |
| | 2 | Chicken | | 2 | | | 2 | | | | | | **4** |
| | 2 | Equine | | | | | 2 | | | | | | **2** |
| | 2 | Food (Eggs) | 4 | | | | | | | | | | **4** |
| | 2 | Human | 43 | 23 | 2 | 2 | | 8 | | | | | **78** |
| | 2 | Pigeon | 3 | | | | | | | | | | **3** |
| | 2 | Porcine | | | | | 1 | 1 | | | | | **2** |
| | 2 | Poultry | | | | | | 4 | | | | | **4** |
| | 2 | Turkey | | 1 | | | | | | | | | **1** |
| | 3 aero. | Human | | 1 | | | | 1 | | | | | **2** |
| | 4 | Human | | 1 | | | | | | | | | **1** |
| | 9 | Human | | | | | | 1 | | | | | **1** |
| | 10 | Bovine | | | | | 2 | | | | | | **2** |
| | 10 | Ferret | | | | | 1 | | | | | | **1** |
| | 10 | Human | 3 | | | 1 | | 5 | | | | | **9** |
| | 10 | Poultry | | | | | | 3 | | | | | **3** |
| | 10 | Turkey | | | | | 1 | | | | | | **1** |
| | 10 | Unknown | | | | | | 1 | | | | | **1** |
| | 11 | Human | | 1 | | | | | | | | | **1** |
| | 12 | Bovine | | | | | | 1 | | | | | **1** |
| | 12 | Food (Pork) | | | | | | 40 | | | | | **40** |
| | 12 | Human | 2 | 4 | 1 | 1 | | 15 | | 1 | | | **24** |
| | 12 | Porcine | | | | 4 | | 2 | | | | | **6** |
| | 12 | Unknown | | | | | | 5 | | | | | **5** |
| | 12a | Bovine | | | | | | 8 | | | | | **8** |
| | 12a | Human | | | | | | 2 | | | | | **2** |
| | 12a | Unknown | | | | | | 1 | | | | | **1** |
| | 15a | Human | 1 | 3 | | | | | | | | | **4** |
| | 20 | Animal Feed | | 1 | | | | | | | | | **1** |
| | 21 | Bovine | | | | | | 2 | | | | | **2** |
| | 22 | Bovine | | | 1 | | | | | | | | **1** |
| | 22 | Chicken | | | | 2 | 2 | | | | | 1 | **5** |
| | 22 | Human | 1 | 2 | 1 | | | 2 | | 4 | | | **10** |
| | 22 | Pet Food | | 1 | | | 1 | | | | | | **2** |
| | 22 | Poultry | | | | | | 1 | | | | | **1** |
| | 23 | Human | | | | | | 2 | | | | | **2** |
| | 27 | Human | 1 | 1 | | | | 1 | | 1 | | | **4** |
| | 27 | Porcine | | | | | 2 | | | | | | **2** |
| | 35 | Equine | | | | | 4 | | | | | | **4** |
| | 35 | Environmental Swab | | | | | 3 | | | | | | **3** |
| | 35 | Human | | | | | | 1 | | | | | **1** |

| Organism | PhageType | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Typhimurium | 35 | Porcine | | | | | 1 | | | | | | **1** |
| | 36 | Avian | | | | | 1 | | | | | | **1** |
| | 36 | Chicken | 1 | | | | | | | | | | **1** |
| | 39 | Avian | | | 1 | | | | | | | | **1** |
| | 39 | Human | | | | | | 1 | | | | | **1** |
| | 39 | Pigeon | 1 | | | | | | | | | | **1** |
| | 40 | Animal Feed | 1 | | | | | | | | | | **1** |
| | 40 | Avian | | | 1 | | 3 | | | | | | **4** |
| | 40 | Human | | 1 | | 1 | | 2 | | | | | **4** |
| | 40 | Unknown | | | | | | 2 | | | | | **2** |
| | 41 | Human | 1 | 1 | | 3 | | 2 | | | | | **7** |
| | 43 | Human | | 1 | | | | | | | | | **1** |
| | 46 | Avian | | | | | | 1 | | | | | **1** |
| | 46 | Human | 1 | 6 | | | | 1 | | | | | **8** |
| | 46 | Poultry | | | | | | 4 | | | | | **4** |
| | 49 | Human | 6 | 1 | | | | | | | | | **7** |
| | 65 | Unknown | | | | | | 1 | | | | | **1** |
| | 66 | Bovine | | | | | | 1 | | | | | **1** |
| | 66 | Chicken | | | | | 1 | | | | | | **1** |
| | 66 | Porcine | | | | | 1 | | | | | | **1** |
| | 67 | Human | | 1 | | | | | | | | | **1** |
| | 69 | Human | | | | | | 4 | | | | | **4** |
| | 80 | Human | | 1 | | | | 1 | | | | | **2** |
| | 82 | Bovine | | | | | | 1 | | | | | **1** |
| | 82 | Human | | | 1 | | | | | | | | **1** |
| | 82 var. | Human | | | | | | 1 | | | | | **1** |
| | 96 | Human | | 2 | | | | | | | | | **2** |
| | 99 | Animal Feed | | | | | | 1 | | | | | **1** |
| | 99 | Avian | | | | | 1 | | | | | | **1** |
| | 99 | Chicken | | 2 | | | | | | | | | **2** |
| | 99 | Duck | | | | | 1 | | | | | | **1** |
| | 99 | Food (Basil) | | | | | | 2 | | | | | **2** |
| | 99 | Human | | 1 | | | | | | | 1 | | **2** |
| | 104 | Animal (Unspecified) | | | | | 5 | | | | | | **5** |
| | 104 | Avian | | | | | 2 | | | | | | **2** |
| | 104 | Bison | | | 1 | | | | | | | | **1** |
| | 104 | Bovine | 5 | 40 | 18 | 1 | 17 | 16 | 2 | | | | **99** |
| | 104 | Canine | | | | | 1 | | | | | | **1** |
| | 104 | Cervid | | 1 | | | | | | | | | **1** |
| | 104 | Chicken | | 9 | | | 37 | | | | | | **46** |
| | 104 | Equine | | 1 | | | | 1 | | | | | **2** |
| | 104 | Environmental Swab | 1 | | | | 1 | | | | | | **2** |
| | 104 | Feline | | | | | 5 | | | | | | **5** |
| | 104 | Food (Beef) | | 1 | | | | 3 | | | | | **4** |
| | 104 | Food (Pork) | | | | | | 55 | | | | | **55** |
| | 104 | Human | 16 | 48 | 12 | 3 | 6 | 45 | | | | | **130** |
| | 104 | Ovine | | | 1 | | | | | | | | **1** |
| | 104 | Pigeon | 1 | | | | | | | | | | **1** |
| | 104 | Porcine | | 2 | 11 | 4 | 21 | 71 | | | | | **109** |

| Organism | PhageType | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Typhimurium | 104 | Poultry | | | | | | 1 | | | | | **1** |
| | 104 | Unknown | | | | | | 9 | | | | | **9** |
| | 104 | Water | | 7 | | | | | | | | | **7** |
| | 104a | Bovine | | | | | 2 | | | | | | **2** |
| | 104a | Equine | | | | | | 1 | | | | | **1** |
| | 104a | Food (Pork) | | | | | | 41 | | | | | **41** |
| | 104a | Human | 3 | | | | | 7 | | | | | **10** |
| | 104a | Porcine | | 1 | | | 4 | 23 | | | | | **28** |
| | 104a | Unknown | | | | | | 5 | | | | | **5** |
| | 104b | Bovine | | 5 | | | 5 | 3 | | | | | **13** |
| | 104b | Chicken | | | | | 1 | | | | | | **1** |
| | 104b | Feline | | | | | 1 | | | | | | **1** |
| | 104b | Food (Pork) | | | | | | 8 | | | | | **8** |
| | 104b | Human | 1 | 5 | | | | 9 | 1 | | | | **16** |
| | 104b | Porcine | | | 1 | | 11 | 3 | | | | | **15** |
| | 104b | Quail | | | | | | 1 | | | | | **1** |
| | 104b | Unknown | | | | | | 3 | | | | | **3** |
| | 107 | Avian | | | | 9 | | | | | | | **9** |
| | 107 | Bovine | | | | | 1 | | | | | | **1** |
| | 107 | Chicken | | | | 16 | 2 | | 2 | 1 | | 1 | **22** |
| | 107 | Human | | 2 | | 3 | | 3 | 6 | 2 | 1 | | **17** |
| | 107 | Poultry | | | | | | 1 | | | | | **1** |
| | 107 | Unknown | | | | | 1 | 1 | | | | | **2** |
| | 108 | Bovine | | | | | 1 | 1 | | | | | **2** |
| | 108 | Chicken | | | | | 1 | | | | | | **1** |
| | 108 | Food (Pork) | | | | | | 3 | | | | | **3** |
| | 108 | Human | | | | | | 2 | | | | | **2** |
| | 108 | Porcine | | | | 3 | 1 | 7 | | | | | **11** |
| | 110b | Avian | | | | | | | 2 | | | | **2** |
| | 110b | Chicken | | | | | 4 | | 1 | | | 2 | **7** |
| | 110b | Food (Chicken) | | 1 | | | | | | | | | **1** |
| | 110b | Human | 1 | | | 1 | | 1 | | 1 | | | **4** |
| | 110b | Porcine | | | | 1 | | 6 | | | | | **7** |
| | 110b | Unknown | | 1 | | | | | | | | | **1** |
| | 120 | Avian | | | 1 | | 1 | | | | | | **2** |
| | 120 | Chicken | | 1 | | | | | | | | | **1** |
| | 120 | Cormorant | | | 1 | | | | | | | | **1** |
| | 120 | Human | 1 | | | | | 1 | | | | | **2** |
| | 120 | Porcine | | | | | 1 | 1 | | | | | **2** |
| | 120 | Unknown | | | | | | 1 | | | | | **1** |
| | 121 | Cormorant | | | 1 | | | | | | | | **1** |
| | 121 | Food (Pork) | | | | | | 1 | | | | | **1** |
| | 121 | Hedgehog | | 2 | | | | | | | | | **2** |
| | 121 | Human | 1 | 12 | | | | | | | | | **13** |
| | 124 | Avian | | | | | 4 | | | | | | **4** |
| | 124 | Duck | | | | | 1 | | | | | | **1** |
| | 124 | Equine | | | | | 1 | | | | | | **1** |
| | 124 | Porcine | | | 1 | | | 1 | | | | | **2** |
| | 124 var. | Human | 1 | 1 | | 3 | | 4 | 1 | | 3 | | **13** |

| Organism | PhageType | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Typhimurium | 124 var. | Unknown | | | | | | 1 | | | | | **1** |
| | 132 | Animal (Unspecified) | | | | | 3 | 4 | | | | | **7** |
| | 132 | Bovine | | 1 | | | | | | | | | **1** |
| | 132 | Chicken | | 4 | | | 3 | | | | | | **7** |
| | 132 | Environmental Swab | 1 | 1 | | | | 1 | | | | | **3** |
| | 132 | Food (Eel) | | | | | 1 | | | | | | **1** |
| | 132 | Ovine | | 1 | | | | | | | | | **1** |
| | 132 | Turkey | | 1 | | | | | | | | | **1** |
| | 132 | Water | | 7 | | | | | | | | | **7** |
| | 135 | Chicken | | | | | 1 | | | | | | **1** |
| | 135 | Human | 2 | 2 | 1 | | | 1 | | | | | **6** |
| | 140 | Human | 1 | | | | | | | | | | **1** |
| | 143 | Human | | | | 1 | | | | | | | **1** |
| | 146 | Water | | 3 | | | | | | | | | **3** |
| | 146a var. | Human | | 1 | | | | | | | | | **1** |
| | 151 | Human | | 1 | | | | 4 | | | | | **5** |
| | 151 | Porcine | | | 1 | | | | | | | | **1** |
| | 153 | Human | 1 | | | | | | | | | | **1** |
| | 160 | Avian | | 3 | 5 | | 5 | | | | | | **13** |
| | 160 | Feline | | 1 | | | | | | | | | **1** |
| | 160 | Human | | 5 | | | | 3 | | | | | **8** |
| | 160 | Sparrow | | 4 | 1 | | | | | | | | **5** |
| | 164 | Porcine | | | 3 | | | | | | | | **3** |
| | 170 | Animal Feed | | | | | | 1 | | | | | **1** |
| | 170 | Bovine | | | | | 15 | 3 | | | | | **18** |
| | 170 | Canine | | | | | 1 | | | | | | **1** |
| | 170 | Chicken | | | | | 5 | 1 | | | | | **6** |
| | 170 | Food (Pork) | | | | | | 8 | | | | | **8** |
| | 170 | Human | | 1 | | 1 | | 27 | | 1 | | | **30** |
| | 170 | Porcine | | | | | | 18 | | 1 | | | **19** |
| | 170 | Unknown | | | | | | 2 | | | | | **2** |
| | 171 | Human | 1 | 2 | | 1 | | | | | | | **4** |
| | 186 | Bovine | | | | | 2 | | | | | | **2** |
| | 186 | Chicken | | | | | 1 | | | | | | **1** |
| | 186 | Porcine | | | | | 3 | | | | | | **3** |
| | 191 | Human | 1 | 3 | 1 | 2 | | 1 | | | | | **8** |
| | 192 | Human | 1 | | | | | | | | | | **1** |
| | 193 | Avian | | | | | | 3 | | | | | **3** |
| | 193 | Food (Chicken) | | 1 | | | | | | | | | **1** |
| | 193 | Food (Pork) | | | | | | 21 | | | | | **21** |
| | 193 | Human | 2 | 7 | | | | 4 | | | | | **13** |
| | 193 | Porcine | | | | | | 4 | | | | | **4** |
| | 193 | Poultry | | | | | | 1 | | | | | **1** |
| | 193 | Unknown | | | | | | 3 | | | | | **3** |
| | 194 | Avian | | | 1 | | | | | | | | **1** |
| | 194 | Chicken | | | | | | | | 1 | | | **1** |
| | 194 | Porcine | | | | 1 | | | | | | | **1** |
| | 195 | Avian | | | | | | 1 | | | | | **1** |
| | 195 | Human | | | | 1 | | 4 | 2 | | 1 | | **8** |

| Organism | PhageType | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Typhimurium | 204 | Human | | 1 | | | | | | | | | **1** |
| | 204a | Food (Pork) | | | | | | 1 | | | | | **1** |
| | 204c | Environmental Swab | | 1 | | | | | | | | | **1** |
| | 204c | Human | | | | | | 1 | | | | | **1** |
| | 208 | Bovine | | 2 | | 2 | 3 | 10 | | | | | **17** |
| | 208 | Chicken | | | | | | 2 | | | | | **2** |
| | 208 | Food (Bean Sprouts) | | | | | | 1 | | | | | **1** |
| | 208 | Food (Pork) | | | | | | 9 | | | | | **9** |
| | 208 | Human | 7 | 5 | | 1 | | 10 | | | | 2 | **25** |
| | 208 | Ovine | | 1 | | | | | | | | | **1** |
| | 208 | Porcine | | | | | 1 | 1 | | | | | **2** |
| | 208 | Unknown | | | | | | 1 | | | | | **1** |
| | 208 | Water | | 4 | | | | | | | | | **4** |
| | 208 var. | Avian | | | | 1 | | | | | | | **1** |
| | 208 var. | Bovine | 11 | 44 | | 12 | | | | | | | **67** |
| | 208 var. | Chicken | | 6 | | | 1 | | | | | | **7** |
| | 208 var. | Environmental Swab | | 1 | | | | | | | | | **1** |
| | 208 var. | Food (Bovine) | 1 | 1 | | | | | | | | | **2** |
| | 208 var. | Human | 7 | 31 | 3 | 10 | | 1 | | | | | **52** |
| | 208 var. | Porcine | | | | | 2 | 1 | | | | | **3** |
| | 208 var. | Tiger | 1 | | | | | | | | | | **1** |
| | 208 var. | Water | | 1 | | | | | | | | | **1** |
| | 812 | Human | 13 | | | | | | | | | | **13** |
| | U276 | Chicken | 1 | | | | | | | | | | **1** |
| | U284 | Avian | 2 | | 3 | | 2 | 13 | | | | | **20** |
| | U284 | Environmental Swab | 1 | | | | | | | | | | **1** |
| | U284 | Feline | | | | | | 6 | | | | | **6** |
| | U284 | Human | 7 | | | | | | 1 | | | | **8** |
| | U284 | Pine Siskin | 2 | | | | | | | | | | **2** |
| | U284 | Sparrow | | | 1 | | | | | | | | **1** |
| | U284 | Unknown | | | | | | 1 | | | | | **1** |
| | U284 var. | Animal Feed | | | | | | 1 | | | | | **1** |
| | U284 var. | Avian | 3 | 2 | 11 | | 37 | 1 | 1 | 1 | | | **56** |
| | U284 var. | Bovine | | | | | 2 | | | | | | **2** |
| | U284 var. | Feline | | 2 | | | 4 | 1 | | | | | **7** |
| | U284 var. | Hedgehog | | 1 | | | | | | | | | **1** |
| | U284 var. | Human | 2 | 9 | | 1 | | 9 | | | 1 | | **22** |
| | U284 var. | Unknown | | | | | | 109 | | | | | **109** |
| | U284 var. | Water | | 1 | | | | | | | | | **1** |
| | U285 | Bovine | | | | | | 1 | | | | | **1** |
| | U285 | Chicken | | 1 | | | | | | | | | **1** |
| | U285 | Human | 1 | | | 1 | | | | | | | **2** |
| | U285 | Unknown | | | | | | 1 | | | | | **1** |
| | U291 | Chicken | | | | | 1 | | | | | | **1** |
| | U292 | Human | | 1 | | | | | | | | | **1** |
| | U295 | Human | | | | | | | | | 1 | | **1** |
| | U297 | Snake | | 1 | | | | | | | | | **1** |
| | U301 | Chicken | | | | | | | | 1 | | | **1** |
| | U302 | Animal (Unspecified) | | | | | 1 | | | | | | **1** |

| Organism | PhageType | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Typhimurium | U302 | Avian | | | | | 2 | | | | | | **2** |
| | U302 | Bovine | | 1 | | | 2 | 2 | | | | | **5** |
| | U302 | Chicken | | | | | 1 | | | | | | **1** |
| | U302 | Equine | | | | | 1 | | | | | | **1** |
| | U302 | Food (Pork) | | | | | | 10 | | | | | **10** |
| | U302 | Food (Unspecified) | | | | | | 3 | | | | | **3** |
| | U302 | Human | 1 | 3 | | | | 24 | | | | | **28** |
| | U302 | Porcine | | | 1 | 3 | 2 | 18 | | | | | **24** |
| | U302 | Unknown | | | | | | 2 | | | | | **2** |
| | UT 1 | Animal (Unspecified) | | 1 | | | | | | | | | **1** |
| | UT 1 | Animal Feed | | 1 | | | | | | | | | **1** |
| | UT 1 | Bovine | | 9 | | | | | | | | | **9** |
| | UT 1 | Chicken | 2 | | | | | | | | | | **2** |
| | UT 1 | Feline | | 1 | | | | | | | | | **1** |
| | UT 1 | Human | 3 | 10 | 1 | | | 2 | | | | | **16** |
| | UT 1 | Poultry | | | | | | 1 | | | | | **1** |
| | UT 1 | Unknown | | 1 | | | | | | | | | **1** |
| | UT 2 | Bovine | 2 | 1 | | | | | | | | | **3** |
| | UT 2 | Chicken Litter | | 1 | | | | | | | | | **1** |
| | UT 2 | Human | 2 | 9 | | | | 2 | | | | | **13** |
| | UT 2 | Ovine | 1 | | | | | | | | | | **1** |
| | UT 3 | Avian | | | | | | 1 | | | | | **1** |
| | UT 3 | Human | 1 | | | | | | | | | | **1** |
| | UT 5 | Bovine | | 1 | | | | | | | | | **1** |
| | UT 5 | Pet Food | | 1 | | | | | | | | | **1** |
| | UT 6 | Human | | 1 | | | | | | | | | **1** |
| | UT 6 | Pet Food | | 2 | | | | | | | | | **2** |
| | UT 7 | Human | | 1 | | | | | | | | | **1** |
| | UT 7 | Pet Food | | 1 | | | | | | | | | **1** |
| | UT 8 | Food (Pork) | | | | | | 1 | | | | | **1** |
| | Atypical | Avian | | | 3 | | 1 | | | | | | **4** |
| | Atypical | Bovine | 1 | 1 | | 3 | 1 | | | | | | **6** |
| | Atypical | Chicken | | | | | 2 | | 2 | 14 | | | **18** |
| | Atypical | Human | 7 | 17 | 2 | 5 | | 4 | 1 | | 1 | | **37** |
| | Atypical | Porcine | | 1 | | | | | | | | | **1** |
| | Atypical | Water | | 3 | | | | | | | | | **3** |
| | Untypable | Animal (Unspecified) | | | | | | 1 | | | | | **1** |
| | Untypable | Animal Feed | | 1 | | | | | | | | | **1** |
| | Untypable | Bovine | | 8 | | 2 | 1 | | | | | | **11** |
| | Untypable | Chicken | | 2 | | | | 1 | | | | | **3** |
| | Untypable | Equine | | | | | 1 | | | | | | **1** |
| | Untypable | Porcine | | | 1 | 1 | 2 | 6 | | | | | **10** |
| | Untypable | Turkey | | | | | 1 | | | | | | **1** |
| | | | | | | | | | | | | | |
| | | Human Total | 144 | 236 | 34 | 48 | 6 | 228 | 12 | 10 | 10 | 3 | **731** |
| | | Non Human Total | 47 | 214 | 73 | 71 | 281 | 640 | 10 | 19 | 0 | 4 | **1359** |
| | | | | | | | | | | | | | |
| *Salmonella* ssp I | 2 | Avian | | | | | 3 | | | | | | **3** |
| 4,[5],12:i:- | 10 | Human | | 1 | | | | | | | | | **1** |

Annual Summary 2002 and 2003

| Organism | PhageType | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Salmonella* ssp I | 35 | Human | 1 | | | | | | | | | | **1** |
| 4,[5],12:i:- | 41 | Human | | | | 2 | | | | | | | **2** |
| | 82 | Human | | 1 | | | | | | | | | **1** |
| | 104a | Porcine | | | | | 1 | | | | | | **1** |
| | 116 | Human | 1 | | | | | | | | | | **1** |
| | 120 | Chicken | | 2 | | | | | | | | | **2** |
| | 121 | Chicken | 3 | | | | | | | | | | **3** |
| | 121 | Human | 1 | | | | | | | | | | **1** |
| | 121 | Raccoon | 1 | | | | | | | | | | **1** |
| | 146 | Avian | | | | | | | | | 1 | | **1** |
| | 146a var. | Chicken | | | 1 | | 1 | | | | | | **2** |
| | 146a var. | Human | 1 | | | 7 | | | | | | | **8** |
| | 160 | Avian | | | 1 | | | | | | | | **1** |
| | 160 | Turkey | | | | | 1 | | | | | | **1** |
| | 191 | Bovine | | | 9 | | | | | | | | **9** |
| | 191 | Chicken | | 4 | | | | | | | | | **4** |
| | 191 | Chicken Litter | | 1 | | | | | | | | | **1** |
| | 191 | Environmental Swab | 2 | 1 | | | | | | | | | **3** |
| | 191 | Human | 12 | 13 | 1 | 2 | | | | | | | **28** |
| | 191 | Porcine | 1 | | 1 | | | | | | | | **2** |
| | 191 var. | Bovine | | | 2 | | | | | | | | **2** |
| | 191 var. | Ovine | | | 1 | | | | | | | | **1** |
| | 193 | Environmental Swab | | 1 | | | | | | | | | **1** |
| | 193 | Human | 1 | | | | | | | | | | **1** |
| | 208 | Human | 1 | | | | | | | | | | **1** |
| | U284 var. | Avian | | | 3 | | | | | | | | **3** |
| | U284 var. | Human | | | 1 | | | | | | | | **1** |
| | U291 | Bovine | | 5 | | | 1 | | | | | | **6** |
| | U291 | Human | 1 | 5 | 1 | | | 1 | | 1 | | 1 | **10** |
| | U302 | Chicken | | | | | 1 | | | | | | **1** |
| | U302 | Human | | | | | | | 1 | | | | **1** |
| | UT 2 | Human | | 1 | | | | | | | | | **1** |
| | Atypical | Bovine | | | 2 | | 1 | | | | | | **3** |
| | Atypical | Chicken | | | 1 | | | | | | | | **1** |
| | Atypical | Human | 1 | 4 | 3 | | | | | | | | **8** |
| | Atypical | Turkey | | | 1 | | | | | | | | **1** |
| | Untypable | Porcine | | 1 | | | | 1 | | | | | **2** |
| | Untypable | Water | | 1 | | | | | | | | | **1** |
| | | | | | | | | | | | | | |
| | | Human Total | 20 | 25 | 6 | 11 | 0 | 1 | 1 | 1 | 0 | 1 | **66** |
| | | Non Human Total | 7 | 16 | 22 | 0 | 9 | 1 | 0 | 0 | 1 | 0 | **56** |

# Table 6: Phage Types of Various *Salmonella* Serovars in Canada, 2003

| Organism | Phage Type | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S.* Enteritidis | 1 | Human | 4 | 6 | 1 | 3 | 44 | 13 | 2 | | | 1 | **74** |
| | 1a | Human | | | | | 1 | | | | | | **1** |
| | 2 | Human | | 18 | | | | | | | | | **18** |
| | 2 | Porcine | | | 1 | | | | | | | | **1** |
| | 3 | Human | | 1 | | | 2 | | | | 1 | | **4** |
| | 4 | Avian | | | | | | 1 | | | | | **1** |
| | 4 | Food (Eggs) | | | | | | 4 | | | | | **4** |
| | 4 | Human | 12 | 21 | 2 | 3 | 104 | 41 | 2 | 6 | | 2 | **193** |
| | 4 | Unknown | | | | | | 9 | | | | | **9** |
| | 4a | Human | 1 | | | | 9 | 1 | | | | | **11** |
| | 4b | Human | | | | | 1 | 2 | | | | | **3** |
| | 5 | Human | | | | | | 1 | | | | | **1** |
| | 5a | Human | | 1 | | | 2 | 1 | | | | | **4** |
| | 5b | Human | | | | | 11 | 3 | | | | | **14** |
| | 5c | Human | | | | | 1 | | | | | | **1** |
| | 6 | Human | 1 | 3 | | | 2 | 4 | 1 | | | | **11** |
| | 6a | Human | | 3 | | | 5 | 1 | | | | | **9** |
| | 6b | Human | | | | | 1 | | | | | | **1** |
| | 7 | Human | | | | | 1 | | | | | | **1** |
| | 7 | Unknown | | | | | | 1 | | | | | **1** |
| | 8 | Cervid | | 1 | | | | | | | | | **1** |
| | 8 | Chicken | | 1 | | | 5 | | | | | | **6** |
| | 8 | Chicken Litter | | 1 | | | | | | | | | **1** |
| | 8 | Environmental Swab | 1 | 1 | | | | | | | | | **2** |
| | 8 | Human | 5 | 32 | | 1 | 28 | 14 | | 3 | | | **83** |
| | 8 | Human | | | | 1 | | | | | | | **1** |
| | 8 | Porcine | | 4 | | | | | | | | | **4** |
| | 8 | Poultry | | 1 | | | | | | | | | **1** |
| | 8 | Turkey | | | | | 1 | | | | | | **1** |
| | 8 | Unknown | 1 | | | | 1 | 1 | | | | | **3** |
| | 8 | Water | | 2 | | | | | | | | | **2** |
| | 9 | Human | | | | | 1 | | | | | | **1** |
| | 9c | Human | | 1 | | | | | | | | | **1** |
| | 11 | Human | 1 | | | | | | | | | | **1** |
| | 11b | Human | | 1 | 6 | 1 | | | | | | | **8** |
| | 11b | Porcine | | | | 1 | | | | | | | **1** |
| | 13 | Human | 6 | 4 | | 1 | 19 | 31 | 1 | 1 | | | **63** |
| | 13 | Poultry | | 1 | | | | | | | | | **1** |
| | 13 | Quail | | 1 | | | | | | | | | **1** |
| | 13 | Reptile | | | | | | | | | 1 | | **1** |
| | 13a | Human | 1 | 3 | | | 14 | 2 | | | 1 | | **21** |
| | 14b | Chicken | | | | | | 1 | | | | | **1** |
| | 14b | Human | 1 | 6 | | | 6 | 1 | | | | | **14** |
| | 14b | Turkey | | | | | 1 | | | | | | **1** |
| | 19 | Equine | | | | | 1 | | | | | | **1** |
| | 20 | Human | | | 2 | | | | | | | | **2** |
| | 21 | Human | 2 | 2 | | | 6 | 5 | 1 | 1 | | | **17** |

| Organism | Phage Type | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Enteritidis | 23 | Turkey | | | | | 1 | | | | | | **1** |
| | 24 | Bovine | | | | | 1 | | | | | | **1** |
| | 24 | Human | | | | | 3 | | | | | | **3** |
| | 28 | Human | | | | | 7 | 2 | | | | | **9** |
| | 29 | Human | 2 | 2 | | | 4 | 2 | | | | | **10** |
| | 30 | Human | | 1 | | | 1 | | | | | | **2** |
| | 33 | Human | 1 | 1 | | | 1 | | | | | | **3** |
| | 34 | Human | | | | | 5 | | | | | | **5** |
| | 35 | Human | | | 1 | | 1 | 1 | | | | | **3** |
| | 45 | Human | 1 | | | | | | | | | | **1** |
| | 911 | Chicken | | | | | | 5 | | | | | **5** |
| | 911 | Food (Chicken) | | | | | | 1 | | | | | **1** |
| | 911 | Human | 8 | | | | | 1 | | | | | **9** |
| | Atypical | Environmental Swab | | | | | | 1 | | | | | **1** |
| | Atypical | Hedgehog | | 2 | | | | | | | | | **2** |
| | Atypical | Human | 4 | 5 | 1 | 1 | 9 | 2 | | | | | **22** |
| | Atypical | Unknown | | | | | | 1 | | | | | **1** |
| | Untypable | Human | 2 | 4 | | | 4 | 1 | | | | | **11** |
| | | | | | | | | | | | | | |
| | | Human Total | 52 | 115 | 13 | 11 | 293 | 129 | 7 | 11 | 2 | 3 | **636** |
| | | Non Human Total | 2 | 15 | 1 | 1 | 11 | 25 | 0 | 0 | 1 | 0 | **56** |
| | | | | | | | | | | | | | |
| *S*. Hadar | 2 | Human | | 4 | 2 | | 16 | 11 | 2 | 1 | | | **36** |
| | 2 | Turkey | | 1 | | | | | | | | | **1** |
| | 4 | Human | | | | | 1 | | | | | | **1** |
| | 5 | Chicken Litter | | 1 | | | | | | | | | **1** |
| | 5 | Human | 1 | 11 | 10 | 1 | 3 | 2 | | 1 | | | **29** |
| | 9 | Human | 1 | | | | | | | | | | **1** |
| | 10 | Human | | 1 | | | | | | | | | **1** |
| | 11 | Human | 3 | 5 | | | 3 | | | | 1 | | **12** |
| | 11 | Pet Food | | 1 | | | | | | | | | **1** |
| | 18 | Human | 1 | | | | 1 | | | | | | **2** |
| | 21 | Human | 2 | | | | 2 | | | | | | **4** |
| | 26 | Human | | | | | | 4 | | | | | **4** |
| | 47 | Chicken Litter | | 2 | | | | | | | | | **2** |
| | 47 | Human | 2 | 7 | 3 | 1 | 3 | 1 | | | | | **17** |
| | 47 | Poultry | | 1 | | | | | | | | | **1** |
| | 51 | Human | | 1 | | | | | | | | | **1** |
| | 55 | Human | | | | | 2 | | | | | | **2** |
| | 56 | Human | 2 | 1 | | | | | | | | | **3** |
| | 58 | Human | 1 | 1 | | | 1 | | | | | | **3** |
| | Atypical | Human | | | | | 1 | | | | | | **1** |
| | Untypable | Human | | | | | 1 | | | | | | **1** |
| | | | | | | | | | | | | | |
| | | Human Total | 13 | 31 | 15 | 2 | 34 | 18 | 2 | 2 | 1 | 0 | **118** |
| | | Non Human Total | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **6** |
| | | | | | | | | | | | | | |
| *S*. Heidelberg | 1 | Human | 1 | | | | 1 | | | | | | **2** |
| | 2 | Human | | | | 3 | 1 | 1 | 2 | | | | **7** |

| Organism | Phage Type | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Heidelberg | 2 | Unknown | 1 | | | | | | | | | | **1** |
| | 4 | Avian | | | | | | 1 | | | | | **1** |
| | 4 | Food (Chicken) | | | | | 1 | 4 | | | | | **5** |
| | 4 | Human | | 3 | | | 12 | 25 | 7 | | | | **47** |
| | 4 | Porcine | | | | | | 1 | | | | | **1** |
| | 5 | Chicken | | | | | 1 | | | | | | **1** |
| | 5 | Chicken Litter | | 1 | | | | | | | | | **1** |
| | 5 | Environmental Swab | | | | | | | 1 | | | | **1** |
| | 5 | Human | | 1 | | 1 | 2 | 2 | | | | | **6** |
| | 5 | Poultry | | 1 | | | | | | | | | **1** |
| | 6 | Chicken | | | | | 1 | | | 1 | | | **2** |
| | 6 | Human | | 1 | 1 | | 8 | 3 | 2 | | | | **15** |
| | 6 | Porcine | | | | | | 1 | | | | | **1** |
| | 6 | Turkey | | | | | 1 | | | | | | **1** |
| | 6 | Unknown | | | | | | 1 | | | | | **1** |
| | 7 | Human | | | | | | | 1 | | | | **1** |
| | 8 | Chicken | | | | | 6 | 1 | | | | | **7** |
| | 8 | Food (Chicken) | | | | | 1 | | | | | | **1** |
| | 8 | Human | | | 2 | | 4 | 1 | | | | | **7** |
| | 8 | Porcine | | | | | 1 | | | | | | **1** |
| | 8 | Turkey | | | | | 1 | | | | | | **1** |
| | 8 | Unknown | 1 | | | | | | | | | | **1** |
| | 9 | Avian | | | | | 1 | | | | | | **1** |
| | 9 | Chicken | | | | 1 | 3 | | 1 | | | | **5** |
| | 9 | Equine | | | | | 1 | | | | | | **1** |
| | 9 | Human | | | | | 2 | | | | | | **2** |
| | 9 | Porcine | | | | | | 3 | | | | | **3** |
| | 9 | Turkey | | | | | 1 | | | | | | **1** |
| | 10 | Human | | | 1 | 3 | | | | | | | **4** |
| | 10 | Porcine | | 2 | | | | | | | | | **2** |
| | 11 | Animal (Unspecified) | | 1 | | | | | | | | | **1** |
| | 11 | Avian | | | | | 3 | | | | | | **3** |
| | 11 | Chicken | | | | | 102 | 2 | | | | | **104** |
| | 11 | Human | 1 | 3 | | 2 | 57 | 11 | | | | | **74** |
| | 12 | Chicken | | 2 | | | 20 | | | | | | **22** |
| | 12 | Food (Turkey) | | | | | 2 | | | | | | **2** |
| | 12 | Human | | | | | | 1 | | | | | **1** |
| | 12 | Turkey | | | | | 1 | | | | | | **1** |
| | 13 | Avian | | | | | 1 | | | | | | **1** |
| | 13 | Chicken | | | | | 3 | | | | | | **3** |
| | 13 | Human | | | | | 2 | | | | | | **2** |
| | 16 | Human | | | | | 1 | 1 | | | | | **2** |
| | 17 | Avian | | | | | 1 | | | | | | **1** |
| | 17 | Chicken | | 2 | | | 3 | | | | | | **5** |
| | 17 | Human | | | | 1 | 2 | | | | | | **3** |
| | 17 | Poultry | | 2 | | | | | | | | | **2** |
| | 17 | Unknown | | | | | 2 | | | | | | **2** |
| | 17 | Water | | 10 | | | | | | | | | **10** |
| | 18 | Avian | | | | | 4 | 1 | | | | | **5** |

| Organism | Phage Type | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Heidelberg | 18 | Bovine | | 1 | | | | | | | | | **1** |
| | 18 | Chicken | | 3 | 1 | | 6 | 1 | | 1 | | | **12** |
| | 18 | Food (Chicken) | | | | | 2 | 2 | | | | | **4** |
| | 18 | Human | | 2 | 1 | | 2 | | | | | | **5** |
| | 18 | Porcine | | 2 | | 1 | | | | | | | **3** |
| | 18 | Water | | 1 | | | | | | | | | **1** |
| | 19 | Avian | | | | | 5 | | 1 | | | | **6** |
| | 19 | Canine | | 2 | | | | | | | | | **2** |
| | 19 | Chicken | | 9 | | | 166 | 2 | 3 | 2 | | 1 | **183** |
| | 19 | Chicken Litter | | 10 | | | | | | | | | **10** |
| | 19 | Duck | | | | | 1 | | | | | | **1** |
| | 19 | Equine | | | | | 2 | | | | | | **2** |
| | 19 | Environmental Swab | | | | | | | 1 | | | | **1** |
| | 19 | Food (Bovine) | | | | | 8 | | | | | | **8** |
| | 19 | Food (Chicken) | | | | | 4 | | | | | | **4** |
| | 19 | Food (Milk) | | | | | 3 | | | | | | **3** |
| | 19 | Food (Turkey) | | | | | 1 | | | | | | **1** |
| | 19 | Human | 38 | 69 | 6 | 20 | 138 | 108 | 8 | 5 | 4 | 1 | **397** |
| | 19 | Porcine | | | | 1 | 1 | | | | | | **2** |
| | 19 | Poultry | | 5 | | | 2 | | | | | | **7** |
| | 19 | Turkey | | 1 | | | 1 | | | | | | **2** |
| | 19 | Unknown | 9 | | | | 1 | 4 | | | | | **14** |
| | 19a | Food (Chicken) | | | | | 1 | | | | | | **1** |
| | 19a | Human | | | | | 3 | 2 | | | | | **5** |
| | 20 | Canine | | | | | | | | | 1 | | **1** |
| | 20 | Chicken | | | | | 1 | | | | | | **1** |
| | 20 | Food (Chicken) | 1 | | | | | | | | | | **1** |
| | 20 | Human | | | | | 1 | 2 | | | | | **3** |
| | 21 | Human | | 2 | | | | | | | | | **2** |
| | 21 | Unknown | | | | | | 1 | | | | | **1** |
| | 22 | Human | | 3 | | | | | | | | | **3** |
| | 23 | Chicken | | | | | 1 | | | | | | **1** |
| | 24 | Human | | | | | | 1 | | | | | **1** |
| | 25 | Chicken | | | | | | 1 | | | | | **1** |
| | 26 | Avian | | | | | | 1 | | | | | **1** |
| | 26 | Chicken | | | | | 34 | 1 | | | | | **35** |
| | 26 | Food (Chicken) | 6 | 1 | | | | | | | | | **7** |
| | 26 | Human | 20 | 16 | | 4 | 30 | 35 | 1 | 2 | 1 | | **109** |
| | 26 | Turkey | | | | | 1 | | | | | | **1** |
| | 27 | Porcine | | | | | 2 | | | | | | **2** |
| | 27 | Turkey | | | | | 1 | | | | | | **1** |
| | 29 | Avian | | | | | 1 | 2 | | | | | **3** |
| | 29 | Chicken | 1 | 2 | | | 41 | | | 3 | | 1 | **48** |
| | 29 | Equine | | | | | 5 | | | | | | **5** |
| | 29 | Environmental Swab | | | | | 1 | | | | | | **1** |
| | 29 | Food (Chicken) | | 1 | | | 3 | 5 | | | | | **9** |
| | 29 | Food (Turkey) | | | | | 1 | | | | | | **1** |
| | 29 | Food (Unspecified) | | | | | | 1 | | | | | **1** |
| | 29 | Human | 3 | 17 | 1 | 4 | 38 | 55 | 1 | | | | **119** |

| Organism | Phage Type | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Heidelberg | 29 | Porcine | | | | | 1 | 15 | | | | | **16** |
| | 29 | Poultry | | 1 | | | | 2 | | | | | **3** |
| | 29 | Turkey | | | | | 1 | | | | | | **1** |
| | 30 | Chicken | | | | | 1 | | | | | | **1** |
| | 32 | Chicken | | | | | 9 | 5 | | | | | **14** |
| | 32 | Chicken Litter | | 1 | | | | | | | | | **1** |
| | 32 | Duck | | | | | 1 | | | | | | **1** |
| | 32 | Food (Chicken) | | | | | | 1 | | | | | **1** |
| | 32 | Food (Turkey) | | | | | 1 | | | | | | **1** |
| | 32 | Human | | 9 | 3 | | 12 | 17 | 14 | 1 | | | **56** |
| | 32 | Poultry | | 2 | | | | 1 | | | | | **3** |
| | 32 | Turkey | 1 | 2 | | | 34 | | | | | | **37** |
| | 32 | Unknown | | | | | | 1 | | | | | **1** |
| | 35 | Chicken | | | | | 6 | | | | | | **6** |
| | 35 | Equine | | | | | | | | | | 1 | **1** |
| | 35 | Environmental Swab | | | | | | | 1 | | | | **1** |
| | 35 | Food (Chicken) | | | | | | 1 | | | | | **1** |
| | 35 | Human | | 1 | | 2 | 9 | 21 | 13 | | 7 | | **53** |
| | 35 | Poultry | | | | | | 1 | | | | | **1** |
| | 36 | Chicken | | | | 1 | 8 | | 2 | | | 2 | **13** |
| | 36 | Chicken Litter | | 2 | | | | | | | | | **2** |
| | 36 | Environmental Swab | | | | | | | 1 | | | | **1** |
| | 36 | Human | | | 1 | | | 3 | | | | | **4** |
| | 36 | Unknown | 2 | | | | | 1 | | | | | **3** |
| | 37 | Human | | | | | 1 | | | | | | **1** |
| | 37 | Porcine | | | | | | 2 | | | | | **2** |
| | 39 | Human | | 3 | | | | | 1 | | | | **4** |
| | 39 | Turkey | | | | | 6 | | | | | | **6** |
| | 40 | Chicken | | | | | 13 | | | | | 10 | **23** |
| | 40 | Food (Chicken) | | | | | | | | | | 1 | **1** |
| | 40 | Human | 1 | | | 1 | | | | | | | **2** |
| | 41 | Chicken | | | | | 20 | | | | | 3 | **23** |
| | 41 | Human | 1 | 2 | 2 | | 36 | 10 | 1 | | | | **52** |
| | 41 | Turkey | | | | | 1 | | | | | | **1** |
| | 41 | Unknown | 1 | | | | | | | | | | **1** |
| | 42 | Human | | 2 | | | 1 | | | | | | **3** |
| | 44 | Chicken | | | | | 1 | | | | | | **1** |
| | 44 | Chicken Litter | | 1 | | | | | | | | | **1** |
| | 44 | Human | | 1 | | 1 | | 2 | | | | | **4** |
| | 45 | Human | | | 1 | 1 | | | | | | | **2** |
| | 46 | Chicken | | | | | 1 | | | | | | **1** |
| | 46 | Food (Chicken) | | | | | 1 | | | | | | **1** |
| | 46 | Porcine | | | 1 | | | | | | | | **1** |
| | 46 | Water | | 2 | | | | | | | | | **2** |
| | 47 | Bovine | | | | | | | | 1 | | | **1** |
| | 47 | Chicken | | | | | | | 1 | | | | **1** |
| | 47 | Human | | | | | 2 | 6 | | 2 | | | **10** |
| | 47 | Porcine | | | | | | 1 | | | | | **1** |
| | 47 | Turkey | | | | | 1 | | | 3 | | | **4** |

| Organism | Phage Type | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Heidelberg | 51 | Chicken | | | | | 1 | | | | | | **1** |
| | 51 | Food (Chicken) | | | | | 1 | | | | | | **1** |
| | 52 | Chicken | | | | 1 | | | | | | | **1** |
| | 52 | Food (Chicken) | | | | | 1 | | | | | | **1** |
| | 52 | Human | | 1 | | | | 2 | | | | | **3** |
| | 52 | Unknown | | | | | | 1 | | | | | **1** |
| | 53 | Human | | 1 | | | 1 | 4 | 2 | | | | **8** |
| | 54 | Bovine | 1 | | | | | | | | | | **1** |
| | 54 | Human | 11 | 2 | 2 | | | 1 | | | | | **16** |
| | 54 | Unknown | 2 | | | | | | | | | | **2** |
| | 55 | Human | | | | | 1 | 1 | | | | | **2** |
| | 56 | Human | | 3 | | | | | | | | | **3** |
| | Atypical | Avian | | | | | 1 | | | | | | **1** |
| | Atypical | Chicken | 2 | 3 | 1 | | 55 | 2 | 2 | | | 2 | **67** |
| | Atypical | Food (Chicken) | | | | | 3 | | | | | | **3** |
| | Atypical | Food (Turkey) | | | | | 1 | | | | | | **1** |
| | Atypical | Human | 2 | 2 | | | 7 | 6 | 3 | 1 | | | **21** |
| | Atypical | Porcine | | 1 | | 3 | | 1 | | | | | **5** |
| | Atypical | Poultry | | | | | 2 | | | | | | **2** |
| | Atypical | Turkey | | | | | 6 | | | | | | **6** |
| | Atypical | Unknown | | | | | | 7 | | | | | **1** |
| | Untypable | Chicken | 1 | | | 1 | 7 | | | | | | **9** |
| | Untypable | Human | 1 | | | | 1 | | | | | | **2** |
| | | | | | | | | | | | | | |
| | | Human Total | 79 | 144 | 21 | 43 | 375 | 321 | 56 | 11 | 12 | 1 | **1063** |
| | | Non Human Total | 29 | 74 | 3 | 9 | 641 | 72 | 14 | 11 | 1 | 21 | **875** |
| | | | | | | | | | | | | | |
| *S*. Infantis | 1 | Human | 1 | | | | 1 | 1 | | | | | **3** |
| | 3 | Human | | 1 | | | 2 | 1 | | | | | **4** |
| | 4 | Human | 3 | 4 | | | 3 | 1 | | | | | **11** |
| | 5 | Human | | | | | 1 | | | | | | **1** |
| | 6 | Human | | | | | 2 | | | | | | **2** |
| | 7 | Human | 2 | 1 | 1 | 1 | 5 | 3 | | 1 | | 1 | **15** |
| | 8 | Human | 1 | | 2 | | 7 | | | | 1 | | **11** |
| | 9 | Human | | 1 | | | 2 | | | | | | **3** |
| | 10 | Human | 1 | | | | | 1 | | | | | **2** |
| | 11 | Human | | 1 | | | | | | | | | **1** |
| | 13 | Human | 2 | | | | 2 | | | | | | **4** |
| | 26 | Human | 1 | | | | 3 | 2 | | | | | **6** |
| | | Human Total | 11 | 8 | 3 | 1 | 28 | 9 | 0 | 1 | 1 | 1 | **63** |
| | | | | | | | | | | | | | |
| *S*. Newport | 1 | Human | 1 | | | | 1 | | | 1 | | | **3** |
| | 2 | Human | 1 | 1 | | 1 | 11 | | | | | | **14** |
| | 3 | Human | 3 | | | | 14 | 1 | 1 | | | | **19** |
| | 4 | Human | 4 | 1 | 1 | | 5 | 1 | | | | 1 | **13** |
| | 6 | Human | | 2 | | | 2 | | | | | | **4** |
| | 9 | Human | 2 | 2 | | | 16 | 6 | | 2 | | | **28** |
| | 10 | Human | 1 | 1 | | | 7 | | | | | | **9** |
| | 13 | Human | 1 | 1 | | | 10 | 1 | | 1 | | | **14** |

| Organism | Phage Type | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Newport | 14 | Human | 1 | | | | 6 | | | | | | **7** |
| | 14a | Bovine | | | | | 27 | | | | | | **27** |
| | 14a | Human | | 3 | | 1 | 5 | | 1 | | | 1 | **11** |
| | 14b | Human | | | | 1 | | | | | | | **1** |
| | 14c | Human | 1 | | | | 1 | | | | | | **2** |
| | 15 | Human | 2 | 2 | | 2 | 6 | | | 3 | | | **15** |
| | 16 | Human | 1 | 4 | | | 13 | 3 | 1 | 1 | | 1 | **24** |
| | 17a | Human | | | | 1 | | | | | | | **1** |
| | 17b | Human | | | | | 2 | | | | | | **2** |
| | 17c | Human | | | | | 1 | | | | | | **1** |
| | Atypical | Human | | | 1 | | 3 | 2 | | | | | **6** |
| | Untypable | Human | 1 | | | | | | | | | | **1** |
| | Untypable | Unknown | 1 | | | | | | | | | | **1** |
| | | | | | | | | | | | | | |
| | | Human Total | 19 | 17 | 2 | 6 | 103 | 14 | 3 | 8 | 0 | 3 | **175** |
| | | Non Human Total | 1 | 0 | 0 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | **28** |
| | | | | | | | | | | | | | |
| *S*. Oranienburg | 1 | Human | 1 | | 2 | | 1 | | | | | | **4** |
| | 2 | Human | | 1 | | | | | | 5 | | | **6** |
| | 6 | Human | 2 | 2 | | 1 | 2 | | | 1 | | | **8** |
| | 7 | Human | | | | | | | 1 | | | | **1** |
| | 8 | Human | 1 | 1 | | 1 | 4 | | | 35 | | 2 | **44** |
| | 13 | Human | 2 | | | | | | | | | | **2** |
| | 15 | Human | | | 1 | | 1 | 2 | | | | | **4** |
| | 17 | Human | | | | | 1 | | | | | | **1** |
| | Atypical | Human | | | | | 1 | | | | | | **1** |
| | | Human Total | 6 | 4 | 3 | 2 | 10 | 2 | 1 | 41 | 0 | 2 | **71** |
| | | | | | | | | | | | | | |
| *S*. Panama | A | Human | | | | | | 3 | | | | | **3** |
| | D | Human | | | | | 1 | | | | | | **1** |
| | G | Animal (Unspecified) | | 1 | | | | | | | | | **1** |
| | G | Human | | | | | 1 | | | | | | **1** |
| | Untypable | Human | 1 | | | | | | | | | | **1** |
| | | | | | | | | | | | | | |
| | | Human Total | 1 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | **6** |
| | | Non Human Total | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| | | | | | | | | | | | | | |
| *S*. Paratyphi B | 1 var. 1 | Human | | | | | 1 | | | | | | **1** |
| var. Java | 1 var. 3 | Human | | | | | | 1 | | | | | **1** |
| | 1 var. 3 | Unknown | | | | | | 4 | | | | | **4** |
| | 1 var. 6 | Human | | | | | | 2 | | | | | **2** |
| | 3b var. 2 | Human | | | | | 1 | | | | | | **1** |
| | 3b var. 3 | Human | | | | | | 2 | | | | | **2** |
| | 3b var. 7 | Human | | | | | | 1 | | | | | **1** |
| | Battersea | Human | | 1 | | | | 1 | | | | | **2** |
| | Dundee | Human | 1 | | | | 1 | 1 | | | | | **3** |
| | Dundee | Unknown | | | | | | 6 | | | | | **6** |
| | Worksop | Human | | 1 | | 3 | 2 | 1 | | | | | **7** |
| | Atypical | Human | 1 | 1 | | | 4 | 21 | 1 | | 1 | 1 | **30** |

| Organism | Phage Type | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Paratyphi B | Atypical | Python | | 1 | | | | | | | | | **1** |
| var. Java | Atypical | Snake | | 1 | | | | | | | | | **1** |
| | Atypical | Unknown | | | | | | 23 | | | | | **23** |
| | | | | | | | | | | | | | |
| | | Human Total | 2 | 3 | 0 | 3 | 9 | 30 | 1 | 0 | 1 | 1 | **50** |
| | | Non Human Total | 0 | 2 | 0 | 0 | 0 | 33 | 0 | 0 | 0 | 0 | **35** |
| | | | | | | | | | | | | | |
| *Salmonella* ssp I | 1 var. 5 | Human | | | | | 2 | | | | | | **2** |
| 4,[5],12:b:- | 3 var. | Human | | | | | 1 | | | | | | **1** |
| | 3b var. 2 | Human | | | | | 9 | 1 | | | | | **10** |
| | Battersea | Human | | | | 1 | 2 | | | | | | **3** |
| | Dundee | Human | | | | | 1 | | | | | | **1** |
| | Dundee var.2 | Human | | | | | 21 | | 1 | | | | **22** |
| | Untypable | Human | 5 | | | | 1 | 2 | | | | | **8** |
| | Worksop | Human | | | | | 2 | | | | | | **2** |
| | Atypical | Human | | | | 1 | 3 | | | | | | **4** |
| | | | | | | | | | | | | | |
| | | Human Total | 5 | 0 | 0 | 2 | 42 | 3 | 1 | 0 | 0 | 0 | **53** |
| | | | | | | | | | | | | | |
| *S*. Thompson | 1 | Human | | 1 | | 1 | 2 | 8 | | | | | **12** |
| | 2 | Human | | 2 | | | 2 | | | | | | **4** |
| | 3 | Human | 1 | 3 | | 1 | 19 | 8 | 2 | | | | **34** |
| | 5 | Human | 1 | | | | 10 | | | 2 | | | **13** |
| | 8 | Human | | | | | 1 | | | | | | **1** |
| | 25 | Human | 1 | 1 | | | | 3 | | | | | **5** |
| | 26 | Avian | | | 2 | | | | | | | | **2** |
| | 26 | Chicken | | 1 | | | | | | | | | **1** |
| | 26 | Human | 1 | | | 2 | 1 | 1 | | 13 | | | **18** |
| | Atypical | Human | | | | | | | 1 | | | | **1** |
| | | | | | | | | | | | | | |
| | | Human Total | 4 | 7 | 0 | 4 | 35 | 20 | 3 | 15 | 0 | 0 | **88** |
| | | Non Human Total | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **3** |
| | | | | | | | | | | | | | |
| *S*. Typhi | A | Human | 3 | 1 | | | 3 | 1 | 1 | | | | **9** |
| | B1 | Human | | | | | 5 | | | | | | **5** |
| | B2 | Human | 1 | 1 | | | | 1 | | | | | **3** |
| | C1 | Human | | | | | 1 | | | | | | **1** |
| | D1 | Human | | | | | 2 | 2 | | | | | **4** |
| | D2 | Human | | | | | 1 | | | | | | **1** |
| | DVS | Human | 1 | | | | 2 | | | | | | **3** |
| | E1 | Human | 14 | 5 | | 1 | 26 | 5 | | | | | **51** |
| | E2 | Human | 1 | | | | | | | | | | **1** |
| | E9 | Human | 6 | 1 | | | 1 | | | | | | **8** |
| | E14 | Human | 4 | 1 | | | 1 | 1 | | | | | **7** |
| | F9 | Human | | | | | | 1 | | | | | **1** |
| | J1 | Human | | | | | | 2 | | | | | **2** |
| | K1 | Human | 1 | | | | | | | | | | **1** |
| | M1 | Human | | 3 | | | | 1 | | | | | **4** |
| | O | Human | 2 | 1 | | | 3 | | | | | | **6** |

| Organism | Phage Type | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Typhi | 36 | Human | | | | | 1 | | | | | | **1** |
| | 38 | Human | | 1 | | | | | | | | | **1** |
| | 40 | Human | | | | | 1 | | | | | | **1** |
| | 46 | Human | | | | | | 1 | | | | | **1** |
| | 53 | Human | | | | | | 1 | | | | | **1** |
| | 54 | Human | | | | | 1 | | | | | | **1** |
| | UVS-(I+IV) | Human | | | | | 2 | 1 | | | | | **3** |
| | Untypable | Human | 3 | | | | 5 | 1 | | | | | **9** |
| | | Human Total | 36 | 14 | 0 | 1 | 55 | 18 | 1 | 0 | 0 | 0 | **125** |
| | | | | | | | | | | | | | |
| *S*. Typhimurium | 1 | Avian | | | 1 | | | | | | 1 | | **2** |
| | 1 | Bovine | | | | | 1 | | | | | | **1** |
| | 1 | Equine | | | | 1 | | | | | | | **1** |
| | 1 | Food (Pork) | | | | | | 1 | | | | | **1** |
| | 1 | Human | 1 | 5 | 3 | 3 | 2 | 4 | | | | | **18** |
| | 1 | Poultry | | | | | | 1 | | | | | **1** |
| | 1 | Water | | 7 | | | | | | | | | **7** |
| | 2 | Animal (Unspecified) | | | | | | 1 | | | | | **1** |
| | 2 | Avian | | | | | 2 | | | | | | **2** |
| | 2 | Bovine | | | | | 6 | | | | | | **6** |
| | 2 | Chicken | | | | | 1 | | | | | | **1** |
| | 2 | Human | 2 | 9 | | 4 | 9 | 5 | | 1 | 1 | | **31** |
| | 2 | Unknown | 2 | | | | | | | | | | **2** |
| | 3 aero. | Human | | | | | 1 | | | | | | **1** |
| | 4 | Human | 1 | | | | | | | | | | **1** |
| | 5 | Human | | | | | | | 1 | | | | **1** |
| | 8 | Human | | | | | 1 | | | | | | **1** |
| | 10 | Avian | | | | | | 1 | | | | | **1** |
| | 10 | Chicken | | | | | 21 | | | | | | **21** |
| | 10 | Environmental Swab | 1 | | | | | | | | | | **1** |
| | 10 | Human | 1 | 2 | | | 18 | | | 1 | | | **22** |
| | 10 | Poultry | | | | | | 2 | | | | | **2** |
| | 10 | Unknown | 1 | | | | | 2 | | | | | **3** |
| | 12 | Bovine | | | | | | 5 | | | | | **5** |
| | 12 | Food (Pork) | | | | | | 35 | | | | | **35** |
| | 12 | Human | | | | 1 | 2 | 10 | | | | | **13** |
| | 12 | Porcine | | | | 8 | 3 | 10 | | | | | **21** |
| | 12 | Unknown | | | | | | 5 | | | | | **5** |
| | 12a | Bovine | | | | | | 1 | | | | | **1** |
| | 12a | Human | | | 1 | | | 1 | | | | | **2** |
| | 20 | Human | | 1 | | | | | | | | | **1** |
| | 21 | Bovine | | | | | | | | 1 | | | **1** |
| | 21 | Human | | | | 1 | 1 | | | | | | **2** |
| | 21 | Porcine | | | | | 1 | | | | | | **1** |
| | 22 | Avian | | | | 1 | | | | | | | **1** |
| | 22 | Human | | | | | | | 1 | | 1 | | **2** |
| | 22 | Porcine | | 3 | 6 | | | | | | | | **9** |
| | 22 | Unknown | | | | | | 2 | | | | | **2** |
| | 27 | Human | | | | | 1 | 3 | | | | | **4** |

| Organism | Phage Type | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Typhimurium | 27 | Porcine | | | 1 | | | | | | | | **1** |
| | 29 | Human | | | | | 1 | | | | | | **1** |
| | 35 | Chicken | | | | | | 1 | | | | | **1** |
| | 35 | Environmental Swab | | | | | 4 | | | | | | **4** |
| | 35 | Equine | | | | | 5 | | | | | | **5** |
| | 35 | Porcine | | 1 | | | 3 | | | | | | **4** |
| | 36 | Human | | | | | 1 | | | | | | **1** |
| | 37 | Bovine | | | | | 2 | | | | | | **2** |
| | 39 | Food (Unspecified) | | | | | | 1 | | | | | **1** |
| | 40 | Animal Feed | | | | | | | 1 | 1 | | | **2** |
| | 40 | Human | 1 | 1 | | | 2 | | | | | | **4** |
| | 40 | Poultry | | | | | | 1 | | | | | **1** |
| | 41 | Avian | | | | | | | 1 | | | | **1** |
| | 41 | Chicken | | | | | | 1 | | | | | **1** |
| | 41 | Human | | | | 1 | 6 | | | | 1 | | **8** |
| | 41a | Human | | 1 | | | | | | | | | **1** |
| | 42 | Human | | | | | 1 | | | | | | **1** |
| | 42 var. | Porcine | | | | | 1 | | | | | | **1** |
| | 46 | Chicken | | | | | | | 1 | | | | **1** |
| | 46 | Human | 1 | 35 | | 1 | 2 | 1 | 2 | | | | **42** |
| | 46 | Poultry | | 1 | | | | 1 | | | | | **2** |
| | 46 | Unknown | | | | | | 2 | | | | | **2** |
| | 49 | Human | 8 | | | | | 1 | | | | | **9** |
| | 51 | Human | | 1 | | | 1 | | | | | | **2** |
| | 56 | Human | | 2 | | | | | | | | | **2** |
| | 66 | Bovine | | | | | 1 | | | | | | **1** |
| | 66 | Human | | | | | 1 | 1 | | | | | **2** |
| | 69 | Chicken | | | | | 1 | | | | | | **1** |
| | 69 | Human | | | | | 7 | 1 | | | | | **8** |
| | 69 | Porcine | | | | | 1 | | | | | | **1** |
| | 73 var. | Porcine | | | | | 1 | 2 | | | | | **3** |
| | 76 | Human | | | | | 1 | | | | | | **1** |
| | 82 | Human | | | | | 2 | | | | | | **2** |
| | 94 | Human | | 4 | | | 2 | | | | | | **6** |
| | 94 | Poultry | | | | | | 1 | | | | | **1** |
| | 95 | Human | | | | 1 | | | | | | | **1** |
| | 97 var. | Environmental Swab | | | | | 1 | | | | | | **1** |
| | 97 var. | Porcine | | | | | 1 | | | | | | **1** |
| | 99 | Duck | | | | | 3 | | | | | | **3** |
| | 99 | Equine | | | | | 1 | | | | | | **1** |
| | 99 | Feline | | | | 1 | | | | | | | **1** |
| | 99 | Human | | | | | 2 | 1 | | | | | **3** |
| | 99 | Porcine | | | | | 1 | 1 | | | | | **2** |
| | 100 | Porcine | | | | | 1 | | | | | | **1** |
| | 104 | Animal (Unspecified) | | | | | 2 | | | | | | **2** |
| | 104 | Avian | | | | | 1 | | | | | | **1** |
| | 104 | Bison | | | | | 1 | | | | | | **1** |
| | 104 | Bovine | 3 | 20 | | 3 | 32 | 4 | | | | | **62** |
| | 104 | Canine | | | | 1 | | | | | | | **1** |

| Organism | Phage Type | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Typhimurium | 104 | Chicken | | 5 | | | 28 | | | | | | **33** |
| | 104 | Chicken Litter | | 2 | | | | | | | | | **2** |
| | 104 | Environmental Swab | | 2 | | | 2 | | | | | | **4** |
| | 104 | Equine | | 1 | | | 9 | | | | | | **10** |
| | 104 | Feline | | | | 1 | | 1 | | | | | **2** |
| | 104 | Food (Beef) | | | | | | 1 | | | | | **1** |
| | 104 | Food (Bovine) | | | | | 3 | 1 | | | | | **4** |
| | 104 | Food (Porcine) | | | | | 3 | | | | | | **3** |
| | 104 | Food (Pork) | | | | | | 66 | | | | | **66** |
| | 104 | Food (Unspecified) | | | | | | 1 | | | | | **1** |
| | 104 | Human | 9 | 59 | 9 | 14 | 77 | 39 | 4 | 4 | | 2 | **217** |
| | 104 | Mouse | | 1 | | | | | | | | | **1** |
| | 104 | Ovine | | | 5 | | 2 | | | | | | **7** |
| | 104 | Porcine | | 6 | 9 | 4 | 71 | 22 | | | | | **112** |
| | 104 | Poultry | | 1 | | | | | | | | | **1** |
| | 104 | Snake | | 1 | | | | | | | | | **1** |
| | 104 | Unknown | 4 | | | | | 6 | | | | | **10** |
| | 104 | Water | | 23 | | | | | | | | | **23** |
| | 104a | Bovine | | | | | | | 1 | 1 | | | **2** |
| | 104a | Chicken | | | | | | 1 | | | | | **1** |
| | 104a | Food (Broccoli) | | | | | 1 | | | | | | **1** |
| | 104a | Food (Pork) | | | | | | 43 | | | | | **43** |
| | 104a | Human | | | | | 7 | 11 | | 1 | | | **19** |
| | 104a | Porcine | | | 1 | | 17 | 30 | | | | | **48** |
| | 104a | Unknown | | | | | | 3 | | | | | **3** |
| | 104b | Animal (Unspecified) | | | | | 1 | | | | | | **1** |
| | 104b | Bovine | | | | | | 1 | | | | | **1** |
| | 104b | Environmental Swab | | | | | 2 | | | | | | **2** |
| | 104b | Equine | | | | | 2 | | | | | | **2** |
| | 104b | Food (Pork) | | | | | | 5 | | | | | **5** |
| | 104b | Human | | 1 | | 1 | 14 | 4 | 1 | | | | **21** |
| | 104b | Porcine | | | | 1 | 18 | 1 | | | | | **20** |
| | 104b | Unknown | | | | | | 1 | | | | | **1** |
| | 104c | Equine | | | | | 1 | | | | | | **1** |
| | 104c | Human | | | | | 2 | | | | | | **2** |
| | 106 | Human | | 1 | | | | 1 | | | | | **2** |
| | 106 var. | Human | | | | | | 1 | | | | | **1** |
| | 107 | Avian | | | | 9 | | | 2 | | | | **11** |
| | 107 | Bovine | | | | | | 4 | | | | | **4** |
| | 107 | Chicken | | | | 2 | 2 | 3 | 2 | | | | **9** |
| | 107 | Human | 1 | 1 | 1 | 6 | 8 | 13 | | 1 | | | **31** |
| | 107 | Poultry | | | | | | 18 | | | | | **18** |
| | 107 | Unknown | | | | | | 6 | | | | | **6** |
| | 108 | Avian | | | | | 2 | | | | | | **2** |
| | 108 | Bovine | | | | | 3 | | | | | | **3** |
| | 108 | Chicken | | | | | 1 | | | | | | **1** |
| | 108 | Food (Pork) | | | | | | 2 | | | | | **2** |
| | 108 | Human | | | | | 13 | 9 | | 2 | 1 | | **25** |
| | 108 | Porcine | | | 15 | 6 | 5 | 11 | | | | | **37** |

| Organism | Phage Type | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Typhimurium | 108 | Unknown | | | | | | 2 | | | | | **2** |
| | 110 | Human | | 3 | | | | | | | | | **3** |
| | 110 | Porcine | | 1 | | | | | | | | | **1** |
| | 110b | Chicken | | | | | 1 | | | | | | **1** |
| | 110b | Food (Pork) | | | | | | 5 | | | | | **5** |
| | 110b | Human | 1 | 2 | | | 1 | 4 | | | | | **8** |
| | 110b | Porcine | | | | | | 1 | | | | | **1** |
| | 110b | Unknown | | | | | | 1 | | | | | **1** |
| | 120 | Equine | | | | | 1 | | | | | | **1** |
| | 120 | Food (Pork) | | | | | | 1 | | | | | **1** |
| | 120 | Human | | 1 | | | | 2 | | | | | **3** |
| | 120 | Unknown | | | | | | 1 | | | | | **1** |
| | 120 | Water | | 1 | | | | | | | | | **1** |
| | 121 | Unknown | 1 | | | | | | | | | | **1** |
| | 124 | Animal Feed | | | | | | | 1 | | | | **1** |
| | 124 | Avian | | | | | 1 | | | | | | **1** |
| | 124 | Human | | | | | 1 | | | | | | **1** |
| | 124 | Porcine | | | | 1 | | | | | | | **1** |
| | 124 var. | Food (Pork) | | | | | | 1 | | | | | **1** |
| | 124 var. | Human | 1 | 7 | | 3 | 21 | 3 | | | 1 | 1 | **37** |
| | 124 var. | Unknown | | | | | | 1 | | | | | **1** |
| | 125 | Human | | 1 | | | | | | | | | **1** |
| | 127 | Human | | | | | | | | 2 | | | **2** |
| | 132 | Animal Feed | | | | | | 3 | | | | | **3** |
| | 132 | Bovine | | | | | 2 | | | | | | **2** |
| | 132 | Chicken | | | | | | 1 | | | | | **1** |
| | 132 | Environmental Swab | | 1 | | | | 2 | | | | | **3** |
| | 132 | Food (Bovine) | | | | | 1 | | | | | | **1** |
| | 132 | Food (Crab) | | | | | | | | 3 | | | **3** |
| | 132 | Food (Shrimp) | | | | | 1 | | | | | | **1** |
| | 132 | Unknown | | | | | | 1 | | | | | **1** |
| | 132 | Water | | 9 | | | | | | | | | **9** |
| | 135 | Human | 6 | | | 1 | 3 | 1 | | | | | **11** |
| | 135 | Porcine | | | | | 1 | | | | | | **1** |
| | 136 | Human | | | | | 1 | | | | | | **1** |
| | 140 var. | Bovine | | | | 37 | 2 | | | | | | **39** |
| | 140 var. | Environmental Swab | | | | 1 | | | | | | | **1** |
| | 140 var. | Ovine | | | | 1 | | | | | | | **1** |
| | 146 | Human | 1 | | | | 1 | 1 | | | | | **3** |
| | 146 | Porcine | | | | | 1 | | | | | | **1** |
| | 146 var. | Porcine | | | | | 1 | | | | | | **1** |
| | 146a | Human | | 2 | | | | | | | | | **2** |
| | 146a var. | Human | | 2 | 1 | 1 | 1 | | | | | | **5** |
| | 146a var. | Unknown | | | | | | 1 | | | | | **1** |
| | 151 | Human | | 1 | | | | | | | | | **1** |
| | 160 | Feline | | 2 | | | | | | | | | **2** |
| | 160 | Human | | 9 | 1 | | 3 | 1 | | | | | **14** |
| | 160 | Poultry | | | | | | 2 | | | | | **2** |
| | 160 | Turkey | | | | | 1 | | | | | | **1** |

| Organism | Phage Type | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Typhimurium | 162 var. | Human | | | | | 1 | | | | | | **1** |
| | 164 | Food (Unspecified) | 1 | | | | | | | | | | **1** |
| | 164 | Human | 18 | 1 | | | | | | | | | **19** |
| | 164 | Unknown | 1 | | | | | | | | | | **1** |
| | 169 | Porcine | | | | | | 2 | | | | | **2** |
| | 170 | Bovine | | | | | 1 | 3 | | | | | **4** |
| | 170 | Chicken | | | | | 1 | | | | | | **1** |
| | 170 | Food (Pork) | | | | | | 6 | | | | | **6** |
| | 170 | Human | 1 | 1 | | | 12 | 14 | 3 | 1 | | | **32** |
| | 170 | Porcine | | | | | 2 | 17 | | 1 | | | **20** |
| | 170 | Unknown | | | | | | 2 | | | | | **2** |
| | 171 | Human | | 1 | | | | | | | | | **1** |
| | 186 | Porcine | | | | | 1 | 2 | | | | | **3** |
| | 191 | Chicken | | | 1 | | | | | | | | **1** |
| | 191 | Human | | 1 | | | 1 | | | | | | **2** |
| | 193 | Bovine | | | | | | 1 | | | | | **1** |
| | 193 | Canine | | | | 1 | | | | | | | **1** |
| | 193 | Chicken | | | | | 2 | | | | | | **2** |
| | 193 | Food (Pork) | | | | | | 14 | | | | | **14** |
| | 193 | Human | 2 | 2 | | | 12 | 16 | | | | 1 | **33** |
| | 193 | Porcine | | | | | 1 | 3 | | | | | **4** |
| | 193 | Unknown | 1 | | | | | 2 | | | | | **3** |
| | 195 | Animal Feed | | | | | | | | 1 | | | **1** |
| | 195 | Avian | | | | | | | | | | 1 | **1** |
| | 195 | Bovine | | | | | | 3 | | | | | **3** |
| | 195 | Human | | | | | 9 | 4 | | | | | **13** |
| | 203 | Food (Eggs) | | | | | | 1 | | | | | **1** |
| | 203 | Human | | | | 1 | | | | | | | **1** |
| | 204c | Animal Feed | | | | | 1 | | | | | | **1** |
| | 204c | Human | | | | | | 1 | | | | | **1** |
| | 204c | Porcine | | | | | 1 | | | | | | **1** |
| | 206 | Human | | | 1 | | | | | | | | **1** |
| | 206 var. | Environmental Swab | | 1 | | | | | | | | | **1** |
| | 208 | Bovine | | 3 | | 3 | 1 | | 1 | | | | **8** |
| | 208 | Food (Pork) | | | | | | 2 | | | | | **2** |
| | 208 | Human | 1 | 4 | | | 11 | 7 | 1 | | | | **24** |
| | 208 | Ovine | | 1 | | | | | | | | | **1** |
| | 208 | Porcine | | 1 | | | 22 | 14 | | | 1 | | **38** |
| | 208 | Unknown | | | | | | 1 | | | | | **1** |
| | 208 | Water | | 4 | | | | | | | | | **4** |
| | 208 var. | Bovine | 1 | 18 | | 4 | | 1 | | | | | **24** |
| | 208 var. | Chicken | | 1 | | | | | | | | | **1** |
| | 208 var. | Equine | | | | 1 | | | | | | | **1** |
| | 208 var. | Food (Pork) | | | | | | 3 | | | | | **3** |
| | 208 var. | Human | 1 | 25 | | 2 | 16 | | 1 | | 2 | | **47** |
| | 208 var. | Porcine | | | | | | 2 | | | | | **2** |
| | 208 var. | Unknown | 1 | | | | | | | | | | **1** |
| | 208 var. | Water | | 3 | | | | | | | | | **3** |
| | 812 | Human | | 1 | | | | | | | | | **1** |

Annual Summary 2002 and 2003

| Organism | Phage Type | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S*. Typhimurium | U275 var. | Porcine | | | | | 3 | | | | | | **3** |
| | U276 | Human | 9 | 4 | 1 | 1 | 1 | 2 | | | 1 | | **19** |
| | U276 | Unknown | 4 | | | | | | | | | | **4** |
| | U279 | Human | | | | | 1 | | | | | | **1** |
| | U284 | Human | | 1 | | | | | | | | | **1** |
| | U284 var. | Avian | | | | | 1 | | | | | | **1** |
| | U284 var. | Hedgehog | | 1 | | | | | | | | | **1** |
| | U284 var. | Human | 5 | 5 | | | | | 1 | | | | **11** |
| | U284 var. | Water | | 3 | | | | | | | | | **3** |
| | U285 | Chicken | | | | | | | | | | 2 | **2** |
| | U285 | Human | | | 1 | | 6 | 1 | | | | | **8** |
| | U285 | Poultry | | | | | | 1 | | | | | **1** |
| | U285 | Unknown | | | | | | 2 | | | | | **2** |
| | U291 | Bovine | | | | | 1 | | | | | | **1** |
| | U291 | Porcine | | | | 1 | | 1 | | | | | **2** |
| | U292 | Chicken | | | 1 | | | | | | | | **1** |
| | U292 | Human | | 1 | 2 | | | | | | | | **3** |
| | U301 | Chicken | | 1 | | | 3 | | | 1 | | | **5** |
| | U302 | Bovine | | | | | | 2 | | | | | **2** |
| | U302 | Chicken | | | | | 1 | | | | | | **1** |
| | U302 | Duck | | | | | 1 | | | | | | **1** |
| | U302 | Food (Pork) | | | | | | 21 | | | | | **21** |
| | U302 | Human | | 2 | | | 10 | 15 | | | | | **27** |
| | U302 | Porcine | | | | 1 | 6 | 10 | | | | | **17** |
| | U302 | Unknown | | | | | | 3 | | | | | **3** |
| | UT 1 | Bovine | | 7 | | | | | | | | | **7** |
| | UT 1 | Environmental Swab | | 1 | | | | | | | | | **1** |
| | UT 1 | Human | 2 | 12 | | 1 | 1 | 3 | | | | | **19** |
| | UT 1 | Unknown | 1 | | | | | | | | | | **1** |
| | UT 2 | Bovine | | 2 | | | | | | | | | **2** |
| | UT 2 | Human | | 5 | | | 2 | | | 1 | | | **8** |
| | UT 3 | Avian | | | | | | 1 | | | | | **1** |
| | UT 5 | Bovine | | 4 | | | | | | | | | **4** |
| | UT 7 | Human | | 2 | | | 1 | | | | | | **3** |
| | Atypical | Equine | | | | | 2 | | | | | | **2** |
| | Atypical | Human | 2 | 5 | | 3 | 9 | 10 | 1 | 2 | | | **32** |
| | Atypical | Unknown | 1 | | | | | | | | | | **1** |
| | Untypable | Avian | | 1 | | | | | | | | | **1** |
| | Untypable | Bovine | | 14 | | 1 | | | | | | | **15** |
| | Untypable | Chicken | 1 | 1 | | | 1 | | | | | | **3** |
| | Untypable | Feline | | 1 | | | | | | | | | **1** |
| | Untypable | Food (Pork) | | | | | | 1 | | | | | **1** |
| | Untypable | Human | | | | | | 1 | | | | | **1** |
| | Untypable | Porcine | | 2 | 1 | | 5 | 2 | | | | | **10** |
| | Untypable | Water | | 3 | | | | | | | | | **3** |
| | | | | | | | | | | | | | |
| | | Human Total | 75 | 224 | 21 | 46 | 310 | 192 | 16 | 16 | 8 | 4 | **912** |
| | | Non Human Total | 24 | 161 | 41 | 90 | 341 | 454 | 10 | 9 | 2 | 3 | **1135** |
| | | | | | | | | | | | | | |

| Organism | Phage Type | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Salmonella* ssp I | 1 | Avian | | | | | | | | | 3 | | **3** |
| 4,[5],12:i:- | 1 | Human | | 1 | | | | | | | | | **1** |
| | 2 | Avian | | | | | 2 | | | | | | **2** |
| | 20 | Animal Feed | | 1 | | | | | | | | | **1** |
| | 22 | Porcine | | 1 | | | | | | | | | **1** |
| | 104 | Human | 1 | | | | | | | | | | **1** |
| | 104b | Turkey | | | | | 1 | | | | | | **1** |
| | 107 | Human | | | | | | | | 1 | | | **1** |
| | 120 | Chicken | | 5 | | | | | | | | | **5** |
| | 121 | Avian | 3 | | | | | | | | | | **3** |
| | 121 | Human | 2 | | | | | | | | | | **2** |
| | 146 | Human | 1 | | | | | | | | | | **1** |
| | 146a var. | Chicken | | | | | 1 | | | | | | **1** |
| | 191 | Avian | | | | | | | | | 2 | | **2** |
| | 191 | Chicken | 2 | | | | 4 | | | | | | **6** |
| | 191 | Equine | | | | | 1 | | | | | | **1** |
| | 191 | Feline | | | | | | | | | | 1 | **1** |
| | 191 | Food (Chicken) | | | | | | | | | | 1 | **1** |
| | 191 | Human | 1 | 8 | 2 | 1 | 5 | 2 | 2 | | | | **21** |
| | 191 var. | Porcine | | | 2 | | | | | | | | **2** |
| | 193 | Chicken Litter | | 1 | | | | | | | | | **1** |
| | 193 | Human | | | | | | | | | | 1 | **1** |
| | 195 | Human | | | | 2 | | | | | | | **2** |
| | 206 | Human | 1 | | | | | | | | | | **1** |
| | 208 var. | Human | | | | | | 1 | | | | | **1** |
| | U284 var. | Avian | | | | | | | | | 3 | | **3** |
| | U284 var. | Human | 1 | 3 | | | | | | | | | **4** |
| | U284 var. | Unknown | 1 | | | | | | | | | | **1** |
| | U291 | Animal Feed | | | | | | 2 | | | | | **2** |
| | U291 | Bovine | | | | | 1 | | | | | | **1** |
| | U291 | Food (Bovine) | | | | | 15 | | | | | | **15** |
| | U291 | Human | | 1 | | 5 | 2 | 1 | | | | | **9** |
| | U291 | Porcine | | | | 1 | | | | | | | **1** |
| | U291 var. | Human | | 1 | | | | | | | | | **1** |
| | UT 7 | Human | | | | | 2 | | | | | | **2** |
| | Atypical | Human | | 1 | | 1 | 1 | 3 | | 1 | | | **7** |
| | Atypical | Turkey | | | | | 1 | | | | | | **1** |
| | Untypable | Avian | 1 | | | | | | | | | | **1** |
| | Untypable | Chicken | | | | | 1 | | | | | | **1** |
| | Untypable | Porcine | | 1 | | | | | | | | | **1** |
| | Untypable | Water | | 1 | | | | | | | | | **1** |
| | | | | | | | | | | | | | |
| | | Human Total | 7 | 15 | 2 | 9 | 10 | 7 | 2 | 2 | 0 | 1 | **55** |
| | | Non Human Total | 7 | 10 | 2 | 1 | 27 | 2 | 0 | 0 | 8 | 2 | **59** |

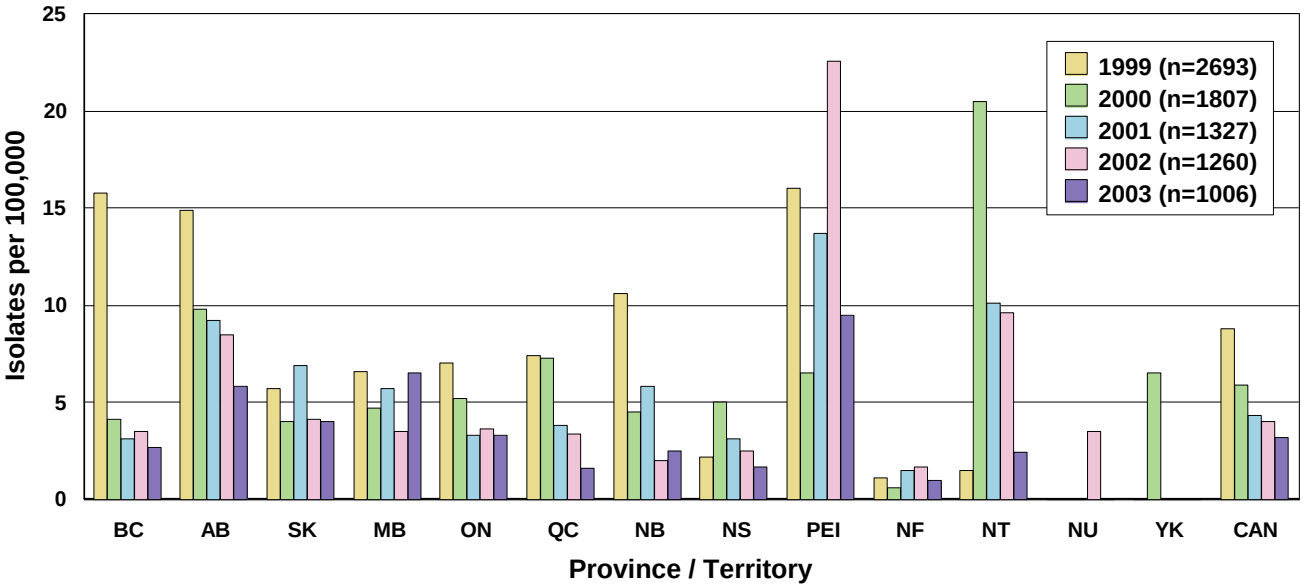
# SECTION 3: PATHOGENIC *ESCHERICHIA COLI*

Population based rates of *E. coli* O157 isolation for each province are shown in Figure 16 and total provincial isolations from each province for 2002 and 2003 are shown in Figures 17 and 18. Although Ontario had the highest number of *E. coli* O157 isolated, due to the large population, the province ranked 5th overall in isolation rate per 100,000 population in 2002. Total *E. coli* O157 isolations are based largely on NESP and supplemented with identifications from NML reference services and include *E. coli* O157:H7, *E. coli* O157:NM, *E. coli* O157 VT+ and *E. coli* O157. Due to differing disease reporting procedures from province to province, high rates of *E. coli* O157 isolation may not necessarily reflect incidence of disease, but different sampling and reporting structures.

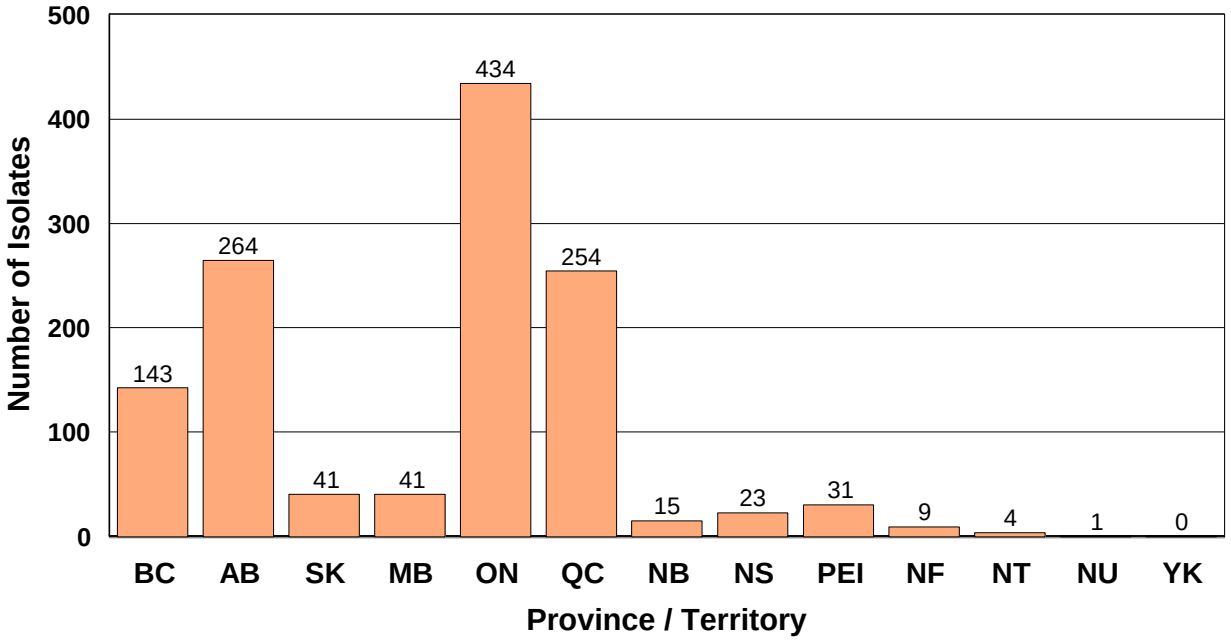
Figure 16 shows the isolation rates per 100,000 population of *E. coli* O157 from 1999 to 2003. Nationally, the isolation rates for *E. coli* O157 have declined from 8.8 isolations per 100,000 population in 1999 to 3.2 isolations per 100,000 population in 2003. Prince Edward Island had the highest rates in 2002 and 2003 with rates of 22.6 and 9.5 isolations per 100,000 residents. Other provinces with the highest rates per 100,000 population in 2003 were Manitoba (6.5), Alberta (5.8), Saskatchewan (4.0) and Ontario (3.3). Lower isolation rates were observed in British Columbia (2.7), Quebec (1.6), New Brunswick (2.5), Northwest Territories (2.4), Nova Scotia (1.7) and Newfoundland (1.0).

Other than in Manitoba, there have been no major increases in the rates of *E. coli* O157 infection in 2003. The largest year-to-year increase has been observed in Manitoba where the rate has increased from 3.5 to 6.5 isolates per 100,000 population.

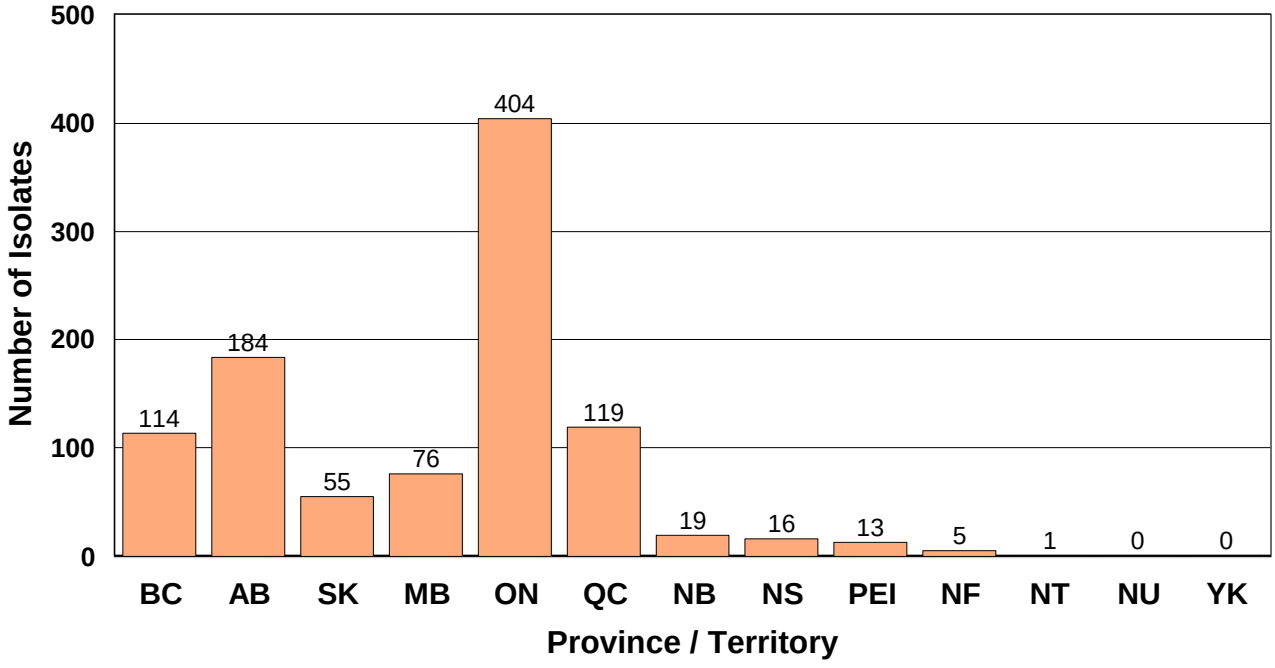
**Figure 16: Rate of *E. coli* O157 Isolation in Canada, 1999 to 2003***



## Figure 17: Number of *E. coli* O157 Isolations from Humans in Canada, 2002




## Figure 18: Number of *E. coli* O157 Isolations from Humans in Canada, 2003



## Table 7: *E. coli* Serotypes Isolated from Humans in Canada, 2002

| Organism | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | NT | NU | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *E. coli* Inactive | | 8 | | 3 | 1 | 2 | | 15 | 3 | 32 | | | **64** |
| *E. coli* O1:K1:H7 | | | | | | | | | 1 | | | | **1** |
| *E. coli* O1:NM | | | 1 | | | | | | | | | | **1** |
| *E. coli* O2:H1 | | | | | | | | | 1 | | | | **1** |
| *E. coli* O2:H7 | | | | | | 1 | | | | | | | **1** |
| *E. coli* O5:NM | 1 | | | | | | | | | | | | **1** |
| *E. coli* O5:H11 | | | | | 1 | | | | | | | | **1** |
| *E. coli* O6:H31 | 1 | | | | | | | 1 | | | | | **2** |
| *E. coli* O6:NM | | | | 1 | | | | 1 | | | | | **2** |
| *E. coli* O18ac:H1 | | | | | | | | | 1 | | | | **1** |
| *E. coli* O19:NM | | 1 | | | | | | | | | | | **1** |
| *E. coli* O26 | | | | 5 | | | | | | | | | **5** |
| *E. coli* O26:H11 | 7 | | | | | | | | | | | | **7** |
| *E. coli* O26:NM | | | | 1 | | | | | | | | | **1** |
| *E. coli* O28:NM | 2 | | | | | | | | | | | | **2** |
| *E. coli* O40:NM | | | | | | | | | 1 | | | | **1** |
| *E. coli* O44 | | | | 13 | | | | | | | | | **13** |
| *E. coli* O55 | | | | 1 | | | | | | | | | **1** |
| *E. coli* O68:NM | | 1 | | | | | | | | | | | **1** |
| *E. coli* O68:H18 | | | | | | | | | 1 | | | | **1** |
| *E. coli* O75:H7 | | 1 | | | | | | | | | | | **1** |
| *E. coli* O75:NM | | 1 | | 1 | | | | | 1 | | | | **3** |
| *E. coli* O83:H42 | | | | | | | | 1 | | | | | **1** |
| *E. coli* O86a | | | | 1 | | | | | | | | | **1** |
| *E. coli* O98:NM | | | | | | | 7 | | | | | | **7** |
| *E. coli* O103:H2 | 1 | | | 1 | | | | | | | | | **2** |
| *E. coli* O103:H25 | 1 | | | 1 | | | | | | | | | **2** |
| *E. coli* O111:H8 | | | | | | | | 1 | | | | | **1** |
| *E. coli* O111:NM | 3 | | | | | | | | | | | | **3** |
| *E. coli* O117:H7 | 3 | | | | | | | | | | | | **3** |
| *E. coli* O117:H25 | | | | | | | 1 | | | | | | **1** |
| *E. coli* O121:H19 | 1 | | | 3 | | | | | | | | | **4** |
| *E. coli* O125 | | | | 4 | | | | | | | | | **4** |
| *E. coli* O127 | | | | 1 | | | | | | | | | **1** |
| *E. coli* O128 | | | | 5 | | | | | | | | | **5** |
| *E. coli* O132:H34 | | | | | | | | 1 | | | | | **1** |
| *E. coli* O135:NM | | | | | | | | | 1 | | | | **1** |
| *E. coli* O142 | | | | 1 | | | | | | | | | **1** |
| *E. coli* O145:H34 | | 1 | | | | | | | | | | | **1** |
| *E. coli* O145:NM | 3 | | | | | | | | | | | | **3** |
| *E. coli* O146:H21 | 1 | | | | | | | | | | | | **1** |
| *E. coli* O148:NM | 2 | | | | | | | | | | | | **2** |
| *E. coli* O153:H-Untypeable | 1 | | | | | | | | | | | | **1** |
| *E. coli* O157 VTEC (includes H7) | 142 | 261 | 39 | 41 | 421 | 246 | 14 | 30 | 23 | 9 | 4 | 1 | **1231** |
| *E. coli* O157:NM | 1 | 3 | 2 | | 12 | 8 | 1 | 1 | | | | | **28** |
| *E. coli* O157:H45 | | | | | 1 | | | | | | | | **1** |
| *E. coli* O165:H25 | 1 | | | | | | | | | | | | **1** |
| *E. coli* O174:H8 | 1 | | | | | | | | | | | | **1** |
| *E. coli* O174:H28 | 1 | | | | | | | | | | | | **1** |

| Organism | | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | NT | NU | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *E. coli* | O179:H8 | 1 | | | | | | | | | | | | **1** |
| *E. coli* | Non-Typed VTEC | | | | 12 | | | | | | | | | **12** |
| *E. coli* | O-Untypeable:NM | 3 | 3 | | | | 1 | 3 | | | 10 | | | **20** |
| *E. coli* | O-Untypeable:H1 | | | | | | | 1 | | | | | | **1** |
| *E. coli* | O-Untypeable:H27 | | | | | 1 | | | | | | | | **1** |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | **Total *E. coli* 2002** | **177** | **280** | **42** | **95** | **437** | **258** | **27** | **51** | **33** | **51** | **4** | **1** | **1456** |

* Data represented in this table is not representative of true incidence. It is provided here to give a general overview of the various serotypes *E. coli* observed in Canada. Few provinces routinely report non-O157 verotoxigenic *E. coli* or non-verotoxigenic *E. coli* isolations and therefore the values listed are largely those that have been forwarded to the NML for reference services. See Appendix 1 for details.

## Table 8: *E. coli* Serotypes Isolated from Humans in Canada, 2003

| Organism | | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | NT | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *E. coli* | Inactive | | | | | | 1 | 17 | | 6 | | | **24** |
| *E. coli* | O4:H5 | | | | | | | 1 | | | | | **1** |
| *E. coli* | O5:NM | 3 | | | 1 | | | | | | | | **4** |
| *E. coli* | O6:H1 | 1 | | | | | 1 | | | | | | **2** |
| *E. coli* | O6:H34 | | | | 1 | | | | | | | | **1** |
| *E. coli* | O8:H49 | | | | | 1 | | | | | | | **1** |
| *E. coli* | O8:NM | | | | | 1 | | | | | | | **1** |
| *E. coli* | O11:H25 | | | | | | 1 | | | | | | **1** |
| *E. coli* | O18(ac):K1:H7 | 1 | | | | | | | | | | | **1** |
| *E. coli* | O25:K1:NM | | | | | | | | 1 | | | | **1** |
| *E. coli* | O25:NM | | | | 2 | | | | | | | | **2** |
| *E. coli* | O26 | | | | 2 | | | | | | | | **2** |
| *E. coli* | O26:H11 | 10 | | | 4 | | | | | | | | **14** |
| *E. coli* | O26:NM | 4 | | | 5 | | | | | | | | **9** |
| *E. coli* | O44 | | | | 15 | | | | | | | | **15** |
| *E. coli* | O55 | | | | 1 | | | | | | | | **1** |
| *E. coli* | O68:NM | 1 | | | | | | | | | | | **1** |
| *E. coli* | O74:H28 | 1 | | | | | | | | | | | **1** |
| *E. coli* | O86:H8 | 1 | | | | | | | | | | | **1** |
| *E. coli* | O91:H21 | 1 | | | | | | | | | | | **1** |
| *E. coli* | O98:NM | 1 | | | | | | 4 | | | | | **5** |
| *E. coli* | O103:H11 | | | | 1 | | | | | | | | **1** |
| *E. coli* | O103:H2 | 1 | | | | | | | | | | | **1** |
| *E. coli* | O103:H25 | 1 | | | 2 | 1 | | | | | | | **4** |
| *E. coli* | O111 | | | | 2 | | | | | | | | **2** |
| *E. coli* | O111:NM | 1 | | | 2 | | | | | | | | **3** |
| *E. coli* | O114 | | | | 1 | | | | | | | | **1** |
| *E. coli* | O115:H25 | 1 | | | | | | | | | | | **1** |
| *E. coli* | O117:H27 | | | | 1 | | | | | | | | **1** |
| *E. coli* | O121:H19 | 6 | | | 2 | 1 | | | | | | | **9** |
| *E. coli* | O125 | | | | 8 | | | | | | | | **8** |
| *E. coli* | O126 | | | | 3 | | | | | | | | **3** |
| *E. coli* | O128 | | | | 4 | | | | | | | | **4** |
| *E. coli* | O128:H45 | 1 | | | | | | | | | | | **1** |
| *E. coli* | O135:NM | | | | 1 | | | | | | | | **1** |
| *E. coli* | O145:NM | 1 | | | 2 | | | | | | | | **3** |
| *E. coli* | O146:H21 | | | | 1 | | | | | | | | **1** |
| *E. coli* | O157 VTEC (Includes H7) | 99 | 179 | 54 | 75 | 394 | 119 | 19 | 16 | 12 | 5 | 1 | **973** |
| *E. coli* | O157:H16 | | | 1 | | 1 | | | | | | | **2** |
| *E. coli* | O157:NM | 15 | 5 | | 1 | 9 | | | | 1 | | | **31** |
| *E. coli* | O174:H21 | 1 | | | | | | | | | | | **1** |
| *E. coli* | O175:H27 | | | | | | | | 1 | | | | **1** |
| *E. coli* | O177:NM | 1 | | | | | | | | | | | **1** |
| *E. coli* | Non-O157 VTEC | 7 | | | | | | | | | | | **7** |
| *E. coli* | Non-typed VTEC | | | | 10 | | | | | | | | **10** |
| *E. coli* | O-Untypeable:H1 | | | | | | | | | 1 | | | **1** |
| *E. coli* | O-Untypeable:H18 | | | | | | | | | 1 | | | **1** |
| *E. coli* | O-Untypeable:NM | 2 | | | | | | | | | | | **2** |
| | **Total** | **161** | **184** | **55** | **147** | **408** | **122** | **41** | **18** | **21** | **5** | **1** | **1163** |

## Table 9: Phage Types of *E. coli* 0157:H7 Isolated in Canada, 2002

| PhageType | Source | BC | AB | SA | MB | ON | QC | NB | NS | NF | PE | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Human | | | 2 | 4 | 3 | 2 | 1 | | | | **12** |
| 2 | Human | | | | | 24 | 5 | | | | | **29** |
| 4 | Human | | 2 | 1 | 2 | 9 | 13 | | | | | **27** |
| 8 | Human | | 1 | 3 | 1 | 38 | 24 | | 1 | 3 | | **71** |
| 10 | Human | | | | 1 | | | | | | | **1** |
| 14 | Human | | | 3 | 4 | 39 | 6 | 1 | | | 5 | **58** |
| 14a | Human | 8 | 7 | 13 | 7 | 152 | 75 | 4 | | | 7 | **273** |
| 14b | Human | | 7 | 11 | 12 | 65 | 56 | | 4 | | 1 | **156** |
| 14c | Human | | | 1 | 1 | 1 | | | | | | **3** |
| 21 | Human | | | 2 | 1 | 15 | 1 | | | | | **19** |
| 23 | Human | | 2 | | 1 | 10 | 1 | | | | | **14** |
| 31 | Human | | | | | 9 | 9 | | | | 2 | **20** |
| 32 | Human | | | | | 12 | 4 | | | | 23 | **39** |
| 33 | Human | | 5 | 1 | | 11 | 7 | | | | | **24** |
| 34 | Human | | | | | 12 | 1 | | | | | **13** |
| 40 | Human | | | | | 2 | | | | | | **2** |
| 42 | Human | | | | | 2 | | | | | | **2** |
| 45 | Human | | | | | 2 | 4 | | | | | **6** |
| 54 | Human | | | | | 1 | 1 | | | | | **2** |
| 73 | Human | | | | | | 2 | | | | | **2** |
| 74 | Human | | | 1 | | 1 | 1 | | | | | **3** |
| 87 | Human | | | | | 1 | 1 | | | | | **2** |
| Atypical | Human | | | | | 5 | 3 | | | | | **8** |
| Untypable | Human | | | | | 1 | | | | | | **1** |
| | **Total** | **8** | **24** | **38** | **34** | **415** | **216** | **6** | **5** | **3** | **38** | **787** |
| | | | | | | | | | | | | |
| 8 | Food (Beef) | | | | | 3 | | | | | | **3** |
| 14 | Food (Beef) | | 2 | | | | | | | | | **2** |
| 14 | Food (Unspecified) | | | | | 5 | | | | | | **5** |
| 14 | Unknown | | | | | | 1 | | | | | **1** |
| 14a | Food (Beef) | | 2 | 4 | | 17 | | | | | | **23** |
| 14a | Food (Meat) | | | | | 11 | | | | | | **11** |
| 14a | Food (Poultry) | | | | | 1 | | | | | | **1** |
| 14a | Food (Unspecified) | | | | | | 3 | | | | | **3** |
| 14a | Poultry | | | | | 1 | | | | | | **1** |
| 14a | Unknown | | | | | 2 | | | | | | **2** |
| 14b | Food (Beef) | | | | | | 4 | | | | | **4** |
| 14b | Unknown | | | | | | 3 | | | | | **3** |
| 21 | Animal (Unspecified) | | | | | 4 | | | | | | **4** |
| 32 | Animal (Unspecified) | | | | | 3 | | | | | | **3** |
| 33 | Food (Meat) | | | | | 2 | | | | | | **2** |
| 63 | Unknown | | | | | | 1 | | | | | **1** |
| Atypical | Bovine | | | | | 1 | | | | | | **1** |
| | **Total** | **0** | **4** | **4** | **0** | **50** | **12** | **0** | **0** | **0** | **0** | **70** |

## Table 10: Phage Types of *E. coli* 0157:H7 Isolated in Canada, 2003

| Phagetype | Source | BC | AB | SK | MB | ON | QC | NB | NS | NF | PE | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Human | | | 3 | | 4 | | | | | 1 | **8** |
| 2 | Human | | 2 | | | 22 | 24 | | | | | **48** |
| 4 | Human | | 2 | 1 | 2 | 8 | 2 | | | | | **15** |
| 8 | Human | | 2 | 1 | 3 | 81 | 6 | 1 | 2 | | | **96** |
| 10 | Human | | | | | 1 | | | | | | **1** |
| 14 | Human | | | | 1 | 17 | 2 | | | | 2 | **22** |
| 14a | Human | | 15 | 40 | 26 | 188 | 56 | 5 | | | 3 | **333** |
| 14b | Human | | | 5 | 4 | 26 | 8 | 11 | | | 1 | **55** |
| 21 | Human | | | 1 | | 1 | 2 | | | | | **4** |
| 23 | Human | | | | 2 | 5 | 3 | | | | 1 | **11** |
| 31 | Human | | 2 | | 1 | 9 | 5 | | | | | **17** |
| 32 | Human | | | 1 | | 12 | 3 | | | | | **16** |
| 33 | Human | | 2 | | 2 | 1 | 2 | | | | | **7** |
| 34 | Human | | | | | 3 | | | | | | **3** |
| 38 | Human | | | | | 3 | | 1 | | | | **4** |
| 42 | Human | | | | | | 1 | | | | | **1** |
| 45 | Human | | 1 | | | 1 | 1 | | | | | **3** |
| 49 | Human | | 1 | | | | | | | | | **1** |
| 51 | Human | | | | | 2 | | | | | | **2** |
| 54 | Human | | | | | 1 | | | | | | **1** |
| 74 | Human | | | | | 1 | | | | | 1 | **2** |
| 79 | Human | | | 1 | | | | | | | | **1** |
| 81 | Human | | | | | 3 | | | | | | **3** |
| Atypical | Human | | | | 1 | 8 | 2 | 1 | | | 1 | **13** |
| | **Total** | | **27** | **53** | **42** | **397** | **117** | **19** | **2** | | **10** | **667** |
| | | | | | | | | | | | | |
| 1 | Unknown | | | | | 1 | | | | | | **1** |
| 14 | Bovine | | | | | 1 | | | | | | **1** |
| 14 | Food (Beef) | | | | | 3 | | | | | | **3** |
| 14 | Food (Unspecified) | | | | | 1 | | | | | | **1** |
| 14a | Unknown | | | | | 4 | 2 | | | | | **6** |
| | **Total** | | **0** | | | **10** | **2** | | | | | **12** |

*Phage type data is generated from isolates forwarded to the NML and LFZ by the provincial health, agriculture, veterinary, university and CFIA laboratories as part of reference requests, passive surveillance, surveys and/or outbreak and cluster investigations. The proportion of specimens forwarded may differ from province to province and should be interpreted with caution, however the subset of data from each particular province remains consistent from year to year and can be useful to establish general trends, recognize emerging or re-emerging strains and to provide a general overview of the subtypes found in Canada.

# SECTION 4: *CAMPYLOBACTER*

This section summarizes data on both case-by-case reports and aggregate data of reported campylobacteriosis captured in the National Notifiable Diseases Reporting System (NDRS) for 2002. Updated totals for the province of Québec were supplied directly from Laboratoire de santé publique du Québec for the Ministère de la santé et des services sociaux du Québec. At the time of publication, the NDRS data have not been finalized and thus, should be considered preliminary.

Data regarding cases of laboratory confirmed gastro-intestinal illness in Canada are generated along two concurrent paths, an epidemiology arm and a laboratory arm (see Appendix 1). Within the epidemiology arm, NDRS receives data that are collected on a mandatory basis by the local health units for an established set of communicable diseases. Eight provinces and territories (British Columbia, Alberta, Saskatchewan, Ontario, Québec, Newfoundland and Labrador, Yukon and Nunavut) provide case-by-case reports that include demographic, clinical, laboratory (minimal) and additional epidemiologic data. The remaining provinces and territories (New Brunswick, Nova Scotia, Prince Edward Island, Manitoba and the Northwest Territories) report aggregate data. With regard to campylobacteriosis, differences exist between numbers of reported *Campylobacter* isolates/cases in the epidemiology arm (i.e. NDRS database) and the laboratory arm (i.e. NML/NESP database). The low frequency with which *Campylobacter* isolates are sent or reported from local laboratories to the provincial/territorial laboratories contributes to the differences between the databases.

Population-based rates of campylobacteriosis for each province and territory are shown in Figure 21. By representing the data as cases per 100,000, the data provide a more accurate reflection of the relative levels of reported campylobacteriosis among the provinces and territories. For example, although Ontario reported the highest number of cases in 2002 (Figure 20), due to its large population, the province ranked 3rd overall in the rate of reported campylobacteriosis with 37.8 cases per 100,000 population after British Columbia (49.6) and Alberta (44.8). Nationally, rates of reported campylobacteriosis have declined from 48.6 isolations per 100,000 in 1998 to 36.7 in 2002. A slight increase was observed in Prince Edward Island with rates increasing from 28.8 cases per 100, 000 in 2001 to 36.5 cases per 100, 000 in 2002 and in Alberta from 40.3 to 44.8 cases per 100, 000. Newfoundland has had the largest decrease in isolation rates from 16.3 in 2001 to 8.7 in 2002.

Table 11 shows the *Campylobacter* species reported in 2002. *Campylobacter jejuni* represented the majority of the isolates reported (2084 of 11508), followed by *C. coli* with 203 isolates reported.

**Figure 19: Rate of Reported Cases of Campylobacteriosis in Canada, 1998 to 2002**

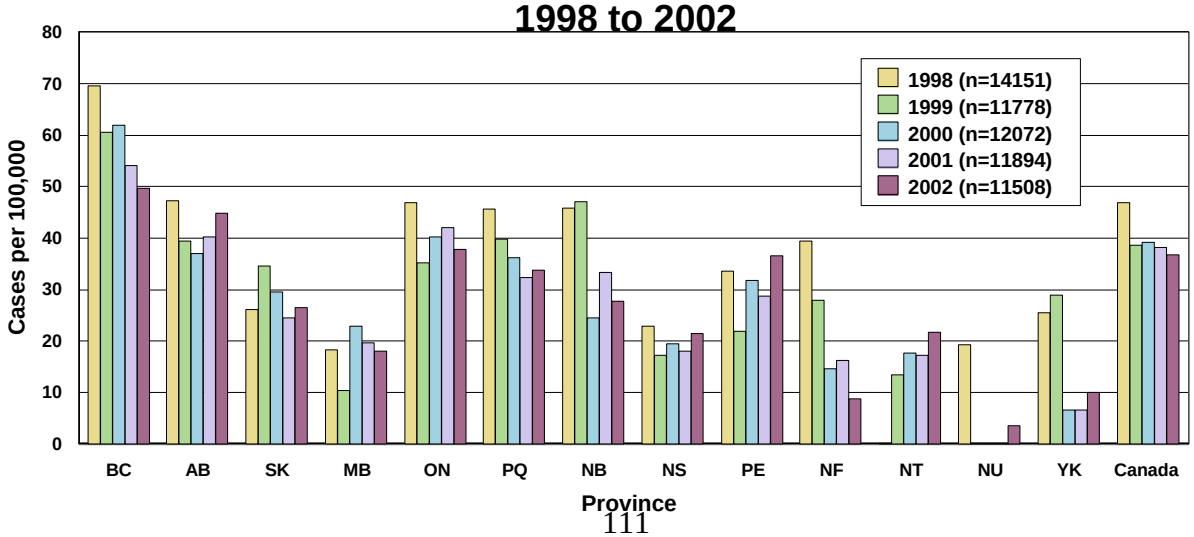


**Figure 20: Number of Reported Cases of Campylobacteriosis in Canada, 2002**

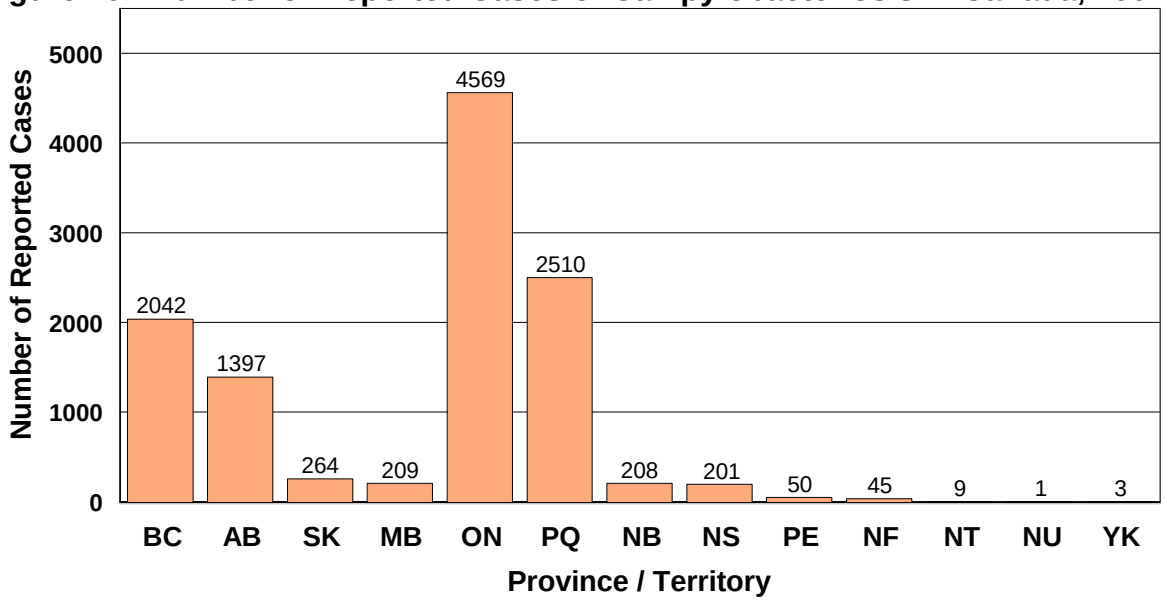
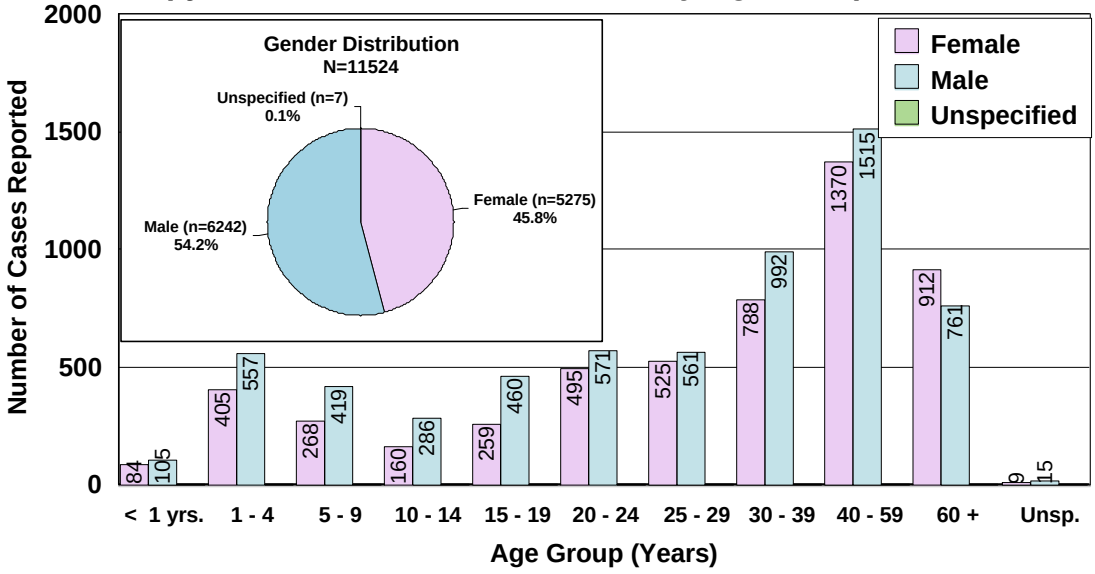



**Figure 21: *Campylobacter* Isolations in Canada by Age Group and Gender Distribution**




## Table 11: *Campylobacter* Species Isolated from Humans in Canada, 2002

| Organism | BC | AB | SK | MB | ON | QC | NB | NS | PEI | NF | NT | NU | YK | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *C.coli* | | 1 | 15 | 8 | | 156 | 2 | | | 21 | | | | **203** |
| *C. fetus* ssp *fetus* | | 1 | 1 | | 5 | 14 | | | | | | | | **21** |
| *C. hyointestinalis* | | | | | | 2 | | | | | | | | **2** |
| *C. jejuni* | | | 240 | | | 1839 | 4 | | | 1 | | | | **2084** |
| *C. jejuni/coli* | 115 | 450 | | 92 | 330 | | 170 | 72 | 48 | 13 | 8 | 1 | 2 | **1301** |
| *C. lari* | 1 | | 3 | | 10 | 2 | 1 | | 2 | | | | | **19** |
| *C. upsaliensis* | 2 | 7 | 5 | | 22 | 4 | 1 | | | | | | | **41** |
| *Campylobacter* sp | 1924 | 938 | | 109 | 4202 | 493 | 30 | 129 | | 10 | 1 | | 1 | **7837** |
| **Total** | **2042** | **1397** | **264** | **209** | **4569** | **2510** | **208** | **201** | **50** | **45** | **9** | **1** | **3** | **11508** |

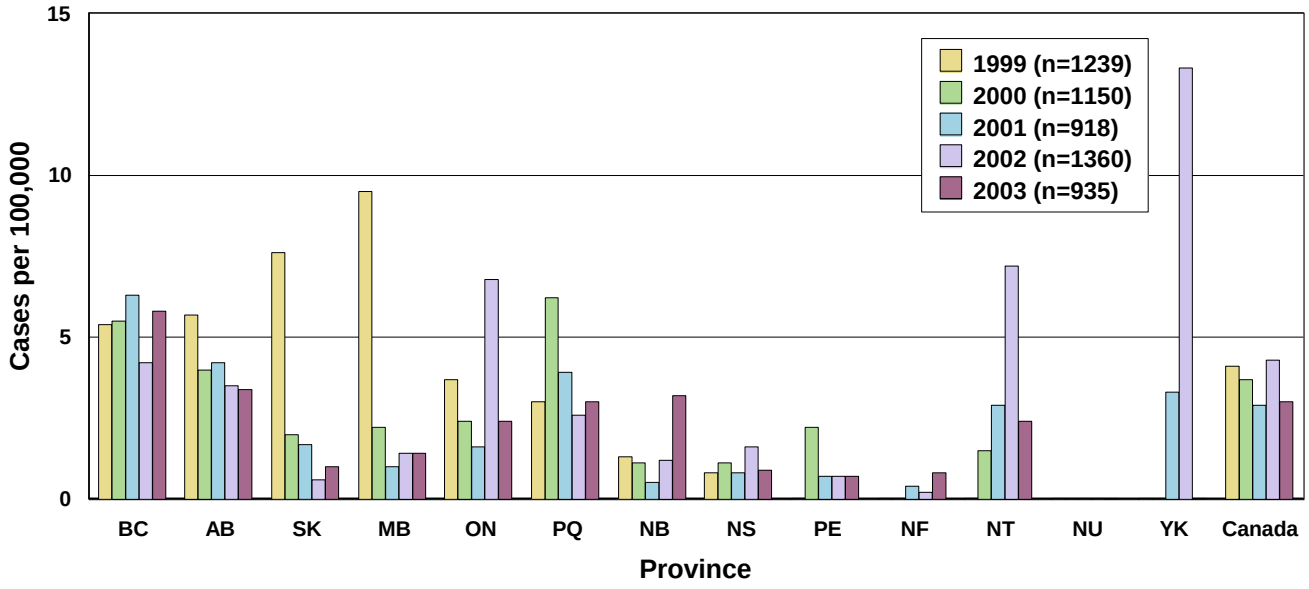
# SECTION 5: *SHIGELLA*

Population-based isolation rates of *Shigella* isolations for each province since 1999 are shown in Figure 22 and the total number of *Shigella* isolations in 2002 and 2003 are shown in Figures 23 and 24. Ontario reported the highest number of isolates (827) however British Columbia had the highest isolation rate of 5.8 isolates per 100,000 population.

Data is largely from the NESP and is supplemented with reference services provided by the NML. The data is based on laboratory identifications and should not be confused with incidence of disease. The proportion of specimens forwarded may differ from province to province and should be interpreted with caution, however the subset of data collected from each province remains consistent from year to year and can be useful to establish general trends, recognize emerging or re-emerging strains and to provide an overview of the subtypes found in Canada.

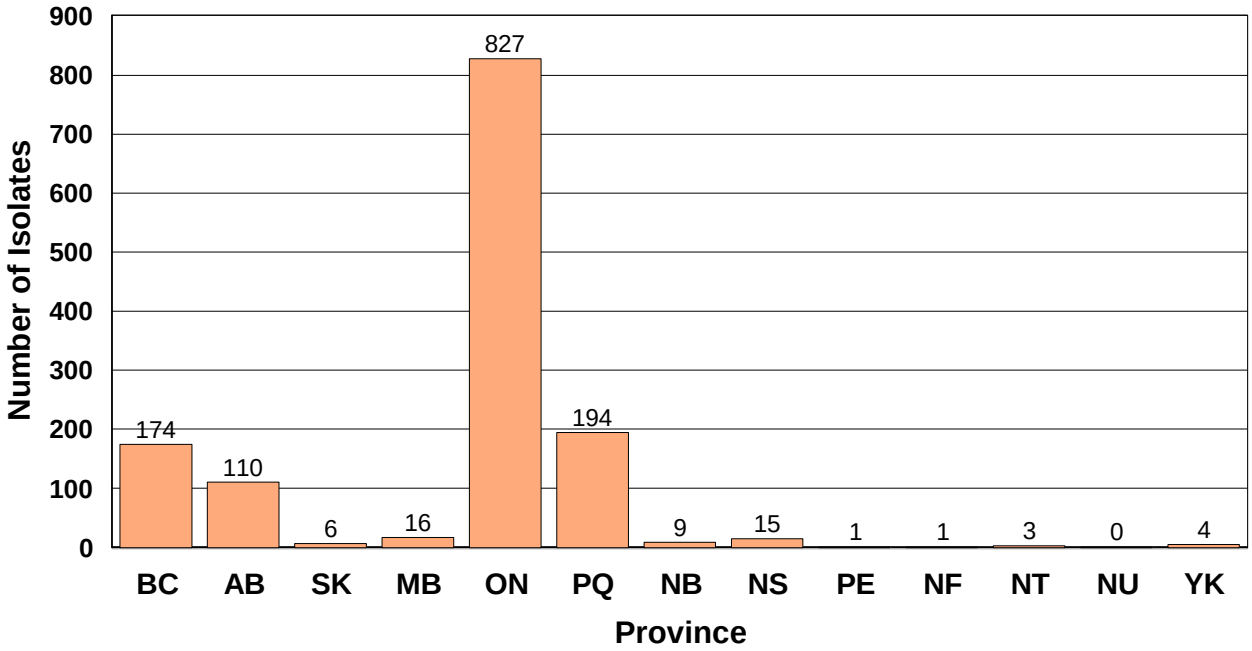
Rates have generally varied little in most provinces between 1999 and 2003 if outbreaks of disease are considered in specific years (i.e. the 426 isolates that were associated with an outbreak linked to Greek style pasta salad in Ontario in 2002). A decrease has been observed in Alberta from 5.7 isolations per 100,000 population in 1999 to 3.5 isolations per 100,000 population in 2003.

**Figure 22: Rate of *Shigella* Isolations in Canada, 1999 to 2003***



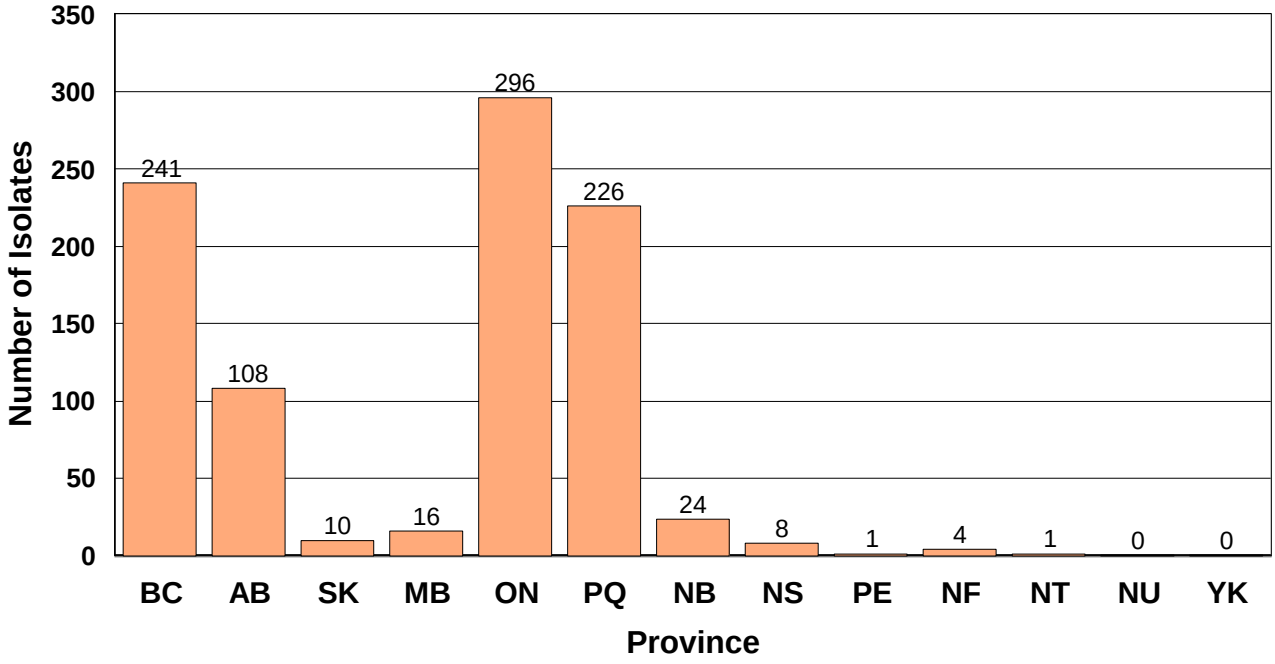

*Provincial population estimates used to calculate isolation rates are taken from the Statistics Canada website. Total isolations are based largely on NESP reports and include cluster and outbreak cases (see Appendix 1 for details). Values are based on laboratory-based identifications and should not be confused with incidence of disease.

## Figure 23: Number of *Shigella* Isolations from Humans in Canada, 2002




Note: Total *Shigella* isolations in Ontario include 426 *S. sonnei* isolates related to a single outbreak associated with Greek style pasta salad.

## Figure 24: Number of *Shigella* Isolations from Humans in Canada, 2003



# Table 12: *Shigella* Isolated from Humans in Canada, 2002

| Organism | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | NT | NU | YK | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Shigella boydii* | | | | | 16 | 2 | | | | | | | | **18** |
| *Shigella boydii* 1 | 2 | 1 | | | | 1 | | | | | | | | **4** |
| *Shigella boydii* 2 | 1 | 1 | | | | | | | | | | | | **2** |
| *Shigella boydii* 4 | 3 | | | | 1 | | | | | | | | | **4** |
| *Shigella boydii* 8 | 1 | 1 | | | | | | | | | | | | **2** |
| *Shigella boydii* 10 | 2 | | | | | | | | | | | | | **2** |
| *Shigella boydii* 12 | | 1 | | | | | | | | | | | | **1** |
| *Shigella boydii* 14 | | 1 | | | | | | | | | | | | **1** |
| *Shigella boydii* 18 | 1 | | | | | | | | | | | | | **1** |
| *Shigella boydii* 19 | 2 | | | | | 1 | | | | | | | | **3** |
| *Shigella boydii* 20 | 2 | 1 | | | 2 | 2 | | 1 | | | | | | **8** |
| **Total *Shigella boydii*** | **14** | **6** | **0** | **0** | **19** | **6** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **46** |
| | | | | | | | | | | | | | | |
| *Shigella dysenteriae* | | | | | 3 | 4 | | | | | | | | **7** |
| *Shigella dysenteriae* 2 | | 1 | | | | | | | | | | | | **1** |
| *Shigella dysenteriae* 4 | | 1 | | | | 1 | | | | | | | | **2** |
| *Shigella dysenteriae* 9 | 1 | 1 | | | | | | | | | | | | **2** |
| *Shigella dysenteriae* 15 | 1 | | | | | | | | | | | | | **1** |
| *Shigella dysenteriae* 16 | 1 | | | 1 | 1 | 2 | | | | | | | | **5** |
| *Shigella dysenteriae* Prov. SH-103 | | | | | 1 | | | | | | | | | **1** |
| *Shigella dysenteriae* Prov. 111 | 1 | 2 | | | | | | | | | | | | **3** |
| **Total *Shigella dysenteriae*** | **4** | **5** | **0** | **1** | **5** | **7** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **22** |
| | | | | | | | | | | | | | | |
| *Shigella flexneri* | | | | 6 | 60 | 48 | 4 | 5 | | | | | | **123** |
| *Shigella flexneri* 1 | 3 | 8 | | | | 5 | | | | | 2 | | | **18** |
| *Shigella flexneri* 1a | | | | | | 4 | | | | | | | | **4** |
| *Shigella flexneri* 1b | 1 | | | | | | | | | | | | | **1** |
| *Shigella flexneri* 2 | 17 | 12 | 1 | | | 10 | | | | | | | | **40** |
| *Shigella flexneri* 2a | | 2 | | | | 14 | | | | | | | | **16** |
| *Shigella flexneri* 2b | | | | | 4 | 2 | | | | | | | | **6** |
| *Shigella flexneri* 3 | 5 | 2 | | | | 1 | | | | | | | | **8** |
| *Shigella flexneri* 3a | 4 | | | | | | | | | | | | | **4** |
| *Shigella flexneri* 3b | | | | | | 5 | | | | | | | | **5** |
| *Shigella flexneri* 4a | 2 | | | | | | | | | | | | | **2** |
| *Shigella flexneri* 6 | 4 | 10 | | | | 4 | | | | | | | | **18** |
| *Shigella flexneri* Prov. SH104 | 3 | 1 | | | 3 | 3 | | | | | | | | **10** |
| *Shigella flexneri* var. Y | | 2 | | | | 2 | | | | | | | | **4** |
| **Total *Shigella flexneri*** | **39** | **37** | **1** | **6** | **67** | **98** | **4** | **5** | **0** | **0** | **2** | **0** | **0** | **259** |
| | | | | | | | | | | | | | | |
| ***Shigella sonnei*** | **117** | **62** | **3** | **6** | **634** | **76** | **5** | **8** | **1** | **1** | **1** | **0** | **1** | **915** |
| | | | | | | | | | | | | | | |
| *Shigella* sp. | 0 | 0 | 2 | 3 | 102 | 7 | 0 | 1 | 0 | 0 | 0 | 0 | 3 | **118** |
| | | | | | | | | | | | | | | |
| **Total 2002** | **174** | **110** | **6** | **16** | **827** | **194** | **9** | **15** | **1** | **1** | **3** | **0** | **4** | **1360** |

# Table 13: *Shigella* Isolated from Humans in Canada, 2003

| Organism | BC | AB | SA | MB | ON | QC | NB | NS | PE | NF | NT | NU | YK | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Shigella boydii* | | | | | 14 | 3 | | | | | | | | **17** |
| *Shigella boydii* 1 | 1 | | | | | | | | | | | | | **1** |
| *Shigella boydii* 2 | 3 | 4 | | | 1 | 1 | | 1 | | | | | | **10** |
| *Shigella boydii* 4 | 1 | 1 | | | 1 | | | | | | | | | **3** |
| *Shigella boydii* 5 | | | | | 1 | | | | | | | | | **1** |
| *Shigella boydii* 8 | | 1 | | | | 1 | | | | | | | | **2** |
| *Shigella boydii* 12 | 2 | | | | | | | | | | | | | **2** |
| *Shigella boydii* 13 | | | | | 2 | | | | | | | | | **2** |
| *Shigella boydii* 14 | 1 | | 1 | | | | | | | | | | | **2** |
| *Shigella boydii* 18 | 1 | | | | | | | | | | | | | **1** |
| *Shigella boydii* 19 | 1 | 1 | | | 1 | | | | | | | | | **3** |
| *Shigella boydii* 20 | 3 | 1 | | | | | | | | | | | | **4** |
| **Total *Shigella boydii*** | **13** | **8** | **1** | **0** | **20** | **5** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **48** |
| | | | | | | | | | | | | | | |
| *Shigella dysenteriae* | | | | | 10 | | | | | | | | | **10** |
| *Shigella dysenteriae* 1 | 1 | | | | | | | | | | | | | **1** |
| *Shigella dysenteriae* 2 | 1 | | | | 3 | 2 | | | | | | | | **6** |
| *Shigella dysenteriae* 3 | 1 | 2 | | | 1 | 2 | | | | | | | | **6** |
| *Shigella dysenteriae* 4 | 4 | 1 | | | | | | | | | | | | **5** |
| *Shigella dysenteriae* 9 | | 1 | | | | | | | | | | | | **1** |
| *Shigella dysenteriae* 16 | 2 | 1 | | | 2 | 2 | | | | | | | | **7** |
| *Shigella dysenteriae* Prov 111 | 3 | | | | 1 | | | | | | | | | **4** |
| **Total *Shigella dysenteriae*** | **12** | **5** | **0** | **0** | **17** | **6** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **40** |
| | | | | | | | | | | | | | | |
| *Shigella flexneri* | | | 1 | 5 | 60 | 27 | | 2 | | 3 | | | | **98** |
| *Shigella flexneri* 1 | 10 | 3 | 1 | | | 1 | | | | | | | | **15** |
| *Shigella flexneri* 1a | | | | | | 3 | | | | | | | | **3** |
| *Shigella flexneri* 1b | 2 | | | | | | | | | | | | | **2** |
| *Shigella flexneri* 2 | 24 | 13 | 1 | | | | | | | | | | | **38** |
| *Shigella flexneri* 2a | 5 | | | | | 16 | 1 | | | | | | | **22** |
| *Shigella flexneri* 2b | | | | | | 3 | | | | | | | | **3** |
| *Shigella flexneri* 3 | 9 | 5 | | | | | | | | | | | | **14** |
| *Shigella flexneri* 3a | 3 | 1 | | | | | | | | | | | | **4** |
| *Shigella flexneri* 3b | | | | | | 4 | | | | | | | | **4** |
| *Shigella flexneri* 4 | 2 | 3 | | | | 1 | | | | | | | | **6** |
| *Shigella flexneri* 4a | | | | | | 1 | | | | | | | | **1** |
| *Shigella flexneri* 4b | | | | | | 1 | | | | | | | | **1** |
| *Shigella flexneri* 6 | 9 | 9 | | | 1 | | | 1 | | | 1 | | | **21** |
| *Shigella flexneri* Provisional SH-101 | 2 | | | | 1 | | | | | | | | | **3** |
| *Shigella flexneri* Provisional SH-104 | 1 | | | | 1 | 3 | | | | | | | | **5** |
| *Shigella flexneri* X variant | | | | | 1 | | | | | | | | | **1** |
| *Shigella flexneri* Y variant | | | | | 1 | 3 | | | | | | | | **4** |
| **Total *Shigella flexneri*** | **67** | **34** | **3** | **5** | **65** | **63** | **1** | **3** | **0** | **3** | **1** | **0** | **0** | **245** |
| | | | | | | | | | | | | | | |
| ***Shigella sonnei*** | **148** | **61** | **6** | **6** | **193** | **146** | **21** | **4** | **1** | **1** | | | | **587** |
| *Shigella* sp | 1 | | | 5 | 1 | 6 | 2 | | | | | | | **15** |
| | | | | | | | | | | | | | | |
| **Total 2003** | **241** | **108** | **10** | **16** | **296** | **226** | **24** | **8** | **1** | **4** | **1** | **0** | **0** | **935** |

Tables 14 and 15 list *Shigella* phage types identified from human strains isolated in 2002 and 2003. The data represented is from isolates forwarded to the NML by the provincial health laboratories for reference services, passive surveillance, surveys or outbreak and cluster investigations. The proportion of specimens forwarded may differ from province to province and should be interpreted with caution, however the subset of data collected from each province remains fairly consistent from year to year and can be useful to establish general trends, recognize emerging or re-emerging strains and to provide an overview of the subtypes found in Canada.

PT1 is the predominant phage type of *S. sonnei* accounting for 85 of 246 isolates. Further surveillance is required to establish whether the prevalence of this sub type is transitory. Isolates from other parts of the country may provide a substantially different phage type distribution. As more data are gathered, the typing databases for this organism will become more reliable and outbreaks of public health significance can be identified with greater precision and accuracy.

## Table 14: Phage Types of *Shigella boydii* and *Shigella sonnei* from Humans in Canada, 2002

| Organism | Phage Type | BC | AB | ON | QC | NB | NS | Total |
|---|---|---|---|---|---|---|---|---|
| *Shigella boydii* 4 | 6 | | | 1 | | | | **1** |
| *Shigella boydii* 12 | 22 | | 1 | | | | | **1** |
| *Shigella boydii* 19 | 3 | 2 | | | | | | **2** |
| *Shigella boydii* 20 | 3 | 2 | 1 | | | | 1 | **4** |
| | **Total** | **4** | **2** | **1** | **0** | **0** | **1** | **8** |
| | | | | | | | | |
| | | | | | | | | |
| *Shigella sonnei* | 1 | 30 | 3 | 40 | | 2 | 1 | **76** |
| | 2 | | | 13 | | | | **13** |
| | 3 | | 1 | | | | | **1** |
| | 5 | 20 | 3 | 17 | | | | **40** |
| | 6 | 1 | 1 | 1 | | | | **3** |
| | 7 | 1 | 1 | 7 | | | | **9** |
| | 8 | 1 | | | | | 1 | **2** |
| | 9 | | | 1 | | | | **1** |
| | 10 | 2 | | 1 | | | | **3** |
| | 12 | 11 | 5 | 3 | | | | **19** |
| | 14 | 1 | | 1 | | | | **2** |
| | 15 | 5 | 3 | 458 | 1 | 1 | | **468** |
| | 16 | 2 | 1 | 1 | | | | **4** |
| | 17 | 6 | | 4 | | | | **10** |
| | 18 | 10 | 4 | | | | 1 | **15** |
| | 19 | 8 | 1 | 24 | | | | **33** |
| | 20 | 3 | | 5 | | 1 | | **9** |
| | Atypical | 16 | 5 | 46 | 1 | | | **68** |
| | **Total** | **117** | **28** | **622** | **2** | **4** | **3** | **776** |

## Table 15: Phage Types of *Shigella boydii* and *Shigella sonnei* from Humans in Canada, 2003

| Organism | Phage Type | BC | AB | ON | QC | NB | NS | PE | Total |
|---|---|---|---|---|---|---|---|---|---|
| *Shigella boydii* 19 | 3 | 1 | 1 | | | | | | **2** |
| *Shigella boydii* 20 | 3 | 4 | | | | | | | **4** |
| *Shigella boydii* 4 | 5 | | 1 | | | | | | **1** |
| *Shigella boydii* 4 | 6 | 1 | | 1 | | | | | **2** |
| | **Total** | **6** | **2** | **1** | **0** | **0** | **0** | **0** | **9** |
| | | | | | | | | | |
| *Shigella sonnei* | 1 | 40 | 9 | 25 | 8 | 2 | | 1 | **85** |
| | 2 | | 3 | 3 | | 2 | | | **8** |
| | 3 | | 1 | | | | | | **1** |
| | 5 | 56 | 1 | | 2 | | | | **59** |
| | 6 | 6 | | 1 | | | | | **7** |
| | 7 | 4 | 1 | 1 | | | | | **6** |
| | 8 | 8 | | | | | | | **8** |
| | 10 | 7 | | | | | | | **7** |
| | 11 | | 2 | 1 | | | 1 | | **4** |
| | 13 | | | 2 | | | | | **2** |
| | 14 | 1 | | | | | | | **1** |
| | 15 | 5 | 6 | 19 | | | | | **30** |
| | 17 | 2 | | 2 | | | | | **4** |
| | 18 | | | 2 | | | | | **2** |
| | 19 | 2 | | 6 | | | | | **8** |
| | 20 | 4 | | 4 | | | | | **8** |
| | Atypical | 3 | 3 | | | | | | **6** |
| | **Total** | **138** | **26** | **66** | **10** | **4** | **1** | **1** | **246** |

* Totals are laboratory confirmed isolates based on information supplied to the NESP and supplemented with identifications from NML reference services. Data is representative of laboratory confirmed isolates only, and should not be confused with incidence of disease. See Appendix 1 for details.

# SECTION 6: PARASITES

Figure 25 shows the isolation rates of *Cryptosporidium*, *Cyclospora, Entamoeba* and *Giardia* strains isolated by each province since 1999 for which national data has been available and the total number of parasitic isolations from each province for 2002 and 2003 are shown in Figures 26 and 27. The data is collected through the NESP and is supplemented with NDRS data. *Cryptosporidium* and *Cyclospora* were not nationally notifiable until January 2000. *Entamoeba* is currently not notifiable and numbers of cases of illness are those reported to the NESP and may be under-reported.

Rates have declined nationally from 18.4 cases per 100,000 population in 2000 to 14.3 cases per 100,000 population in 2003. Although rates have declined in most provinces, Prince Edward Island has seen an increase from 13.7 cases per 100,000 population in 2000 to 18.2 cases per 100,000 population in 2003. The greatest decrease in isolation rates was seen in Northwest Territories from 29.3 cases per 100,000 population to 9.5 cases per 100,000 population and in the Yukon from 81.7 to 29.4 over the last four years.

**Figure 25: Rates of Parasite Identifications (*Cryptosporidium*, *Cyclospora*, *Entamoeba* and *Giardia*) in Canada, 2000 to 2003***

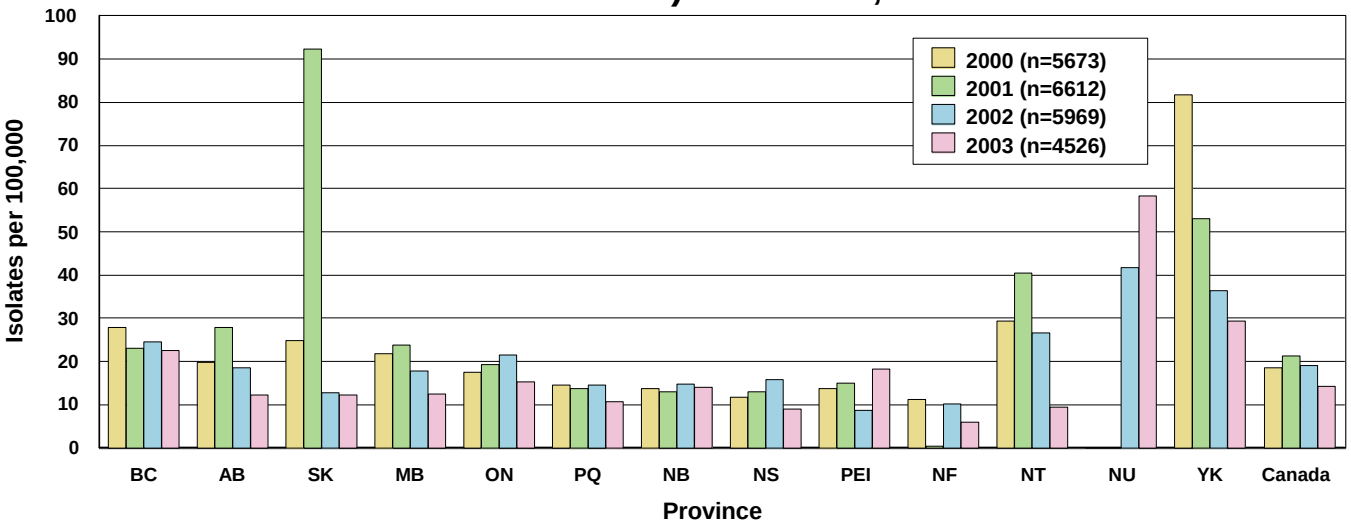
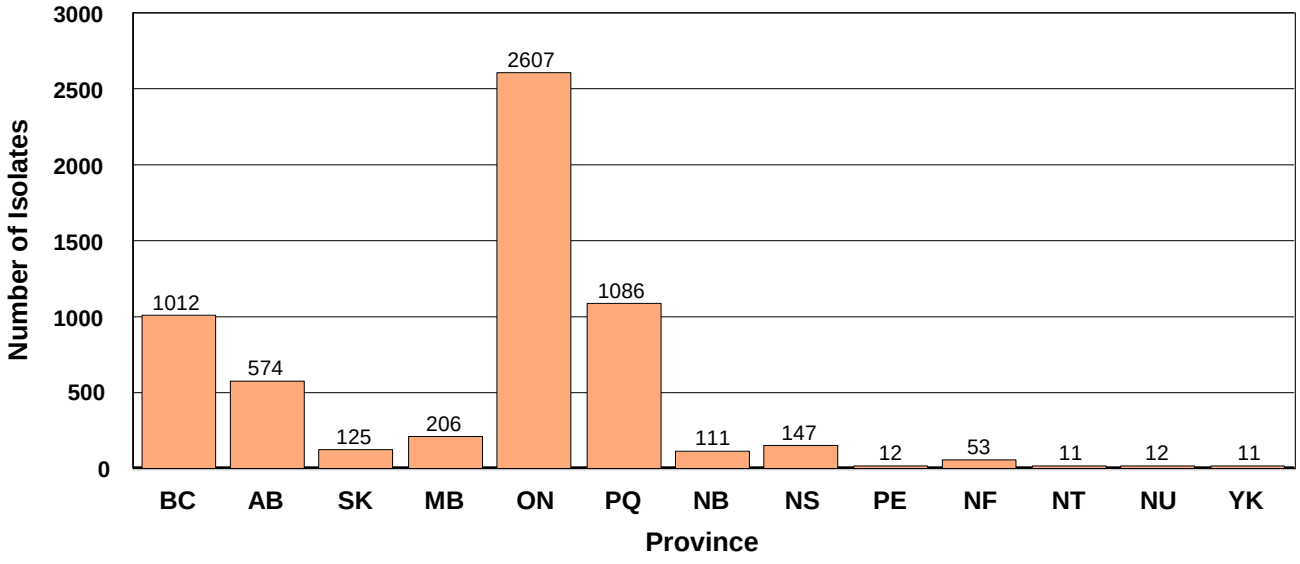
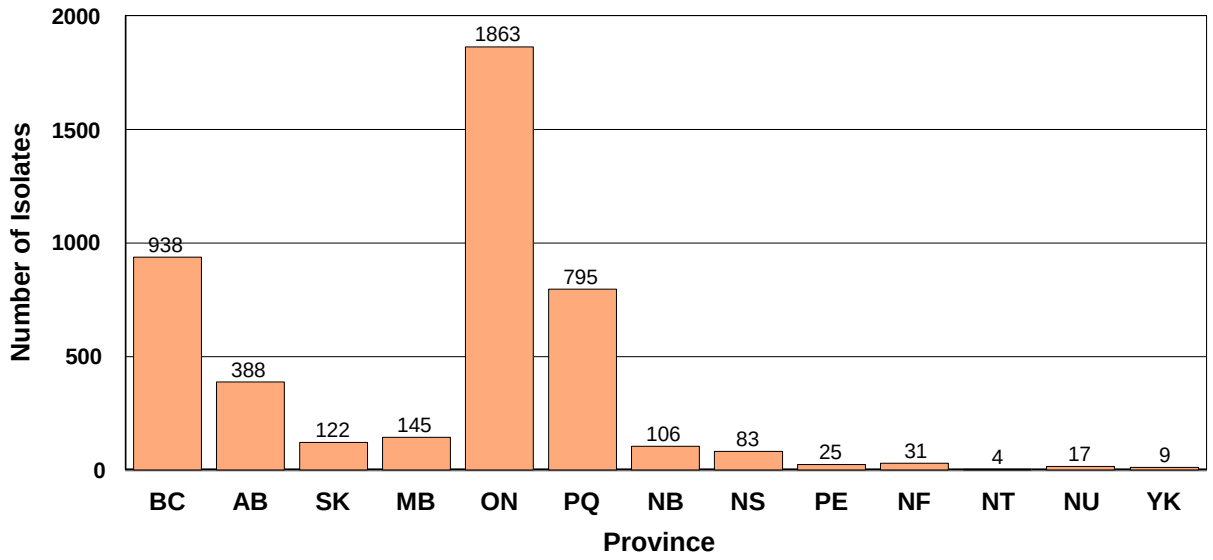



**Figure 26: Number of Parasite Identifications (*Cryptosporidium*, *Cyclospora*, *Entamoeba* and *Giardia*) in Canada, 2002**



## Figure 27: Number of Parasite Identifications (*Cryptosporidium*, *Cyclospora*, *Entamoeba* and *Giardia*) in Canada, 2003




## Table 16: Parasite Identifications (*Cryptosporidium*, *Cyclospora*, *Entamoeba* and *Giardia*) in Canada, 2002

| Organism | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | NT | NU | YK | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Cryptosporidium* | 127 | 130 | 34 | 35 | 222 | 3 | 11 | 8 | 3 | 1 | | | | **574** |
| *Cyclospora* | 47 | | | | 72 | 3 | | 2 | | | | | | **126** |
| *Entamoeba histolytica/dispar* | 133 | 1 | 12 | 18 | 443 | 140 | 3 | 15 | 2 | 15 | 1 | | 1 | **784** |
| *Giardia* | 705 | 443 | 79 | 153 | 1870 | 940 | 97 | 122 | 7 | 37 | 10 | 12 | 10 | **4485** |
| **Total** | **1012** | **574** | **125** | **206** | **2607** | **1086** | **111** | **147** | **12** | **53** | **11** | **12** | **11** | **5969** |

## Table 17: Parasite Identifications (*Cryptosporidium*, *Cyclospora*, *Entamoeba* and *Giardia*) in Canada, 2003

| Organism | BC | AB | SA | MB | ON | QC | NB | NS | PE | NF | NT | NU | YK | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Cryptosporidium* | 132 | 92 | 32 | 30 | 128 | 8 | 14 | 7 | 7 | 1 | | | 2 | **453** |
| *Cyclospora* | 39 | | | | 39 | | | | | | | | | **78** |
| *Entamoeba histolytica/dispar* | 94 | 1 | 6 | 19 | 444 | 98 | | 15 | 1 | 1 | | | | **679** |
| *Giardia* | 673 | 295 | 84 | 96 | 1252 | 689 | 92 | 61 | 17 | 29 | 4 | 17 | 7 | **3316** |
| **Total** | **938** | **388** | **122** | **145** | **1863** | **795** | **106** | **83** | **25** | **31** | **4** | **17** | **9** | **4526** |

**Cryptosporidium* and *Cyclospora* were not nationally notifiable until January 2000. *Entamoeba* is not notifiable and numbers of cases of illness are those reported to NESP, which may be under-reported.

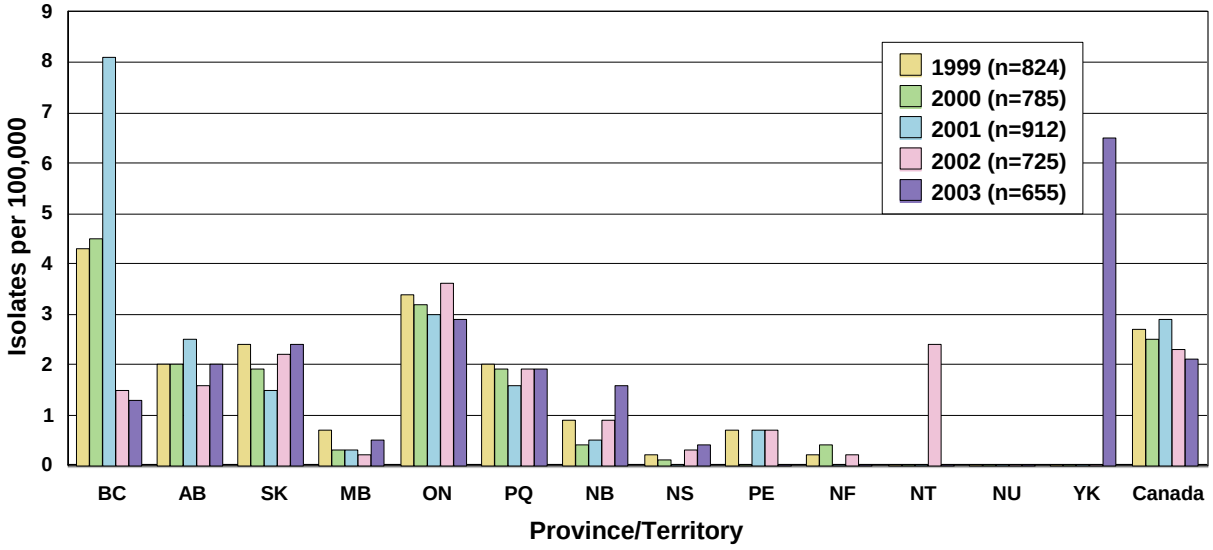
# SECTION 7: *YERSINIA*

The population-based rate of *Yersinia* isolation for each province is shown in Figure 28 and the total number of *Yersinia* isolations for 2002 and 2003 are shown in Figures 29 and 30. Ontario had the highest number of isolations (n=437) as well as the highest isolation rate of 1.9 isolates per 100,000 population after the Yukon Territory with 6.5 isolates per 100,000 population.

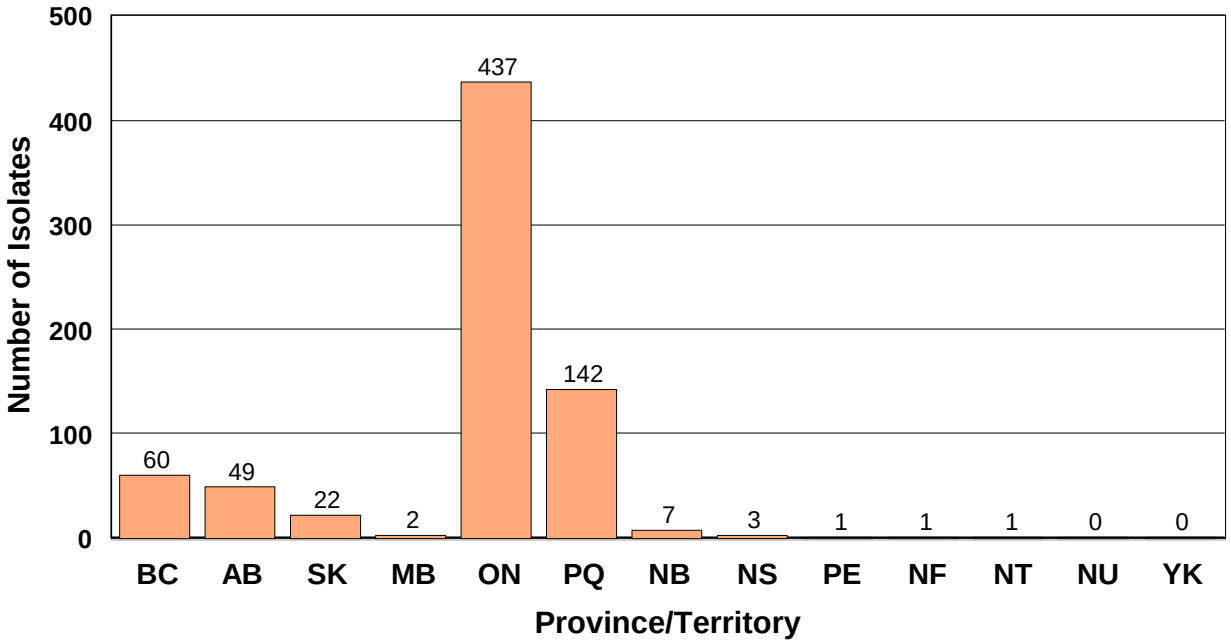
Data is from the NESP and is supplemented with identifications from reference services provided by the NML. The data is based on laboratory identifications and should not be confused with incidence of disease. Due to differing disease reporting procedures from province to province, high rates of isolation may not necessarily reflect incidence of disease, but rather different sampling and reporting structures (see Appendix 1 for details). The proportion of specimens reported may differ from province to province and should be interpreted with caution, however the subset of data collected from each province remains consistent from year to year and can be useful to establish general trends, recognize emergent or re-emergent strains and to provide an overview of the subtypes found in Canada.

Nationally, the rate of isolation of *Yersinia* has declined from 2.7 isolates per 100,000 population in 1999 to 2.1 cases per 100,000 population in 2003 (Figure 28). An increase has been observed in New Brunswick where isolations have increased from 0.4 cases per 100,000 population in 2000 to 1.6 cases per 100,000 population in 2003.

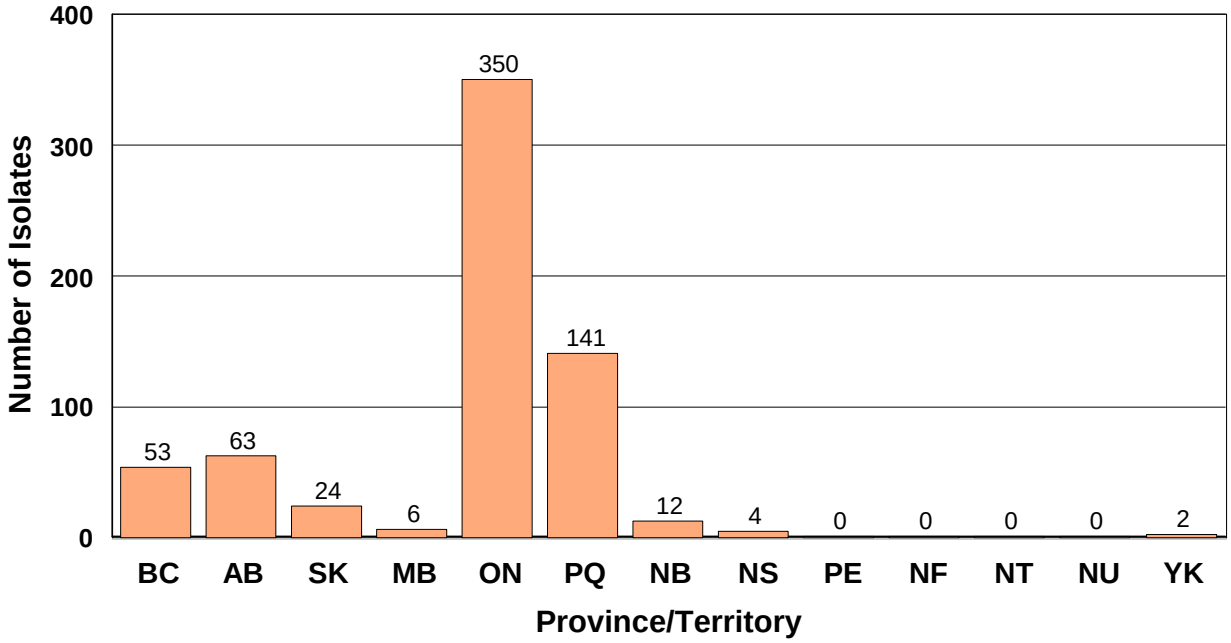
**Figure 28: Rates of *Yersinia* Isolations in Canada, 1999 to 2003***



## Figure 29: Number of *Yersinia* Isolations in Canada, 2002




## Figure 30: Number of *Yersinia* Isolations in Canada, 2003



## Table 18: *Yersinia* Isolates in Canada, 2002

| Organism | BC | AB | SK | MB | ON | QC | NB | NS | PE | NF | NT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Y. enterocolitica* | 55 | 44 | | 2 | 436 | 141 | 5 | 3 | | 1 | 1 | **688** |
| *Y. enterocolitica* bio 1A | | | 9 | | | | | | | | | **9** |
| *Y. enterocolitica* bio 2 sero O:9 | | | 1 | | | | | | | | | **1** |
| *Y. enterocolitica* bio 4 sero O:3 | | | 2 | | | | | | | | | **2** |
| **Total *Y. enterocolitica*** | **55** | **44** | **12** | **2** | **436** | **141** | **5** | **3** | **0** | **1** | **1** | **700** |
| | | | | | | | | | | | | |
| *Y. frederiksenii* | 1 | 2 | 2 | | 1 | 1 | | | 1 | | | **8** |
| *Y. intermedia* | 1 | | 7 | | | | | | | | | **8** |
| *Y. kristensenii* | 1 | 1 | 1 | | | | | | | | | **3** |
| *Y. mollaretii* | 1 | | | | | | | | | | | **1** |
| *Y. pseudotuberculosis* | 1 | | | | | | | | | | | **1** |
| | | | | | | | | | | | | |
| *Yersinia* sp. | | 2 | | | | | 2 | | | | | **4** |
| | | | | | | | | | | | | |
| **Total *Yersinia*** | **60** | **49** | **22** | **2** | **437** | **142** | **7** | **3** | **1** | **1** | **1** | **725** |
| | | | | | | | | | | | | |

## Table 19: *Yersinia* Isolates in Canada, 2003

| Organism | BC | AB | SA | MB | ON | QC | NB | NS | YK | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| *Y. bercovieri* | | | | | 1 | | | | | **1** |
| *Y. enterocolitica* | 35 | 48 | 6 | 6 | 328 | 141 | 12 | 4 | 2 | **582** |
| *Y. enterocolitica* bio 1A | | | 8 | | | | | | | **8** |
| *Y. frederiksenii* | 5 | 8 | 5 | | 10 | | | | | **28** |
| Y. intermedia | 5 | 2 | 5 | | 7 | | | | | **19** |
| *Y. kristensenii* | 3 | 1 | | | 4 | | | | | **8** |
| *Y. mollaretii* | 2 | | | | | | | | | **2** |
| *Y. rohdei* | 3 | 4 | | | | | | | | **7** |
| *Yersinia* sp. | | | | | | | | | | |
| **Total** | **53** | **63** | **24** | **6** | **350** | **141** | **12** | **4** | **2** | **655** |
| | | | | | | | | | | |

* Totals are laboratory confirmed isolates based on information supplied to the NESP and supplemented with identifications from NML reference services. This data is representative of laboratory confirmed isolates only, and should not be confused with incidence of disease. See Appendix 1 for details.

# SECTION 8: OUTBREAKS

Table 20 summarizes major outbreaks of enteric disease reported for the years 1999 to 2003 through various surveillance systems such as the NESP, PulseNet Canada and cluster investigations that the NML and CIDPC have provided assistance. This is not an exhaustive list of all outbreaks that have occurred in Canada. Some outbreaks are limited to a geographical location and are not reported by the PPHLs to current federal outbreak management systems. Outbreaks are grouped by causative organism and outbreak type. Outbreak types classify the outbreaks into general categories of community, family, institutional, restaurant and travel. Community outbreaks include those events involving a group of individuals with common exposure to specific events (banquets, weddings and parties) or products (ground beef from large retail outlets). Family outbreaks are small events consisting of immediate family members and friends and generally consist of person-to-person spread of the infectious agent within a household. Institutional outbreaks include hospitals, long-term care facilities, schools and other events in which individuals are in close contact and share exposures. Day care outbreaks are a sub-set of the institutional category, but because of the extra concerns of young children being affected these events are described separately. Restaurant outbreaks involve events related to commercial distribution of prepared meals. Travel related outbreaks involve those events where the original infection is thought to have occurred outside the country but symptoms are displayed after returning to Canada.

There were 78 outbreaks reported in Canada during 2002 involving 1154 cases of illness. *Salmonella* accounted for 55% (43/78) of the reported outbreaks and 40% (461/1154) of all outbreak-related illnesses (Table 20). Verotoxigenic *E. coli* was implicated in 25 outbreaks (33%) and included 245 (21%) associated cases. Although only 6 *Shigella*-related outbreaks were recorded in 2002, a single *S. sonnei* outbreak accounted for one third (426/11154) of all the outbreak-related cases.

In 2003, there were 68 outbreaks with 625 cases of illness recorded. *Salmonella* infections accounted for 49% (34/68) of the outbreaks and 48% (302/625) of all outbreak-related illnesses. Verotoxigenic *E. coli* accounted for 26% (18/68) of outbreaks and 37% (234/625) of outbreak-related cases. *Shigella* was responsible for 19% (13/68) of outbreaks and 13% (18/625) of outbreak-related cases identified.

## Outbreaks 2002

*Salmonella*

There were 43 *Salmonella*-associated outbreaks in 2002 that included 18 different serovars and a total of 461 cases of illness (Table 21). *S*. Oranienburg caused the largest *Salmonella* outbreak in 2002 resulting in 189 illnesses between January and April. Strains of *S*. Oranienburg PT 1 and PFGE pattern ORXAI.0002 were isolated in all provinces from British Columbia east to Ontario as well as in Nunavut. From October to November 2001, 373 cases of *S*. Oranienburg associated with imported German chocolate had been identified in Europe and the CFIA had recalled the company's products that were imported into Canada. The phage type associated with the German chocolate was different from that identified from human cases in Canada. Despite several investigations and case-control studies, the source of the infections could not be determined.

There were 7 outbreaks of *S*. Typhimurium infections making this serovar the most frequently confirmed outbreak-related serovar accounting for 14% (64/461) of all outbreak-related *Salmonella* infections. In August and September, British Columbia reported 32 cases

of *S*. Typhimurium PT 2 among the passengers and crew of a cruise ship traveling from Vancouver to Alaska. A second outbreak of 13 isolates of PT 812 was also identified in British Columbia in September and was associated with a deli on Vancouver Island. Another cluster reported among five family members in Saskatchewan was linked to well water contaminated by cattle grazing in a field. Two community outbreaks (5 cases each) were seen in Québec in September and October and one outbreak in a household setting (2 cases) was noted in British Columbia during this same time.

There were 5 outbreaks of *S*. Heidelberg infections associated with 19 cases of illness in 2002. Three of the outbreaks were in Quebec and were family related with 2 cases each, a community outbreak in New Brunswick involved 6 cases, and an outbreak associated with a curry restaurant in Alberta resulted in 7 illnesses.

Six outbreaks of *S*. Enteritidis infection were reported in 2002 with 20 related isolations recorded. In Alberta, there was a community-related outbreak (6 cases) and one linked to a restaurant (2 cases). A community outbreak in Ontario involved 5 infections of *S*. Enteritidis PT 5b / PFGE pattern SENXAI.0008 and family related outbreaks were reported in New Brunswick, Nova Scotia and Quebec.

During August to September, there were three community-related outbreaks in which multi-drug resistant *S*. Newport PT 14a was identified as the agent of infection. Four cases from two households in Alberta were linked to contaminated dog treats imported from the United States. Eight isolates from Manitoba were identical to the strain characterized in Alberta but the source of these infections was not confirmed. In Ontario, 22 people were reported ill following two birthday parties held in the Muskoka-Parry Sound area in late September. The illnesses were epidemiologically linked to containers of fresh cut fruit purchased at a local grocery store. Although the *S*. Newport isolates in Ontario were also PT 14a and had the same resistance pattern (ACSSuT) as those identified in Alberta and Manitoba, the PFGE analysis confirmed that the Ontario strain was unrelated to the others.

In July, community-based outbreaks of *S*. Thompson were reported in Newfoundland (6 cases), Québec (10 cases), Alberta (7 cases) and Ontario (13 cases). The same PT 1 / STHXAI.0002 strain was seen in both the Ontario and Quebec outbreaks whereas the organism involved in the Newfoundland outbreak was PT 26 / STHXAI.0001. Isolates from the fourth community outbreak in Alberta were PT2 and PFGE pattern STHXAI.0008. A fifth outbreak of *S*. Thompson consisted of 3 household cases in Québec during October.

From mid-April to mid-May, an increase in the number of *S*. Poona isolations reported in British Columbia, Saskatchewan, Manitoba, Ontario and the United States was observed. Identical PFGE patterns were identified in all jurisdictions and a U.S.-led case-control study linked these infections to the consumption of cantaloupe imported from Mexico, which was recalled from the market. Multi-state outbreaks of *S*. Poona related to cantaloupe had been identified in April and May of the past three years. As a result, the FDA in the United States halted the importation of cantaloupe from Mexico until a food-safety program to improve sanitation had been developed with the Mexican government.

Fifteen other outbreaks involving 11 serovars were also reported. Two of them were associated with family pets, with 2 cases of *S*. Paratyphi B var. Java being linked to a turtle and 5 cases of *Salmonella* ssp I 4,5,12:b:- linked to a lizard. The Québec Ministry of Health also reported that 10 *S*. Paratyphi B var. Java infections identified in that province during the year had recent contact with tropical fish aquariums. Investigations conducted in Québec in 2000 and 2001 had found that contact with tropical fish and aquariums was a common source for many of the *S*. Paratyphi B infections in that province (CCDR - June 1, 2002). In June several cases of *S*. Stanley infection in British Columbia and Alberta were linked to a brand of imported peanuts that was associated with an outbreak in May of 2001.

## Table 20: Summary of Outbreaks in Canada, 1999 to 2003

| Organism | Outbreak Type | 1999 | | 2000 | | 2001 | | 2002 | | 2003 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | #OB(a) | Cases | #OB | Cases | #OB | Cases | #OB | Cases | #OB | Cases |
| *Salmonella* | Community | 12 | 246 | 12 | 199 | 16 | 360 | 19 | 381 | 12 | 155 |
| | Day Care | 0 | 0 | 0 | 0 | 1 | 35 | 0 | 0 | 0 | 0 |
| | Family | 25 | 53 | 40 | 94 | 17 | 39 | 21 | 58 | 10 | 23 |
| | Institutional | 2 | 11 | 2 | 16 | 0 | 0 | 0 | 0 | 5 | 26 |
| | Restaurant | 1 | 15 | 2 | 71 | 3 | 162 | 3 | 22 | 7 | 99 |
| | Travel | 0 | 0 | 1 | 11 | 1 | 3 | 0 | 0 | 0 | 0 |
| | **Total** | **40** | **325** | **57** | **391** | **38** | **599** | **43** | **461** | **34** | **303** |
| *E. coli O157* VTEC | Community | 4 | 39 | 7 | 256 | 2 | 7 | 7 | 166 | 9 | 206 |
| | Day Care | 1 | 3 | 2 | 9 | 1 | 3 | 5 | 35 | 1 | 4 |
| | Family | 5 | 11 | 24 | 60 | 7 | 16 | 11 | 30 | 7 | 19 |
| | Institutional | 1 | 5 | 0 | 0 | 0 | 0 | 1 | 12 | 0 | 0 |
| | Restaurant | 0 | 0 | 0 | 0 | 1 | 15 | 1 | 2 | 1 | 5 |
| | **Total** | **11** | **58** | **33** | **325** | **11** | **41** | **25** | **245** | **18** | **234** |
| *Campylobacter jejuni* | Community | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 0 | 0 |
| | Family | 2 | 10 | 1 | 2 | 0 | 0 | 2 | 4 | 2 | 5 |
| | **Total** | **2** | **10** | **1** | **2** | **0** | **0** | **4** | **8** | **2** | **5** |
| *Campylobacter* sp. | Family | 1 | 2 | 2 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Shigella boydii* | Family | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 2 |
| *Shigella dysenteriae* | Family | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| *Shigella flexneri* | Family | 1 | 2 | 1 | 3 | 0 | 0 | 3 | 6 | 0 | 0 |
| *Shigella sonnei* | Community | 0 | 0 | 3 | 121 | 1 | 26 | 1 | 426 | 6 | 40 |
| | Day Care | 0 | 0 | 1 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Family | 10 | 25 | 3 | 6 | 1 | 2 | 0 | 0 | 4 | 18 |
| | Institutional | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 15 |
| | Travel | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 6 | 0 | 0 |
| | **Total** | **10** | **25** | **8** | **135** | **2** | **28** | **2** | **432** | **11** | **73** |
| *Yersinia enterocolitica* | Family | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| *Cryptosporidium* | Community | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 |
| *Giardia* | Family | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | | **66** | **424** | **103** | **864** | **51** | **668** | **78** | **1154** | **69** | **626** |

(a) = Number of Outbreaks.

Verotoxigenic *E. coli* (VTEC)

*E. coli* O157 VTEC (includes serotypes reported as O157, O157:H7 and O157:NM) was associated with 25 outbreaks including 245 cases of illness.

Household related infections accounted for 11 of the outbreaks with 2 or 3 cases each for a total of 30 illnesses. There were two daycare centre outbreaks in Alberta during June and August, two in Ontario during May and August, and one in Prince Edward Island in December resulting in a combined total of 35 illnesses (CCDR, February 1, 2003).

A community outbreak involved 45 cases of *E. coli* O157:H7 infections among 250 attendees at a youth bowling league banquet in Ontario in May. In November, salads and sandwiches prepared in an institutional kitchen in Prince Edward Island were linked to 12 illnesses. A multi-provincial cluster of 87 isolates with a PFGE pattern of ECXAI.0508 was identified during May and June and was traced to ground beef distributed and sold through a large retail chain.

*Shigella*

There were six *Shigella* outbreaks reported in 2002 with a total of 440 cases of illness. The majority of these cases were from a single outbreak of *Shigella sonnei* where 426 isolates where characterized as PT 15 / PFGE pattern SSOXAI.0088. Onset dates of illness ranged between May 11 to May 28 and 95% of confirmed cases investigated had a history of eating one specific brand of Greek Style Pasta Salad produced in Toronto. The CFIA issued an Urgent Outbreak Notification on May 18 and a voluntary recall of the salad was initiated.

Household clusters of *S. boydii* and *S. flexneri* in British Columbia and Quebec represented 4 outbreaks of 2 cases each, and 6 cases of *S. sonnei* PT 2 / PFGE pattern SSOXAI.0124 from Ontario were associated with travel to the Turks and Caicos Islands.

Table 21 presents the major national and international enteric pathogen outbreaks reported in 2002 through the various surveillance systems used for monitoring outbreaks of gastroenteritis in Canada such as NESP, PulseNet Canada and cluster investigations which the NML and the CIDPC have provided assistance. The outbreaks reported are community, institutional, restaurant, travel and familial types. The data does not cover all outbreaks occurring in Canada and exact case counts for each outbreak were not possible to verify, however the table provides a general overview of enteric pathogens and their subtypes commonly circulating within the population and causing outbreaks of disease.

# Table 21: Outbreaks in Canada During 2002

| Organism | Month | Province | No. Cases | PT (a) | PFGE (b) | Comments |
|---|---|---|---|---|---|---|
| *S.* Anatum | Jul | ON | 20 | PT 4 | - (c) | Community - Birthday Party - Meat Loaf |
| *S.* Brandenburg | Jul | QC | 18 | - | - | Community - Barbeque |
| *S.* Enteritidis | Jan | NB | 3 | PT 24 | SENXAI.0003 | Family |
| | Apr | AB | 6 | - | - | Community |
| | Apr | ON | 5 | PT 5b | SENXAI.0008 | Community |
| | May | AB | 2 | - | - | Restaurant |
| | Jun | QC | 2 | - | - | Family |
| | Sep | NS | 2 | PT 13 | SENXAI.0062 | Family |
| *S.* Hadar | Feb | QC | 2 | - | - | Family |
| *S.* Heidelberg | May | NS | 6 | PT 47 | SHEXAI.0001 | Community |
| | May | QC | 2 | - | - | Family |
| | Aug | QC | 2 | - | - | Family |
| | Sep | QC | 2 | - | - | Family |
| | Oct | AB | 7 | PT 19 | - | Restaurant - Curry Chicken and Lamb |
| *S.* Indiana | Aug | BC | 2 | - | - | Family |
| *S.* Infantis | Aug | BC | 2 | - | - | Family |
| *S.* Newport | Aug | AB | 4 | PT 14a | - | Family - Imported Dog Treats - USA |
| | Sep | MB | 8 | PT 14a | NewpXAI.0037 | Community |
| | Sep | ON | 22 | PT 14a | - | Commnunity - Birthday Party - Fruit Tray |
| *S.* Oranienburg | Jan - Apr | BC, AB, SK, MB, ON, NU | 189 | PT1 | ORXAI.0002 | Community |
| *S.* Poona | Apr - May | BC, SK, MB, ON | 10 | - | POOXAI.0008 | Community - Imported Canteloupe - Mexico |
| *S.* Paratyphi B | Jan - Dec | QC | 10 | Atypical | - | Community - Aquarium Contact |
| var. Java | Apr | AB | 3 | PT 3b var. 7 | - | Family |
| | Apr | BC | 2 | - | - | Family - Pet Turtle |
| *S.* Stanley | Jun | BC, AB | 2+ | - | - | Community - Imported Peanuts - China |

| Organism | Month | Province | No. Cases | PT (a) | PFGE (b) | Comments |
|---|---|---|---|---|---|---|
| *S*. Thompson | Jul | NF | 6 | PT 26 | STHXAI.0001 | Community |
| | Jul | QC | 10 | PT 1 | STHXAI.0002 | Community - Family Gathering |
| | Jul | AB | 7 | PT 2 | STHXAI.0008 | Community |
| | Jul | ON | 13 | PT 1 | STHXAI.0002 | Community |
| | Aug | QC | 3 | PT 5 | - | Family |
| | | | | | | |
| *S*. Typhimurium | Jan | BC | 2 | PT U284 | - | Family |
| | Jul | SK | 5 | PT 104 | STXAI.0029 | Family - Well water |
| | Aug - Sep | BC | 32 | PT 2 | - | Community Cruise Ship |
| | Sep | BC | 13 | PT 812 | - | Restaurant - Deli |
| | Sept | QC | 5 | - | - | Community |
| | Oct | BC | 2 | - | - | Family |
| | Oct | QC | 5 | - | - | Community |
| *S*. Typhi | Apr | ON | 3 | PT D1 | - | Family |
| | Sep - Oct | NB | 2 | PT A | - | Family |
| | | | | | | |
| *S*. ssp I 4,12:b:- | Aug | QC | 6 | - | - | Family |
| *S*. ssp I 4,5,12:b:- | Oct - Nov | QC | 5 | Atypical | - | Family - Pet Lizard |
| *S*. ssp I 4,5,12:i:- | Jul | MB | 7 | PT 146a var. | STXAI.0128 | Community |
| *S*. ssp I 4,5,12:i:- | Dec | BC | 2 | - | - | Family |
| *E.coli* O157 VTEC | May | AB | 5 | - | - | Family |
| | May | ON | 5 | PT 14a | ECXAI.0146 | Daycare - Hamburger |
| | May | ON | 45 | PT 14a | - | Community - Bowling League Banquet |
| | May | QC | 15 | PT 14a | - | Community - Hamburger |
| | May - Jun | National | 87 | PT 14a | ECXAI.0508 | Community - Hamburger |
| | Jun | AB | 12 | PT 14b | - | Daycare |
| | Jul | AB | 2 | - | - | Restaurant |
| | Jul | BC | 3 | - | - | Family |
| | Jul | ON | 4 | - | - | Community - Hamburger |
| | Aug | AB | 5 | - | - | Daycare |
| | Aug | ON | 10 | - | - | Daycare |
| | Aug | ON | 3 | - | - | Community - Wedding Reception |
| | Aug | PEI | 2 | PT 14a | ECXAI.0484 | Community - Church Camp |
| | Aug | QC | 2 | - | - | Family |
| | Sep | NF | 3 | PT 14b | ECXAI.0508 | Family |
| | Sep | QC | 2 | - | - | Family |

| Organism | Month | Province | No. Cases | PT (a) | PFGE (b) | Comments |
|---|---|---|---|---|---|---|
| *E. coli* VTEC (continued) | Oct - Dec | AB | 10 | - | - | Community - Unpasturized Cheese |
| | Oct | BC | 2 | - | - | Family |
| | Oct | MB | 2 | PT 1 | - | Family |
| | Oct | QC | 2 | - | - | Family |
| | Nov | ON | 5 | PT 33 | - | Family - Hamburger |
| | Nov - Dec | PEI | 2 | PT 14 | ECXAI.0776 | Family |
| | Nov | PEI | 12 | PT 32 | ECXAI.0756 | Institutional - Psychiatric Hospital |
| | Dec | BC | 2 | - | - | Family |
| | Dec | PEI | 3 | PT 14 | ECXAI.0767 | Daycare |
| | | | | | | |
| *Shigella boydii* 4 | Mar | BC | 2 | - | - | Family |
| | | | | | | |
| *Shigella sonnei* | May | ON | 426 | PT 15 | SSOXAI.0088 | Community - Greek Style Pasta Salad |
| | Nov | ON | 6 | PT 2 | SSOXAI.0124 | Travel - Turks and Caicos |
| | | | | | | |
| *Shigella flexneri* 6 | Jun | QC | 2 | - | - | Family |
| *Shigella flexneri* | Oct | BC | 2 | - | - | Family |
| *Shigella flexneri* 2 | Dec | BC | 2 | - | - | Family |
| | | | | | | |
| *Campylobacter jejuni* | Mar | AB | 2 | - | - | Community |
| | Jul | ON | 2 | - | - | Family |
| | Jul | BC | 2 | - | - | Family |
| | Nov | QC | 2 | - | - | Community |

(a) = Predominant Phage Type, (b) = Predominant *xba*I PFGE pattern, (c) = Not available.

# Outbreaks 2003

*Salmonella*

Thirty-three outbreaks of *Salmonella* involving 15 serovars and 302 cases of illnesses were identified in 2003. The largest *Salmonella* outbreak in 2003 occurred in Nova Scotia during August where 40 cases of *S*. Oranienburg PT 8 / OranXAI.0020 infections were associated with the consumption of hamburgers at a fast food restaurant.

*S*. Typhimurium, the most frequently confirmed serovar, was associated with 10 outbreaks and accounted for 30% (92/302) of all outbreak *Salmonella* cases. A large outbreak in Alberta in August was associated with a restaurant located in a shopping mall and consisted of 20 cases of *S*. Typhimurium PT46 / PFGE pattern STXAI.0214. Another large outbreak of 17 cases of PT164 / PFGE pattern STXAI.0019 occurred at a wedding reception in British Columbia in September. Other community-based outbreaks included a pig roast picnic in Manitoba in June (7 cases), a house party in British Columbia (3 cases) in August and a birthday party in Ontario (34 cases). A bakery was involved with another outbreak of 3 cases in October in British Columbia and 4 outbreaks were in household settings in British Columbia, Saskatchewan and Quebec with 2 cases of infection each.

There were 4 outbreaks of *S*. Enteritidis infection with 21 related cases of illness in 2003. In January, Alberta identified 8 cases associated with a fast-food restaurant at a prominent shopping mall and 9 illnesses in British Columbia were linked to a catered social event in June. There was also one family outbreak (2 cases) in British Columbia in February and a small conference hotel outbreak of 2 cases in British Columbia in June.

Despite the increase in number of *S*. Heidelberg isolations in 2003, only 4 outbreaks were recognized causing a total 28 cases of illness. During the month of March, 5 members of one British Columbia family were confirmed with *S*. Heidelberg PT 26 and an investigation identified frozen chicken nuggets and strips as the likely source of infection. A multi-provincial case-control study of *S*. Heidelberg cases identified between January and May was conducted and statistically significant associations were observed between gastroenteritis and the consumption of improperly home-prepared chicken nuggets/strips and undercooked eggs. *S*. Heidelberg PT 35 was identified in 8 illnesses among residents of a convent in New Brunswick in March and 7 cases in a nursing home in Manitoba in June. A community outbreak in New Brunswick during July, August and September consisted of 8 PT32 isolations that had PFGE pattern SHEXAI.0116.

A cluster of 12 cases of *S*. Thompson PT 26 / PFGE pattern STHAXI.0001 was identified in Nova Scotia between May and September 2003. The cases were distributed through five different districts and no common source was identified. Another *S*. Thompson outbreak was observed in Quebec during February involving 8 cases of infection in an institutional setting.

Two outbreaks of *S*. Newport were seen in 2003 with one in Ontario consisting of 5 cases of PT3, and the second was a family related outbreak in Quebec with 2 cases.

Other outbreaks of note included 27 cases of *Salmonella* ssp. I 4,5,12:b:- PT Dundee var. 2 (27 cases) in Ontario in July and August, 16 cases of *S*. Hartford in Québec in June and July, 15 cases of *S*. Berta in Ontario in May, and 17 cases of *S*. Minnesota in New Brunswick in July.

There were 18 outbreaks associated with verotoxigenic *E. coli* O157 (includes H7, NM and non-typed) with 234 related cases in 2003. The largest outbreak involved at least 65 visitors of a petting zoo in British Columbia in November. Two other large event-related outbreaks were identified in Ontario last year. In January, 60 people attending a Robbie Burns party and who had consumed improperly prepared haggis became ill. During the month of June, 44 cases of *E. coli* O157:H7 PT8 were identified among attendees of a high school graduation banquet.

A community outbreak in April was associated with frozen beef-filled pastries in Ontario and consisted of 7 infections of *E. coli* O157:H7 PT14 / PFGE pattern ECXAI.0023. Among the other outbreaks listed for 2003, 5 cases of PT14a were linked to a fast food restaurant in Ontario in March, 3 cases with PFGE pattern ECXAI.0381 to a hotel conference in Alberta during July, 2 cases linked to a calf at a petting zoo in Ontario in July, 8 cases of PT 14b / PFGE pattern ECXAI.0052 from a community outbreak in New Brunswick during August, and a day care outbreak of 4 cases in June in Alberta.

*Shigella*

There were 13 *Shigella* outbreaks in 2003, 11 of them related to *S. sonnei*. *S. sonnei* outbreaks in Québec included an outbreak of 15 illnesses among hospital staff in July that were associated with consumption of food from the salad bar of the hospital cafeteria, a community outbreak of 3 illnesses in January, a camping event held in August with 3 cases, as well as 3 family clusters of 2 cases each during April and May. *Shigella sonnei* was also linked to two community outbreaks, one with 4 cases and the other with 8, in Alberta in June. A youth camp in Ontario saw 12 cases during August and another 12 cases were identified among members of two New Brunswick families that attended the same family event in October.

*Shigella dysenteriae* was reported among 3 family members in Ontario in March and 2 cases of *S. boydii* 2 were associated with family contact in Alberta in November.

*Cryptosporidium*

In British Columbia 4 *Cryptosporidium* infections were identified between October and December 2003 that were likely associated with a public swimming pool.

Table 22 presents the major national and international enteric pathogen outbreaks reported in 2003 through the various surveillance systems used for monitoring outbreaks of gastroenteritis in Canada such as NESP, PulseNet Canada and cluster investigations in which the NML and the CIDPC have provided assistance. The outbreaks reported are community, institutional, restaurant, travel and familial types. The data does not cover all outbreaks occurring in Canada and exact case counts for each outbreak were not possible to verify, however the table provides general overview of enteric pathogens and their subtypes commonly circulating within the population and causing outbreaks of disease.

# Table 22: Outbreaks In Canada During 2003

| Organism | Month | Province | No. Cases | PT (a) | PFGE (b) | Comments |
|---|---|---|---|---|---|---|
| *S.* Agona | Jan | BC | 2 | - (c) | - | Family |
| *S.* Berta | May | ON | 15 | - | - | Community - Family Dinner |
| *S.* Enteritidis | Jan | AB | 8 | - | - | Restaurant - Fast Food - Hamburger |
| | Jun | BC | 9 | - | - | Community - Catered Event |
| | Feb | BC | 2 | - | - | Family |
| | Jun | BC | 2 | PT 911 | - | Community - Hotel Conference |
| | Dec | AB | 1 | - | - | Institution - Elementary School |
| *S.* Hartford | Jun | QC | 16 | - | - | Community |
| *S.* Heidelberg | Mar | BC | 5 | PT 26 | - | Family - Chicken Nuggets |
| | May - Jun | NB | 8 | PT 35 | SHEXAI.0060 | Institution - Convent |
| | Jun | MB | 7 | PT 35 | - | Institution - Nursing Home |
| | Jul - Sep | NB | 8 | PT 32 | SHEXAI.0116 | Community |
| *S.* Minnesota | Jul | NB | 17 | - | - | Restaurant - Fast Food |
| *S.* Newport | Mar | ON | 5 | PT 3 | - | Community |
| | May | QC | 2 | - | - | Family |
| *S.* Oranienburg | Aug | NS | 40 | PT 8 | OranXAI.0020 | Restaurant - Fast Food - Hamburger |
| *S.* Paratyphi B var. Java | Sep | QC | 2 | - | - | Family |
| *S.* Rubislaw | Jun | BC | 2 | - | - | Family |
| *S.* Saintpaul | Jul | AB | 9 | - | SainAXI.0008 | Restaurant |
| *S.* Thompson | Feb | QC | 8 | PT 1 | - | Institution |
| | May - Sep | NS | 12 | PT 26 | STHAXI.0001 | Community |
| *S.* Typhimurium | Mar | SK | 2 | - | - | Family |
| | Jun | MB | 7 | PT 104 | - | Community - Pig Roast Picnic |
| | Aug | AB | 20 | PT 46 | STXAI.0214 | Restaurant |
| | Aug | BC | 3 | - | - | Community - House Party |
| | Aug | ON | 34 | - | - | Community - Birthday Party |
| | Aug | QC | 2 | - | - | Family |
| | Sep | BC | 17 | PT 164 | STXAI.0019 | Community - Wedding Reception |
| | Sep | BC | 2 | - | - | Family |
| | Sep | QC | 2 | - | - | Family |
| | Oct | BC | 3 | - | - | Bakery |

| Organism | Month | Province | No. Cases | PT | PFGE | Comments |
|---|---|---|---|---|---|---|
| *S.* ssp I 4,5,12:b:- | Jul - Aug | ON | 27 | Dundee var.2 | - | Community |
| | | | | | | |
| *S.* ssp I 4,5,12:i:- | Aug | BC | 2 | - | - | Restaurant - Steamed Chicken |
| | Nov | AB | 2 | - | - | Institution - Long Term Care |
| *E. coli O157 VTEC* | Jan | ON | 60 | PT 14a | - | Community - Robbie Burns Banquet - Haggis |
| | Mar | ON | 5 | PT 14a | - | Restaurant - Fast Food |
| | Apr | ON | 7 | PT 14 | ECXAI.0023 | Community - Beef Pastries |
| | May | ON | 3 | - | ECXAI.0801 | Community |
| | May | SK | 3 | PT 14a | ECXAI.0001 | Family – Hamburger |
| | Jun | AB | 4 | - | - | Day Care |
| | Jun | ON | 53 | PT 8 | - | Community - School Graduation Banquet |
| | Jul | AB | 3 | - | ECXAI.0381 | Community - Hotel Conference |
| | Jul | BC | 2 | - | - | Family |
| | Jul | ON | 2 | - | - | Community - Petting Farm – Calf |
| | Aug | NB | 8 | PT 14b | ECXAI.0052 | Community |
| | Aug | NB | 5 | PT 14a | ECXAI.0010 | Family |
| | Aug | SK | 2 | PT 14a | ECXAI.0073 | Family |
| | Oct | BC | 3 | - | - | Family |
| | Oct | ON | 2 | - | - | Family |
| | Nov | BC | 65 | - | - | Community - Petting Zoo |
| | Nov | QC | 2 | - | - | Family |
| | Dec | BC | 5 | - | - | Community |
| | | | | | | |
| *Campylobacter jejuni* | Aug | SK | 3 | - | - | Family |
| | Oct | SK | 2 | - | - | Family |
| | | | | | | |
| *Shigella boydii* 2 | Nov | AB | 2 | PT 6 | - | Family |
| | | | | | | |
| *Shigella sonnei* | Apr | QC | 2 | - | - | Family |
| | Apr | QC | 2 | - | - | Family |
| | May | QC | 2 | - | - | Family |
| | Jan | QC | 3 | - | - | Community |
| | Aug | QC | 3 | - | - | Community - Camping Event |
| | Jul | QC | 15 | - | - | Hospital - Staff - Salad Bar |
| | Jun | AB | 4 | - | - | Community |
| | Jun | AB | 8 | - | - | Community |
| | Aug | ON | 12 | - | - | Community - Youth Camp |
| | Oct | NB | 12 | - | - | Family Event |
| | Dec | QC | 10 | PT 1 | - | Community - Gay Males |
| | | | | | | |
| *Shigella dysenteriae* | Mar | ON | 3 | - | - | Family |
| | | | | | | |
| *Yersinia enterocolitica* | Feb | BC | 2 | - | - | Family |
| | | | | | | |
| *Cryptosporidium* | Oct - Dec | BC | 4 | - | - | Community - Public Swimming Pool |

(a) = Predominant Phage Type, (b) = Predominant xbaI PFGE pattern, (c) = Not available.

# SECTION 9: MISCELLANEOUS INFORMATION

## Table 23: Travel Related Enteric Pathogen Infections, 2002

| Organism | Country of Travel |
|---|---|
| *C. coli* | 1 Mexico, 1 Thailand. |
| *C. jejuni* | 1 Bali, 1 Boliva, 2 Cuba, 2 India, 1 Jamaica, 6 Mexico, 1 Russia, 1 United Kingdom. |
| | |
| *Cryptosporidium* | 1 Kenya. |
| *Cyclospora cayetanensis* | 1 Columbia, 1 Mexico, 1 Morocco. |
| *Entamoeba histolytica/dispar* | 1 Africa, 1 Asia, 1 China, 1 Egypt, 1 Haiti, 1 Mexico, 1 Pakistan. |
| *Giardia* | 2 Africa, 1 Asia, 2 Brazil, 1 China, 2 Columbia, 1 Haiti, 1 India, 1 Mexico, 1 Thailand. |
| | |
| *E. coli* O157 VTEC | 1 Africa, 1 Mexico, 1 United Kingdom. |
| | |
| *S*. Agona | 1 Bali, 1 Cuba, 1 Mexico. |
| *S*. Albany | 1 Brazil. |
| *S*. Bonariensis | 1 Jamaica. |
| *S*. Bredeney | 1 Cuba. |
| *S*. Choleraesuis | 1 Dominican Republic, 1 Thailand. |
| *S*. Eastbourne | 1 Cuba. |
| *S*. Enteritidis | 1 Australia, 5 Cuba, 9 Dominican Republic, 1 Kenya, 9 Mexico, 2 Spain, 2 United States of America. |
| *S*. Give | 1 Pakistan. |
| *S*. Hadar | 1 China. |
| *S*. Heidelberg | 1 Costa Rica, 1 Jamaica, 1 Thailand. |
| *S*. Javiana | 1 Mexico. |
| *S*. Kentucky | 1 Indonesia, 1 Middle East. |
| *S*. Newport | 1 Cuba, 1 Thailand, 1 United States of America. |
| *S*. Oranienburg | 1 Africa, 2 Mexico. |
| *S*. Panama | 1 Costa Rica, 2 Mexico, 2 Nicaragua. |
| *S*. Paratyphi A | 1 Asia, 1 China, 5 India. |
| *S*. Paratyphi B | 1 India. |
| *S*. Paratyphi B var. Java | 1 Thailand. |
| *S*. Poona | 1 Bahamas. |
| *S*. Richmond | 1 China. |
| *S*. Rissen | 1 Thailand. |
| *S*. Rubislaw | 1 Venezuela. |
| *S*. Saintpaul | 1 Africa. |
| *S*. Stanley | 1 Malaysia. |
| *S*. Typhi | 6 India, 1 Pakistan. |
| *S*. Typhimurium | 4 Mexico, 1 Peru, 1 United States of America. |
| *S*. Umbilo | 1 Africa. |
| *S*. Virchow | 2 Thailand. |
| *S*. Weltevreden | 1 Cook Islands, 1 Indonesia, 1 Philippines. |
| *Salmonella* ssp I 4,5,12:b:- | 1 Kampuchea, 1 Thailand. |
| | |
| *S. boydii* 1 | 1 India. |
| *S. boydii* 4 | 1 India. |
| *S. boydii* 10 | 1 Bangladesh. |
| *S. boydii* 19 | 1 Bangladesh. |
| *S. boydii* 20 | 2 Cuba, 1 Guatemala. |
| | |
| *S. dysenteriae* 16 | 1 Haiti |
| | |
| *S. flexneri* 1 | 1 Mexico, 1 Peru and 1 Sudan. |
| *S. flexneri* 2 | 1 Caribbean, 1 Dominican Republic. |
| *S. flexneri* 3 | 1 India. |
| *S. flexneri* 6 | 1 Brazil, 1 India, 1 Mexico, 1 Pakistan. |
| *S. flexneri* Prov. SH104 | 2 Haiti. |

| Organism | Country of Travel |
|---|---|
| *S. sonnei* | 1 Costa Rica, 1 Dominican Republic, 1 Egypt, 3 India, 13 Mexico, 1 Pakistan, 1 Russia, 1 Venezuela. |
| | |
| *Shigella* sp. | 1 Cuba. |
| | |
| *V. cholerae* O1 | 1 Bangladesh. |
| *V. cholerae* non-O1/O139 | 1 Cuba, 3 Mexico, 1 Thailand. |
| *V. parahaemolyticus* | 1 Vietnam. |
| *Y. enterocolitica* | 2 Cuba, 2 Mexico. |

# Table 24: Travel Related Enteric Pathogen Infections, 2003

| Organism | Country of Travel |
|---|---|
| *C. coli* | 1 Asia, 2 Dominican Republic, 1 India, 2 Mexico. |
| *C. jejuni* | 1 Cuba, 1 Dominican Republic, 1 Ecuador, 1 India, 1 Mexico, 1 United States of America. |
| *C. jejuni/coli* | 1 Morocco. |
| *Campylobacter* sp. | 1 Romania. |
| *Cryptosporidium* | 1 Mexico. |
| *E. coli* O157 VTEC | 1 Mexico, 1 United States of America. |
| *Entamoeba histolytica/dispar* | 1 Africa, 2 Haiti, 2 Mexico, 1 Romania, 2 Thailand, 1 Tunisia. |
| *Giardia* | 1 Africa, 1 Asia, 2 Brazil, 4 Haiti, 1 India. |
| *Hymenolepis nana* | 1 Somalia. |
| *S.* Agona | 1 Dominican Republic. |
| *S.* Albany | 1 Asia. |
| *S.* Anatum | 1 Cuba. |
| *S.* Arechavaleta | 1 St. Lucia. |
| *S.* Enteritidis | 8 Cuba, 1 Dominican Republic, 1 Indonesia, 7 Mexico, 1 Thailand, 1 United States of America. |
| *S.* Heidelberg | 1 Greece, 1 Mexico. |
| *S.* Infantis | 1 Mexico. |
| *S.* Jamaica | 1 Costa Rica. |
| *S.* Javiana | 1 Cuba. |
| *S.* Kibusi | 1 Cameroon. |
| *S.* Lagos | 1 Africa. |
| *S.* London | 1 Mexico. |
| *S.* Mississippi | 1 Caribbean. |
| *S.* Muenster | 1 Kenya. |
| *S.* Newport | 2 Egypt, 1 El Salvador, 1 United States of America. |
| *S.* Paratyphi A | 2 India, 1 Pakistan. |
| *S.* Rissen | 1 Hong Kong, 1 Thailand. |
| *S.* Saintpaul | 1 Congo, 1 Hong Kong, 1 Mexico. |
| *S.* Stanley | 1 Thailand. |
| *S.* Telelkebir | 1 Caribbean. |
| *S.* Typhi | 1 Bangladesh, 1 India, 1 Nepal, 1 Pakistan. |
| *S.* Typhimurium | 1 Costa Rica, 1 Cuba, 1 Czech Republic, 1 Mexico, 1 Morocco, 1 St. Lucia, 1 Thailand. |
| *S.* Uganda | 1 Dominican Republic, 1 Mexico. |
| *S.* Weltevreden | 1 Haiti. |
| *S.* ssp I 9,12:-:e,n,z15 | 1 Cuba. |
| | |
| *S. boydii* | 2 Mexico. |
| *S. boydii* 8 | 1 India. |
| *S. boydii* 12 | 1 India. |
| *S. boydii* 14 | 1 India. |
| *S. boydii* 20 | 1 Chile. |
| | |
| *S. flexneri* | 3 Dominican Republic, 1 India, 1 Pakistan. |
| *S. flexneri* 1 | 1 Mexico. |
| *S. flexneri* 2 | 2 Dominican Republic, 1 Mexico, 1 Pakistan, 1 Uganda. |
| *S. flexneri* 3 | 1 India, 1 Africa, 4 Congo, 1 India, 2 Mexico. |
| *S. sonnei* | 3 Costa Rica, 4 Cuba, 1 Ecuador, 1 Ghana, 1 India, 5 Mexico, 1 Morocco, 1 Tansania, 1 Togo. |
| *Shigella* sp. | 1 India. |
| | |
| *V. cholerae* non O1 | 1 Mexico. |
| *V. cholerae* non-O1/O139 | 1 Cuba, 1 Dominican Republic, 1 Ecuador, 1 India, 1 Mexico. |
| *V. mimicus* | 1 Mexico. |
| *V. parahaemolyticus* | 1 Mexico. |
| | |
| *Y. enterocolitica* | 2 Cuba, 1 Ecuador, 1 France, 1 Poland, 1 Tonga Islands. |

Travel information in Tables 23 and 24 is supplied to the NESP and supplemented with data submitted with specimens forwarded to the NML for reference services.

# Table 25: Unusual Isolation Sites of Enteric Pathogen Infections, 2002

| Isolation Site | Organism | Total |
|---|---|---|
| Abcess | *S.* Heidelberg | 1 |
| Abdomen | *S.* Blockley | 1 |
| Blood | *C. coli* | 1 |
| | *C. jejuni* | 2 |
| | *C. fetus* ssp fetus | 2 |
| | *C. upsaliensis* | 2 |
| | *S.* Berta | 1 |
| | *S.* Bredeney | 1 |
| | *S.* Dublin | 2 |
| | *S.* Enteritidis | 21 |
| | *S. flexneri* 2a | 1 |
| | *S.* Heidelberg | 79 |
| | S. Hithergreen | 1 |
| | *S.* Muenster | 1 |
| | *S.* Newport | 1 |
| | *S.* Oranienburg | 5 |
| | *S.* Panama | 1 |
| | *S.* Paratyphi A | 4 |
| | *S.* Paratyphi B | 1 |
| | *S.* Paratyphi B var. Java | 1 |
| | *S.* Saintpaul | 3 |
| | *S.* Sandiego | 1 |
| | *S.* Schwarzengrund | 1 |
| | *S.* Stanley | 1 |
| | *S.* Thompson | 3 |
| | *S.* Typhi | 61 |
| | *S.* Typhimurium | 13 |
| | *S.* Virchow | 1 |
| | *S.* spp I 4,5,12:i:- | 2 |
| | *S. sonnei* | 1 |
| | *Y. enterocolitica* | 2 |
| Bone | *S.* Typhimurium | 1 |
| Cerebral Spinal Fluid | *S.* Oranienburg | 1 |
| Ear | *V. cholerae* non-O1/O139 | 2 |
| Gall Bladder | *S.* Heidelberg | 1 |
| Peritoneal Fluid | *S.* Heidelberg | 1 |
| | *S.* Oranienburg | 1 |

| Isolation Site | Organism | Total |
|---|---|---|
| Sinus | *S.* Paratyphi A | 1 |
| Sputum | *S.* Litchfield | 1 |
| Urine | *E. coli* Inactive | 1 |
| | *E. coli* O6:HM | 1 |
| | *E. coli* O75:NM | 1 |
| | *S.* Adelaide | 2 |
| | *S.* Albany | 1 |
| | *S.* Anatum | 2 |
| | *S.* Baildon | 1 |
| | *S.* Brandenburg | 2 |
| | *S.* Bredeney | 1 |
| | *S.* Enteritidis | 6 |
| | *S.* Give | 1 |
| | *S.* Hadar | 2 |
| | *S.* Heidelberg | 28 |
| | *S.* Infantis | 3 |
| | *S.* Javiana | 1 |
| | *S.* Mbandaka | 1 |
| | *S.* Newport | 3 |
| | *S.* Oranienburg | 7 |
| | *S.* Paratyphi B | 1 |
| | *S.* Paratyphi B var. Java | 2 |
| | *S.* Rubislaw | 1 |
| | *S.* Saintpaul | 2 |
| | *S.* Sandiego | 2 |
| | *S.* sonnei | 1 |
| | *S.* Thompson | 1 |
| | *S.* Tilene | 1 |
| | *S.* Typhimurium | 13 |
| | *S.* Typhi | 1 |
| | *Salmonella* ssp I 4,12:-:- | 1 |
| | *Salmonella* ssp I 4,5,12:i:- | 3 |
| | *Salmonella* ssp I Rough-O:i:1,2 | 1 |
| | *Salmonella* ssp IIIb 50:-:- | 1 |
| | *Salmonella* ssp IIIb 60:r:e,n,z15 | 1 |
| | *Y. enterocolitica* | 2 |
| Vaginal Swab | *S.* Heidelberg | 1 |
| Wound | *S.* Enteritidis | 1 |
| | *S.* Muenster | 1 |
| | *S.* Schwarzengrund | 1 |

# Table 26: Unusual Isolation Sites of Enteric Pathogen Infections, 2003

| Isolation Site | Organism | Total |
|---|---|---|
| Abdomenal cyst | *S.* Virchow | 1 |
| Abscess (Breast) | *S.* Heidelberg | 3 |
| Abscess (Chest Wall) | *S.* Heidelberg | 1 |
| Abscess (Liver) | *S.* Uganda | 1 |
| Abscess (Spleen) | *S.* Heidelberg | 1 |
| Aspirate | *S.* Oranienburg | 1 |
| Appendicitis | *S.* Heidelberg | 1 |
| Blood | *C. fetus* ssp fetus | 1 |
| | *C. jejuni* | 1 |
| | *S.* Agona | 1 |
| | *S.* Bergen | 1 |
| | *S.* Berta | 1 |
| | *S.* Brandenburg | 2 |
| | *S.* Bredeney | 1 |
| | *S.* Dublin | 1 |
| | *S.* Enteritidis | 19 |
| | *S.* Haardt | 1 |
| | *S.* Hadar | 4 |
| | *S.* Heidelberg | 122 |
| | *S.* Indiana | 1 |
| | *S.* Infantis | 1 |
| | *S.* Lomalinda | 1 |
| | *S.* Minnesota | 4 |
| | *S.* Muenchen | 2 |
| | *S.* Newport | 3 |
| | *S.* Paratyphi A | 10 |
| | *S.* Paratyphi B | 2 |
| | *S.* Paratyphi B var. Java | 2 |
| | *S.* Rubislaw | 2 |
| | *S.* Saintpaul | 2 |
| | *S.* Schwarzengrund | 1 |
| | *S.* Stanley | 1 |
| | *S.* Thompson | 2 |
| | *S.* Typhi | 51 |
| | *S.* Typhimurium | 19 |
| | *S.* Virchow | 2 |
| | *Salmonella* ssp I 4,5,12:b:- | 3 |
| | *Salmonella* ssp IV 16:z4,z32:- | 1 |
| | *Shigella flexneri* 2 | 1 |
| | *Shigella sonnei* | 1 |
| Biopsy | *S.* Dublin | 1 |
| Bowel | *Salmonella* ssp I 4,5,12:i:- | 1 |
| Cerebral Spinal Fluid | *S.* Heidelberg | 1 |
| Dialysis Line | *Y. enterocolitica* | 1 |
| Ear | *V. alginolyticus* | 3 |
| | *V. cholerae* non-O1/O139 | 3 |
| Expectoration | *Salmonella* ssp IIIb 61:k:1,5,7 | 1 |
| Gall Bladder | *Salmonella* ssp I Rough-O:e,h:1,2 | 1 |
| Joint Fluid | *S.* Enteritidis | 1 |
| Leg | *S.* Typhimurium | 1 |
| Peritoneum | *Campylobacter fetus* ssp fetus | 1 |
| | *S.* London | 1 |
| | *S.* Mikawasima | 1 |
| | *S.* Thompson | 1 |
| Sputum | *S.* Bredeney | 1 |
| | *Salmonella* ssp IIIb 61:k:1,5 | 1 |
| Urine | *E. coli* O25:NM | 2 |
| | *E. coli* O157 VTEC | 3 |
| | *S.* Agona | 6 |
| | *S.* Albany | 1 |
| | *S.* Amager | 1 |
| | *S.* Amsterdam | 2 |
| | *S.* Anatum | 2 |
| | *S.* Apapa | 1 |
| | *S.* Bareilly | 1 |
| | *S.* Berta | 1 |
| | *S.* Braenderup | 3 |
| | *S.* Brandenburg | 3 |
| | *S.* Brazzaville | 1 |
| | *S.* Dublin | 1 |
| | *S.* Enteritidis | 6 |
| | *S.* Eschberg | 1 |
| | *S.* Hadar | 6 |
| | *S.* Havana | 1 |
| | *S.* Heidelberg | 46 |
| | *S.* Infantis | 3 |
| | *S.* Javiana | 3 |
| | *S.* Kentucky | 1 |
| | *S.* Kintambo | 1 |
| | *S.* Manhattan | 1 |
| | *S.* Mbandaka | 1 |
| | *S.* Montevideo | 1 |
| | *S.* Muenchen | 2 |
| | *S.* Newport | 8 |
| | *S.* Oranienburg | 4 |
| | *S.* Paratyphi B var. Java | 1 |
| | *S.* Pomona | 1 |
| | *S.* Potsdam | 1 |
| | *S.* Richmond | 1 |
| | *S.* Rissen | 1 |
| | *S.* Saintpaul | 1 |
| | *S.* Schwarzengrund | 1 |
| | *S.* Stanley | 1 |
| | *S.* Stanleyville | 1 |
| | *S.* Thompson | 1 |

| Isolation Site | Organism | Total |
|---|---|---|
| Urine | *S*. Typhi | 1 |
| (continued) | *S*. Typhimurium | 10 |
| | *S*. Uganda | 1 |
| | *S*. Urbana | 1 |
| | | |
| | *Salmonella* ssp I Rough-O:-:- | 3 |
| | *Salmonella* ssp I Rough-O:e,h:1,2 | 1 |
| | *Salmonella* ssp I 4,5,12:i:- | 1 |
| | *Salmonella* ssp I Rough-O:m,t:- | 1 |
| | *Salmonella* ssp I Rough-O:r:1,2 | 1 |
| | *Salmonella* ssp IIIb 60:r:z | 1 |
| | *Salmonella* ssp IIIb 61:i:z | 1 |
| | *V. cholerae* Non O1/Non O139 | 1 |
| | | |
| | | |
| Uterus | *S*. Lomalinda | 1 |
| | | |
| Umbilical cord | *Salmonella* ssp I 3,15:l,v:- | 1 |
| | | |
| Wound | *S*. Typhi | 1 |

# APPENDIX 1 : DISCUSSION OF DATA SOURCES

The past few issues of the Annual Summary have been part of an effort to update and formalize this report series. Annual Summaries for 1995 and earlier years were data reports with tables and figures. Beginning in 1996, we adopted a descriptive report format and the 1997 Annual Summary saw an improvement in the textual information, even though the contents continued to be aimed at directing the reader to find the raw numbers of interest; very little interpretation was given. Production of the 1998 Annual Summary involved a fundamental shift in our handling of enteric data. Notably, the component data sets began to be stored by source, allowing a more balanced set of estimates of the number of lab-confirmed isolates in Canada. A simple estimator, the maximum value among the overlapping data sets, was introduced, based on the assumption that over-estimation is not likely. All of this work made the information easier to access, and organized the available data sets in anticipation of their more effective use. The 1999 and 2000 were completed with further enhancements and data clarification early in 2002. The 2001 Annual Summary attempted to redesign some of the figures and tables to convey more meaningful information. Footnotes and explanations have been added to help the reader understand the data sets and limitations of the information presented. This combined 2002 and 2003 Annual Summary will allow the reporting processes to be up to date and address data acquisition issues involved in the compilation of the *Campylobacter* reporting. To facilitate the production of this report quickly, the 2003 *Campylobacter* data will be included in the 2004 annual summary.

Although data on acute gastro-intestinal illness (AGI) is routinely collected as part of a passive surveillance system, AGI remains significantly under-reported, and consequently under-counted in Canada. The under-reporting of this illness results from the relatively small number of ill patients who seek medical attention, despite AGI being quite common in the Canadian population. According to preliminary data resulting from the National Studies on Acute Gastro-intestinal Illness (Foodborne, Waterborne and Zoonotic Infections Division, CIDPC), only a small fraction (13%) of the approximately 1 in 5 people who do seek care for AGI, are requested to submit a specimen for laboratory testing. Consequently, the data on the enteric pathogens presented in this report represent only the "tip of the iceberg".

Currently in Canada, surveillance of disease caused by gastro-intestinal pathogens is accomplished through two separate, yet complementary systems: a laboratory based and an epidemiologically based method of collecting data. Generally, an illness is recorded when an individual seeks medical assistance from their local doctor, a specimen is collected for analysis, the specimen is tested, a pathogen isolated, identified and reported to the provincial health laboratory. A local lab may forward an isolate on to the provincial health laboratory for further testing and/or confirmation, which is then captured by the National Enteric Surveillance Program (NESP). In turn, the provincial laboratory may forward the culture on to the national laboratory for further characterization.

Within the epidemiology arm, the National Notifiable Diseases Reporting System (NDRS) receives data that are collected on a mandatory basis by the local health units for an established set of communicable diseases. Eight provinces and territories (BC, AB, SK, ON, QC, NF, YK and NU) provide case-by-case reports that include demographic, clinical, laboratory (minimal) and additional epidemiologic data. The remaining provinces and territories (NB, NS, PE, MB and NT) report aggregate data. Because legislation requires the reporting of this information by the health units, the epidemiologically based processes tends to be more reliable for total numbers of illnesses (i.e. Salmonellosis). The NESP data however, supplemented with the National Microbiology Laboratory (NML) characterizations, has better strain characterization information (i.e. numbers of *Salmonella* ssp I 4,5,12:i:- isolations).

Discrepancies in numbers between the two surveillance systems can be largely attributed to under-reporting caused by interruptions in the data transfer chain.

Weekly reports of laboratory-based analysis at the provincial laboratories forwarded as part of the NESP are summarized for annual numbers. In addition, ten provincial laboratories send us paper/electronic reports: some send monthly reports, some annual, and some send data in raw form or reports specifically produced for this document. The non-human data arrive in monthly and an annual paper report from Laboratory for Foodborne Zoonoses, Guelph, Ontario (LFZ) and data is selected and interpreted for this compilation. The Centre for Infectious Disease Prevention and Control (CIDPC) provides annual totals of gastro-intestinal disease information from their NDRS database. Data from NML is collected from various paper and electronic sources: from the Laboratory Data Management System / Canadian Integrated Public Health Surveillance (LDMS/CIPHS), our current operational database at NML; from specialized custom electronic databases (e.g., data from the Molecular Typing Laboratory and Phage Typing, Antimicrobial Resistance and Surveillance Laboratory); and from handwritten laboratory notebooks.

Given the large number of data sets and sizes of the data matrices, the accurate and timely production of this report presents a major challenge. Another characteristic of enteric data is that, while all numbers are categorical (counts), most are so small that they could be treated as binary (presence/absence) without loss of information, while a few exhibit large enough counts that their data can be treated as continuous. Another challenge stems from the fact that not all data within a particular database are equally meaningful, one datum may represent one case of human illness, a different datum may represent many cases (as is the case with outbreaks). Not all databases are of uniform quality and the differences must be addressed. For example, some databases result as isolates are submitted at the good will of the submitting doctor or nurse, while other databases result as isolates are submitted as part of a formal data collection program.

Lastly, since the data sets are not random samples meant to estimate some population parameter, it is even hard to visualize usual statistics, like accuracy and precision. If there was only one database for each category of information (e.g., data from human isolates in Manitoba), then we would have one unambiguous estimate of the number of lab-confirmed cases of enteric pathogens in that category. However, there is usually more than one data set corresponding to each category and specimens and isolates are often sent between regions for analysis using specialist expertise that may exist there. It is a challenge even to correctly produce an estimate of the number of isolates processed through Canadian laboratories. The laboratory data are attractive and useful mainly because they are available, often extending back in time many years.

It is thus clear that it is desirable that the data sets be treated systematically with regards to data quality. Yet, given the nature of the data, there is no systematic, analytical way of determining data quality. The only way to end up with the best data estimates is to deal carefully with each dataset, with as much knowledge about their origin and characteristics as available. This, at least, will ensure the best possible estimates. Now that the datasets are stored separately, it is possible to evaluate them. This is done below, by type of organism.

## Human *Salmonella*

The reported number of isolates in the provincial reports and NESP are very similar. The individual differences are quite unique: both *Salmonella* sp. and *Salmonella* ssp. I are consistently higher in NESP and this may be a product of the timely reporting inherent in the design of NESP. By subtracting numbers, for example of *S.* Heidelberg and *S.* Typhimurium found in the LDMS/CIPHS database (as a result of reference services provided by NML) from

the total reported *Salmonella* serogroup B numbers, a more accurate estimate can be achieved. As well, by adding a number of a generic group of *Salmonella* sp. to the totals to adjust level to those reported by the NDRS database, and thereby maintaining a constant denominator, the relative proportions of organisms can be compared from year to year. Differing identification procedures and antisera availability across provinces affect accuracy of the data, however proficiency testing is improving testing comparability.

*Salmonella* phage types

Analyses showed that the overlap between the NML and the LFZ data are minimal, with the NML database contributing information mainly about human isolates and LFZ data relating mainly to animal isolates. The non-human data are mainly from agriculture and veterinary labs; many isolates also come from Canadian Food Inspection Agency (CFIA) laboratories and Health Canada research laboratories. The few human samples that are recorded in LFZ's reports are mainly from research projects. Isolates are submitted to LFZ and NML for routine reference services, passive surveillance, studies and outbreak investigations.

Non-human *Salmonella* serovars

Provincial distributions of LFZ data are considered reasonable approximations of what is actually happening in the field, with the possible exception of *S*. Heidelberg (Anne Muckle, LFZ, personal communication). As with the non-human phage type data, isolates are submitted mainly by the good will of agriculture, veterinary and university laboratories and are not part of a structured sampling plan.

*Escherichia coli*

*E. coli* data is based largely on isolations reported to the NESP and supplemented with identifications from NML reference services. Few provinces routinely report fully antigenically characterized verotoxigenic *E. coli* isolations and therefore the values represented are largely those that have been forwarded to the NML. A national reporting standard for all VTEC is needed in order to provide a complete national picture of disease caused by this group of organisms.

It is difficult to assess the importance to human disease in Canada of the non-O157 *E. coli* organisms. The independent submission of isolates with the same serotype from different provinces suggests that laboratory surveillance may be detecting events occurring over larger geographical areas. However, the limited number of reported isolates makes it difficult to separate possible events or trends from chance associations, or to follow up on such cases epidemiologically. It is likely that the number of illnesses caused by these organisms is higher than the available data indicate. For example, the provincial laboratory in British Columbia currently reports the majority of human infections of non-O157 VTEC in Canada. Increased detection of these organisms in some provinces appears to be the result of enhanced surveillance through the use of testing protocols specific for VTEC. Assuming that non-O157 VTEC are found in the same ratio to the population as in the rest of Canada, this *E. coli* virulence group contributes significantly to morbidity due to enteric pathogens throughout the country. Since the disease symptoms of a subset of the non-O157:H7 VTEC are as severe as those for *E. coli* O157:H7, it would seem that future surveillance systems should consider testing for all VTEC across Canada.

Finally, please note that the EPEC were designated as such only on the basis of serotype, not on the basis of the FAS test or the presence of the *eae* gene in the absence of verotoxin genes.

*Campylobacter, Arcobacter,* and *Helicobacter*

Large differences exist between numbers of reported *Campylobacter jejuni/coli* cases in the NDRS database (epidemiology side) and the NML/NESP database (laboratory side). For example, in 1998, 10- to 31-fold differences existed between the numbers of *Campylobacter* cases reported in the NDRS database and the NML/NESP database in Ontario, Québec, British Columbia and Alberta, with the number of *Campylobacter* cases in the NDRS database being consistently higher. Due to the very large number of specimens, isolates are sent or reported from local laboratories to the provincial/territorial laboratories with lower frequencies. Information pertaining to these isolates is therefore made available only by reporting of cases through the health units to provincial epidemiologists, which contributes to the differences between the databases. Since isolates of other species of *Campylobacter* have been sent for laboratory confirmation, the two data sets are in better agreement.

*Arcobacter* and *Helicobacter* are no longer included in the summary because of improved laboratory identification methods have resulted in the mis-identification of *Campylobacter* is now a rarity and information on these other organisms is no longer deemed necessary to gain a full picture of the isolation of *Campylobacter* in Canada.

*Shigella*

There were many differences between the provincial and NESP databases but total numbers were relatively comparable. It could be that the differences are due to reporting, but it is not clear which are the most accurate data. Travel information has been identified as a risk factor for Shigellosis, however it is inconsistently reported. Data was supplemented by reference service identifications held in the NML database.

*Yersinia*

Although not a nationally notifiable disease, and listed as reportable in only 7 provinces, *Yersinia* constitutes a considerable proportion of gastro-intestinal disease in Canada. Reported numbers of disease are likely under reported and data may not be representative of true incidence.

Parasites

Parasitic gastro-intestinal infections, such as *Cryptosporidium*, *Cyclospora*, *Entamoeba* and *Giardia*, have recently become of more interest and private laboratories are referring more testing to the provincial labs. Currently in many provinces, analysis of stool specimens for parasites is only done for specific requests by physicians or for cluster related specimens that are forwarded to the provincial laboratories. Although *Giardia* has been nationally notifiable for some time, *Entamoeba* is currently not and *Cryptosporidium* and *Cyclospora* were notifiable only since January 2000. Therefore numbers of isolations reported will not be representative of all cases occurring in Canada.

## Viruses

Enteric viruses (Norwalk-like virus, Calicivirus, Rotavirus, etc.) are currently not represented in this compilation. Differing identification capabilities across Canada make it impossible to collect and summarize this data in a reasonable and standardized way. As the importance of this group of organisms to public health becomes more evident, cases of infection will be reported more reliably to current surveillance systems and then may be included in future annual summaries.

## The Future

Progress is now being made in dealing with data standardization problems. An annual meeting of NESP stake-holders was initiated in 2001 and this is an important step in the process of obtaining a shared understanding of Canadian enteric disease reporting. There have recently been national meetings concerned with laboratory standardization and new initiatives by the CIDPC in conjunction with the NML, the LFZ, CPHLN and the Bureau of Microbial Hazards, Food Directorate and Healthy Products and Foods Branch, are aimed at developing a more comprehensive and complete national surveillance system. Cooperation and coordination between the various contributors to enteric surveillance in Canada continues to improve and new programs such as the Canadian Integrated Program for Antimicrobial Resistance (CIPARS) will enhance data validity.

By looking at the Canadian experience in an international perspective, it is useful to note that systems in use in the U.S., U.K. and Australia also collect only a small fraction of cases and outbreaks that actually occur. These deficiencies in data collection can be addressed through the implementation of a system analogous to the FoodNet system in the U.S. In such a case, the laboratory isolation data and reports of food-borne illness incidents would become only two components of a surveillance system that would also collect data through systems providing early alert of disease and the use of special epidemiological studies and surveys to determine a more accurate level of morbidity. Recent developments in this area include NSAGI, C-EnterNet, PulseNet Canada, Canadian Integrated Outbreak Surveillance Centre, Canadian Network for Public Health Intelligence and a web-based National Enteric Surveillance Program.

Information pertaining to isolates from animals suffers from similar deficiencies. There has never existed a nationwide network for obtaining a statistically valid sample of enteric bacteria infecting animals. Most data are collected through special projects and collated by the LFZ, while some data are collected by provincial PPHLs and reported through the NESP or in monthly/annual/ad hoc reports.

This report gives an estimate of the types of pathogenic enteric organisms circulating within Canada; identifies broad trends in populations of these enteric pathogens; identifies unusual public health events; identifies gaps where more surveillance data needs to be collected; and identifies knowledge gaps requiring further research. We trust that this report will be both informative and useful to you.