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ISSN 1181-960X**CLOSTRIDIUM PERFRINGENS
OUTBREAK AT CHRISTMAS
BANQUET****Introduction**

On December 15, 2000, the Porcupine Health Unit received a call from a school in Timmins. The Principal of the school reported that some students and staff were experiencing gastrointestinal symptoms. He suspected the illness was associated with the school's Christmas banquet that they had attended the previous day.

Background

The Porcupine Health Unit Inspection staff responded to the complaint immediately. Enteric outbreak kits were provided to the Principal for distribution to the affected students, staff and their families. One-hundred-and-twenty people attended the banquet. Some attendees had taken left-over food home. After becoming aware that many people who attended the banquet became ill, the Principal phoned and advised them to discard the left-over food. All persons not reached by the Principal were visited by the Porcupine Health Unit staff and advised not to consume left-over food from the banquet.

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The Principal reported that the roast beef was prepared at a private residence by a person experienced in food handling. The person who cooked the food reported that, on December 13, 2000, six beef roasts were delivered to him at about 10:30 a.m. Three roasts were pan fried to seal in the juices and put the oven preheated to 400° F at about 11:00 a.m. The roasts were cooked in an oven at 450°F for ten minutes and subsequently cooked for 2.5 hours at 350°F. At about 2:00 p.m., the roasts were removed from the oven and kept in a refrigerator. Temperatures were not taken during or after cooking. The second batch was taken out of the refrigerator and was prepared in the same manner. Once cooked, the roasts were cut in half and kept in the refrigerator until the next morning.

At about 10:30 a.m., on December 14, 2000, the roasts were taken out of the refrigerator, taken to a butcher shop, and sliced by a machine. The meat was refrigerated after slicing. At about 12:45 p.m., the sliced roast was obtained from the butcher shop and transported to the banquet hall unrefrigerated. At the banquet hall, the volunteers washed their hands, divided the roasts into portions, and put them into the pan. The roasts were then reheated in an oven at a temperature of 258°F for 1.5 hours. The meal was served between 5:00 and 6:00 p.m. on December 14, 2000. Roast beef, gravy, baked potatoes, corn, salad, coffee, tea, pastry, and whipping cream were served at the banquet.

Methodology

A questionnaire was created in EpiInfo 6 (Centers for Disease Control, Atlanta) to obtain information about the food items the attendees consumed during the banquet,

onset times, symptoms, and other pertinent data. The Porcupine Health Unit staff administered the questionnaire to attendees by telephone.

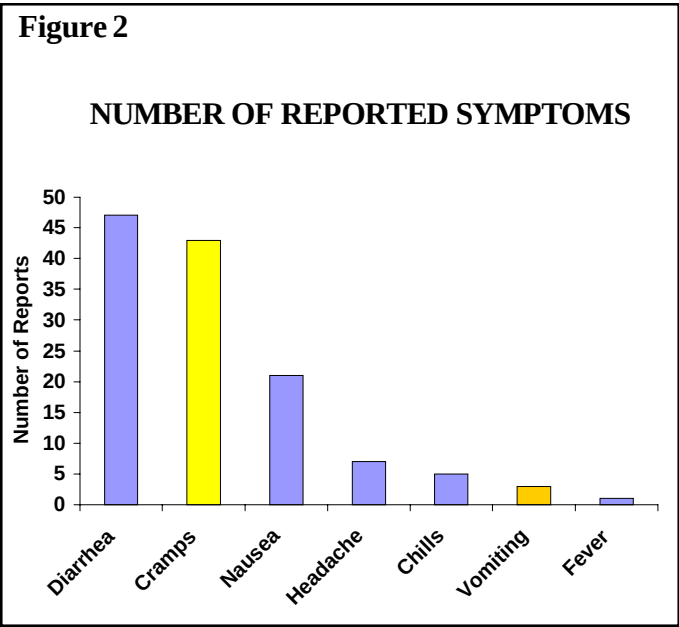
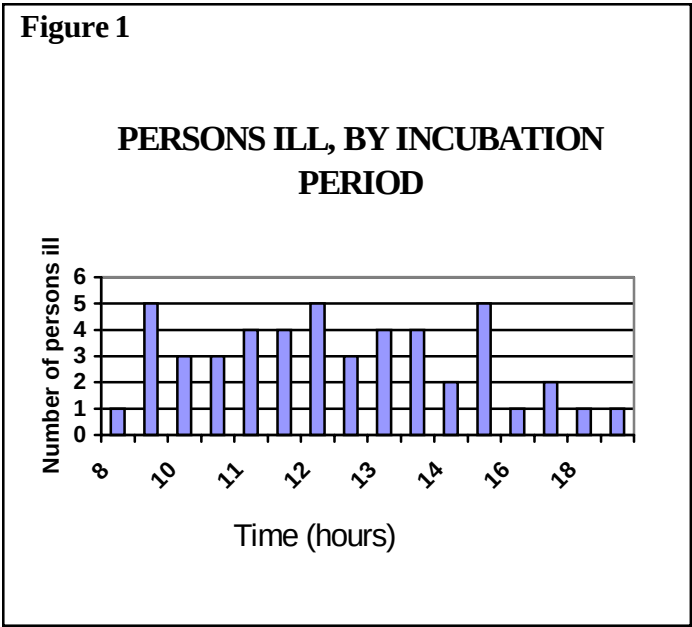
The questionnaire data were analysed using EpiInfo 2000 (Centres for Disease Control, Atlanta). A case-control study was conducted. Any person who had attended the banquet and developed one or more symptoms thereafter was considered a case. Any person who attended the banquet and did not develop any symptoms was classified as a control.

Stool samples and available left-over samples of roast beef and gravy were sent to the Timmins Public Health Laboratory for bacteriological examination. Environmental swabs taken from the slicing machine at the butcher’s shop were also submitted to the laboratory.

Results

Of the 120 persons who attended the banquet, 78 (65%) were contacted by telephone. Forty-eight cases (61.5%) and thirty controls (38.5%) were obtained. The remaining persons could not be contacted due to the lack of information such as the phone number or other personal identifiers.

The index case had an incubation period of eight hours and the onset of symptoms was about 2:00 a.m. on December 15, 2001. The median incubation period was 12.5 hours. The number of persons ill by incubation period is shown in Figure 1. Ninety-eight per cent of the cases reported diarrhea, 90% severe abdominal cramps, and three persons (6.3%) reported vomiting as a symptom of illness (Figure 2).



Analysis of food histories of cases showed that 94% (43/46) of cases had consumed roast beef at the banquet. Two cases could not recollect whether they ate roast beef. Eighty-three per cent (40/48) had consumed salad, 83% (40/48) had consumed gravy, 96% (46/48) had consumed corn and 96% (46/48) consumed baked potato with the meal. Sixty-seven per cent (20/30) of the controls ate roast beef, and 57% (17/30) consumed gravy. The highest attack rates were for roast beef 73% (46/63) and gravy 84% (48/57).

Chi-square tests revealed a significant association between consuming roast beef and becoming ill ($\chi^2=9.2$, $p < .01$), and consuming gravy and becoming ill ($\chi^2=6.7$, $p < .01$).

Roast beef and gravy were the only foods with significant odds ratios (OR). The OR for roast beef was 7.2 (95% CI [1.8, 28.9]) and the OR for gravy was 3.8 (95% CI [1.3, 10.9]).

Laboratory analyses of the two samples of the roast beef showed a heterotrophic plate count (HPC) of 1.2×10^5 and 1.4×10^5 , respectively. Left-over samples of roast beef and gravy showed excessive growth of *Clostridium perfringens* bacteria (i.e., greater than 2×10^6 organisms per gram of food). *Clostridium perfringens* were also detected in the stool samples of symptomatic cases. Further analysis and molecular serotyping of the bacteria showed identical serotype (8, 29) in the food and stool.

Discussion

The epidemiological investigation showed that roast beef and gravy were the most likely foods implicated in the outbreak. The two samples of the roast beef had elevated HPC's. It is reasonable to expect properly prepared and handled ready-to-eat foods have HPC's lower than 1×10^4 organisms per gram of food. An HPC greater than 10^5 per gram of food supports evidence of temperature abuse, inadequate cooking, or improper storage conditions.¹ In addition, laboratory analyses of the left-over samples of roast beef and gravy showed excessive growth of *C. perfringens* bacteria. The Ontario Ministry of Health and Long-Term Care have set the acceptable limit of less than 100 colony-forming units (cfu) of *C. perfringens* per gram of ready-to-eat foods.¹ Finally, *C. perfringens* were cultured from the case's stool and the isolates had the same molecular typing of the isolates from the food. These findings provide strong evidence that the illnesses were caused by roast beef, and/or gravy, contaminated by *C. perfringens*.

It is speculated that the time between transporting the sliced meat from the butcher shop and serving (4 hours) likely contributed to the outbreak. During this period, the food was not kept refrigerated, which may have allowed the initiation of germination and growth of *Clostridium* spores. The use of thermometers to monitor cooking and storage temperature would have assisted in detecting temperature abuse.

Different bacterial agents have relatively specific incubation periods. The median incubation period can be suggestive of the most probable pathogen implicated in an outbreak. The incubation period of 12.5 hours corresponds with the incubation period of *C. perfringens*. The average incubation period of *C. perfringens* is 6–24 hours, usually 10–12 hours.

The high incidence of diarrhea and abdominal cramps with a relatively low incidence of vomiting and fever are suggestive of *C. perfringens* intoxication. Nausea, chills, fever, headache were some of the other symptoms reported by the cases in this outbreak.

C. perfringens outbreaks are one of the more common foodborne illnesses encountered in Canada, usually associated with the improper holding temperatures of mostly meat products or meat. *C. perfringens* is part of the intestinal flora of all warm-blooded animals and can be found in low numbers in the environment.

The genus *Clostridium* is anaerobic. These bacteria have the ability to produce spores under adverse environmental conditions. Under conditions of nutritional depletion, each cell forms a single internal spore, which is liberated when the mother cell undergoes autolysis. The spore is a resting cell, highly resistant to desiccation, heat, and chemical agents. When returned to favourable nutritional conditions, the spore germinates to produce a single vegetative cell.² Food poisoning is caused by the release of enterotoxin in the intestine by sporulating organisms. *C. perfringens* food poisoning requires the ingestion of 10^8 to 10^9 vegetative cells per gram of food. A count of 10^5 organisms per gram of food is considered a sufficient level to incriminate *C. perfringens*.¹ In this case, the counts were greater than 2×10^6 organisms per gram of food. Spores also survive normal cooking temperatures, and can multiply during slow cooling, storage at ambient temperatures, and/or inadequate reheating.¹

The disease is associated with the ingestion of strains of *C. perfringens* of type A that are capable of forming heat

resistant spores. These strains are ubiquitous in the environment, and they have been isolated from a high proportion of samples of raw meat, animal feces, and occasionally from the feces of healthy persons. Outbreaks of clostridial food poisoning are usually associated with products such as gravy that provide an anaerobic environment. The meat is cooked at a temperature that enables the spores to survive and then the meat is left to stand at temperatures that allow growth. Symptoms usually appear within 10 – 24 hours after the ingestion of the contaminated food. Crampy abdominal pain and diarrhea are the major symptoms; nausea and vomiting are rare. Fever, headache, and other signs or symptoms of infection are seldom prominent.³

Conclusions

The food in this instance was cooked at a private residence by a volunteer. Educating the public about safe food-handling practices can help to reduce the number of these types of outbreaks. Partnering with community groups proved very effective at communicating the food safety message. In one study, the New England food safety specialists found that when volunteers were shown a ten-minute video and given material to take home, a positive impact was made.⁴ As a direct result of this outbreak, the Porcupine Health Unit initiated the following methods to promote food-handler education to the public at large.

- 1) Liaised with several volunteer organizations who prepare food and informed them about the importance of food safety lessons and the availability of such lessons free of charge at any convenient time that suits them.
- 1) Food handling courses were offered free of charge to any group interested in food safety.
- 3) The Porcupine Health Unit will continue to promote food safety awareness to the general public, through the quarterly news letter “Just for the Health of it” which is also available from their web-site:
<http://www.porcupinehu.on.ca/healthofit.html>.



ACKNOWLEDGEMENTS

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SOURCE

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Summary of Reportable Diseases in Ontario - May, 2002

Health Units by Region	Population 2000	AIDS	Campylo.	Chicken-pox	Chlamydia	Enceph./ Meningitis	GAS	Gonorrhea
Algoma	125,109		1	22	20		2	
North Bay	93,505			30	14			
Northwestern	91,920			20	26	1		3
Porcupine	93,680				9			
Sudbury	199,619			1	18			
Thunder Bay	158,698		1		22		1	2
Timiskaming	37,721			6	7			
Total - Northern	800,252		2	79	116	1	3	5
Eastern Ontario	194,945		5	40	19			
Hastings & Prince Edward	159,088		5	11	9		1	
Kingston, Frontenac & Lennox	180,225			25	38	1		1
Leeds, Grenville & Lanark	163,143						4	
Ottawa	779,274		19	315	79	2	4	17
Renfrew	101,131				7			
Total- Eastern n	1,577,806		29	391	152	3	9	18
Durham	512,271		14		60			5
Haliburton-Kawartha	168,120		6		7			
Muskoka-Parry Sound	86,218			8	2		1	
Peel	1,008,163		29	232	122	3		19
Peterborough	128,881	1	4	18	12	3		
Simcoe	377,405		5	141	29	1	2	1
Toronto - total	2,542,844		140	338	504	9	11	115
North	627,021		36	67	106	4	6	15
South	688,584		40	97	156		2	53
West	509,302		40	21	133	5	1	25
East	717,937		24	153	109		2	22
York	724,969		28	91	26	3	1	3
Total - Central East	5,548,871	1	226	828	762	19	15	143
Grey Bruce	157,664			4	5		1	
Elgin-St. Thomas	84,182		2	75	7	1	1	
Huron	61,097		5	37	2			
Chatham-Kent	112,897		1	6	3		2	
Lambton	131,643				1			
Middlesex-London	412,976		14		31	1		8
Oxford	102,561		4		5	1		
Perth	75,238		4	12	3			
Windsor-Essex	381,672		19		47	2		4
Total - Southwest	1,519,930		49	134	104	5	4	12
Brant	126,481		4	86	23			
Haldimand-Norfolk	109,536		3	15	4			
Halton	375,705		11	32	5	1	2	1
Hamilton	498,553		15	34	61	8	3	10
Niagara	423,600		7	374	16	2		2
Waterloo	446,833		12	40	53			2
Wellington-Dufferin-Guelph	241,777		7	31	16			1
Total - Central West	2,222,485		59	612	178	11	5	16
May 2002	11,669,344	1	365	2044	1312	39	36	194
* Total YTD 2002	-	18	1285	8046	7135	147	187	1160
* Total YTD 2001	-	59	1350	6007	6779	159	190	1211

The Toronto City regions above are now defined as: North - former North York; South - former City of Toronto; West - former Etobicoke and City of York; East - former Scarborough and East York

* A adjusted for deletions and late reports.

Summary of Reportable Diseases in Ontario - May, 2002

Health Units by Region	Population 2000	PPNG	Hepatitis A	Hepatitis B	Hepatitis C	Hib	Influenza	Measles	Meningo- coccal
Algoma	125,109				7				
North Bay	93,505				3				
Northwestern	91,920				3				
Porcupine	93,680						2		
Sudbury	199,619				6				
Thunder Bay	158,698	1			9				
Timiskaming	37,721						4		
Total - Northern	800,252	1			28		6		
Eastern Ontario	194,945				1				1
Hastings & Prince Edward	159,088								
Kingston, Frontenac & Lennox	180,225				7				
Leeds, Grenville & Lanark	163,143				2		4		
Ottawa	779,274		1		29		1		
Renfrew	101,131				2		1		
Total - Eastern	1,577,806		1		41		6		1
Durham	512,271						1		1
Haliburton-Kawartha	168,120				6				
Muskoka-Parry Sound	86,218				2				
Peel	1,008,163	2	1		25		4		
Peterborough	128,881				4				
Simcoe	377,405	1			19		1		
Toronto - total	2,542,844	2		3	131		7		1
<i>North</i>	<i>627,021</i>				27		4		
<i>South</i>	<i>688,584</i>	1		2	41		1		
<i>West</i>	<i>509,302</i>				27		2		
<i>East</i>	<i>717,937</i>	1		1	36				1
York	724,969				4				1
Total - Central East	5,548,871	5	1	3	191		13		3
Grey Bruce	157,664				1				
Elgin-St. Thomas	84,182				3				
Huron	61,097				2				
Chatham-Kent	112,897								
Lambton	131,643				9				
Middlesex-London	412,976				12				
Oxford	102,561				1				
Perth	75,238								
Windsor-Essex	381,672				12				
Total - Southwest	1,519,930				40				
Brant	126,481								
Haldimand-Norfolk	109,536				2				
Halton	375,705				4				
Hamilton	498,553		1		25				
Niagara	423,600				16	1			1
Waterloo	446,833	1	1		1				
Wellington-Dufferin-Guelph	241,777			1			2		
Total - Central West	2,222,485	1	2	1	48	1	2		1
May 2002	11,669,344	7	4	4	348	1	27		5
* Total YTD 2002	-	91	46	41	1,975	4	2151		24
* Total YTD 2001	-	64	66	87	2,314	2	762	6	57

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East - former Scarborough and East York

* A adjusted for deletions and late reports.

Summary of Reportable Diseases in Ontario - May, 2002

Health Units by Region	Population 2000	Mumps	Pertussis	Rubella	Salmon.	Shigellosis	Syphilis (Prim/Sec)	VTEC
Algoma	125,109				4			
North Bay	93,505							
Northwestern	91,920				1			
Porcupine	93,680				1			
Sudbury	199,619		1		1			
Thunder Bay	158,698							2
Timiskaming	37,721							
Total - Northern	800,252		1		7			2
Eastern Ontario	194,945		1		3	2		
Hastings & Prince Edward	159,088		2		1			
Kingston, Frontenac & Lennox	180,225	1						
Leeds, Grenville & Lanark	163,143					11		1
Ottawa	779,274				14	176	3	15
Renfrew	101,131							2
Total- Eastern	1,577,806	1	3		18	189	3	18
Durham	512,271				3	31		
Haliburton-Kawartha	168,120				1	3		
Muskoka-Parry Sound	86,218							
Peel	1,008,163		3		17	31		1
Peterborough	128,881		2					
Simcoe	377,405					4		
Toronto - total	2,542,844		3		47	190	9	4
<i>North</i>	627,021				14	19	1	1
<i>South</i>	688,584		2		16	89	7	2
<i>West</i>	509,302				13	67		1
<i>East</i>	717,937		1		4	15	1	
York	724,969		3		8	12		1
Total - Central East	5,548,871		11		76	271	9	6
Grey Bruce	157,664				2			5
Elgin-St. Thomas	84,182					1		
Huron	61,097				1			
Chatham-Kent	112,897				1	1		
Lambton	131,643							
Middlesex-London	412,976				4			
Oxford	102,561		1		1	13		
Perth	75,238					1		
Windsor-Essex	381,672				4	7		
Total - Southwest	1,519,930		1		13	23		5
Brant	126,481				3			
Haldimand-Norfolk	109,536				5	4		
Halton	375,705				4	1		
Hamilton	498,553				5	6		
Niagara	423,600					3		
Waterloo	446,833				6	1		1
Wellington-Dufferin-Guelph	241,777				8	1		
Total - Central West	2,222,485				31	16		1
May 2002	11,669,344	1	16		145	499	12	32
* Total YTD 2002	-	6	121	1	816	576	30	72
* Total YTD 2001	-	1	198	14	949	110	3	93

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* Adjusted for deletions and late reports.

Summary of Reportable Diseases in Ontario - April, 2002

Health Units by Region	Population 2000	AIDS	Campylo.	Chicken-pox	Chlamydia	Enceph./ Meningitis	GAS	Gonorrhea
Algoma	125,109		3		15	1		
North Bay	93,505			20	22	1		
Northwestern	91,920				21			1
Porcupine	93,680		1		19			
Sudbury	199,619		7	35	25	1	2	
Thunder Bay	158,698		4		40			3
Timiskaming	37,721				5			
Total - Northern	800,252		15	55	147	3	2	4
Eastern Ontario	194,945		4	8	14	1	1	
Hastings & Prince Edward	159,088		3	11	20			
Kingston, Frontenac & Lennox	180,225		3	9	25			1
Leeds, Grenville & Lanark	163,143		3					
Ottawa	779,274		10	129	82	1	2	14
Renfrew	101,131		2		7			
Total- Eastern	1,577,806		25	157	148	2	3	15
Durham	512,271		5		55	1		5
Haliburton-Kawartha	168,120		2		3		1	
Muskoka-Parry Sound	86,218			7	6	1		
Peel	1,008,163		28	179	119	3	1	18
Peterborough	128,881		2	35	11			
Simcoe	377,405		1	73	29			1
Toronto - total	2,542,844		79	281	539	6	4	145
<i>North</i>	<i>627,021</i>		<i>14</i>	<i>55</i>	<i>118</i>		<i>1</i>	<i>19</i>
<i>South</i>	<i>688,584</i>		<i>34</i>	<i>41</i>	<i>181</i>	<i>3</i>	<i>2</i>	<i>85</i>
<i>West</i>	<i>509,302</i>		<i>18</i>	<i>6</i>	<i>154</i>	<i>3</i>	<i>1</i>	<i>22</i>
<i>East</i>	<i>717,937</i>		<i>13</i>	<i>179</i>	<i>86</i>			<i>19</i>
York	724,969		25	118	37	3	3	3
Total - Central East	5,548,871		142	693	799	14	9	172
Grey Bruce	157,664		4	4	3		1	1
Elgin-St. Thomas	84,182		1	20	8			1
Huron	61,097		2	28	1			
Chatham-Kent	112,897			11	6			3
Lambton	131,643	1			1			
Middlesex-London	412,976		6		43		2	3
Oxford	102,561		3		2			
Perth	75,238		2	21	6			
Windsor-Essex	381,672		6	53	39	3	1	1
Total - Southwest	1,519,930	1	24	137	109	3	4	9
Brant	126,481			75	16			
Haldimand-Norfolk	109,536		2	22	5			1
Halton	375,705		7	3	14			1
Hamilton	498,553		6	91	75	4	2	9
Niagara	423,600		7	71	38			5
Waterloo	446,833		4	149	51	1		4
Wellington-Dufferin-Guelph	241,777		5	16	20	1	1	
Total - Central West	2,222,485		31	427	219	6	3	20
April 2002	11,669,344	1	237	1469	1422	28	21	220
* Total YTD 2002	-	17	920	6002	5823	108	151	966
* Total YTD 2001	-	43	995	4688	5416	117	157	947

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* Adjusted for deletions and late reports.

Summary of Reportable Diseases in Ontario - April, 2002

Health Units by Region	Population 2000	PPNG	Hepatitis A	Hepatitis B	Hepatitis C	Hib	Influenza	Measles	Meningo-coccal
Algoma	125,109				6		13		
North Bay	93,505			1	3		9		
Northwestern	91,920				2		1		
Porcupine	93,680				1		5		
Sudbury	199,619				10		7		
Thunder Bay	158,698				7		6		
Timiskaming	37,721				2		2		
Total - Northern	800,252			1	31		43		
Eastern Ontario	194,945				3		1		1
Hastings & Prince Edward	159,088						5		
Kingston, Frontenac & Lennox	180,225			1	5		4		1
Leeds, Grenville & Lanark	163,143				13		5		
Ottawa	779,274		1		28		6		
Renfrew	101,131						5		
Total - Eastern	1,577,806		1	1	49		26		2
Durham	512,271		1				7		1
Haliburton-Kawartha	168,120				11		2		
Muskoka-Parry Sound	86,218		1		3		1		
Peel	1,008,163	1	3		23		19		
Peterborough	128,881				9				
Simcoe	377,405	1			14		6		
Toronto - total	2,542,844	7	3	6	142		30		
North	627,021				32		8		
South	688,584	5	1	2	54		12		
West	509,302	1	2	2	32		6		
East	717,937	1		2	24		4		
York	724,969	1			13		13		
Total - Central East	5,548,871	10	8	6	215		78		1
Grey Bruce	157,664			1	2		1		
Elgin-St. Thomas	84,182				3		1		
Huron	61,097				1		1		
Chatham-Kent	112,897				1		1		
Lambton	131,643				5				
Middlesex-London	412,976				9		4		2
Oxford	102,561				7		3		
Perth	75,238						4		
Windsor-Essex	381,672	1			14		2		
Total - Southwest	1,519,930	1		1	42		17		2
Brant	126,481						7		
Haldimand-Norfolk	109,536				3		1		
Halton	375,705				12		2		
Hamilton	498,553	1			21		12		
Niagara	423,600				20		10		
Waterloo	446,833				3		6		
Wellington-Dufferin-Guelph	241,777			1	5		3		1
Total - Central West	2,222,485	1		1	64		41		1
April 2002	11,669,344	12	9	10	401		205		6
* Total YTD 2002	-	84	42	37	1,627	3	2124		19
* Total YTD 2001	-	52	49	71	1,830	2	756	6	47

The Toronto City regions above are now defined as: North - former North York; South - former City of Toronto; West - former Etobicoke and City of York; East - former Scarborough and East York

* Adjusted for deletions and late reports.

Summary of Reportable Diseases in Ontario - April, 2002

Health Units by Region	Population 2000	Mumps	Pertussis	Rubella	Salmon.	Shigellosis	Syphilis (Prim/Sec)	VTEC
Algoma	125,109				1			
North Bay	93,505				2			
Northwestern	91,920							
Porcupine	93,680							
Sudbury	199,619							
Thunder Bay	158,698				2			
Timiskaming	37,721							
Total - Northern	800,252				5			
Eastern Ontario	194,945				8			
Hastings & Prince Edward	159,088				4			
Kingston, Frontenac & Lennox	180,225		2					
Leeds, Grenville & Lanark	163,143		3		1	1		
Ottawa	779,274				15	4	1	2
Renfrew	101,131		2			1		
Total- Eastern n	1,577,806		7		28	6	1	2
Durham	512,271				2			
Haliburton-Kawartha	168,120		1		1			
Muskoka-Parry Sound	86,218							
Peel	1,008,163				26	3		1
Peterborough	128,881				2	1		
Simcoe	377,405				4			
Toronto - total	2,542,844		5		41	9	4	4
<i>North</i>	627,021				6	2		1
<i>South</i>	688,584		1		11	5	3	1
<i>West</i>	509,302		1		9	1	1	
<i>East</i>	717,937		3		15	1		2
York	724,969		1		10			5
Total - Central East	5,548,871		7		86	13	4	10
Grey Bruce	157,664				1			
Elgin-St. Thomas	84,182				1			
Huron	61,097							
Chatham-Kent	112,897				1			
Lambton	131,643							
Middlesex-London	412,976				5			
Oxford	102,561							
Perth	75,238		1		1			
Windsor-Essex	381,672		1		10			1
Total - Southwest	1,519,930		2		19			1
Brant	126,481				2	1		
Haldimand-Norfolk	109,536				4			
Halton	375,705		1		6			1
Hamilton	498,553				7			1
Niagara	423,600				10			1
Waterloo	446,833				4	1	1	
Wellington-Dufferin-Guelph	241,777				2			
Total - Central West	2,222,485		1		35	2	1	3
April 2002	11,669,344		17		173	21	6	16
* Total YTD 2002	-	5	105	1	671	77	18	40
* Total YTD 2001	-	1	156	11	756	80	3	60

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* A adjusted for deletions and late reports.

Summary of Reportable Diseases

1st Quarter, 2002

Ministry of Health and Long-Term Care



Ontario

Summary of Reportable Diseases in Ontario - 1st Quarter 2002

Health Units by Region	Population 2000	AIDS	Campylo.	Chicken-pox	Chlamydia	Enceph./ Meningitis	GAS	Gonorrhea
Algoma	125,109		1	126	37		1	
North Bay	93,505		1	245	35			
Northwestern	91,920		2	24	63		2	6
Porcupine	93,680		1	29	32			
Sudbury	199,619	1	6	3	78		2	
Thunder Bay	158,698		3		106	2		7
Timiskaming	37,721			146	8			
Total - Northern	800,252	1	14	573	359	2	5	13
Eastern Ontario	194,945		5	48	36		1	1
Hastings & Prince Edward	159,088		6	16	43	1	2	2
Kingston, Frontenac & Lennox	180,225		6	29	89	3	2	2
Leeds, Grenville & Lanark	163,143		2	146	8	1	6	1
Ottawa	779,274	1	50	218	263	7	5	44
Renfrew	101,131		5		15		3	
Total - Eastern	1,577,806	1	74	457	454	12	19	50
Durham	512,271		14	258	172	2	12	15
Haliburton-Kawartha	168,120		5		19		2	1
Muskoka-Parry Sound	86,218		1	11	15		1	
Peel	1,008,163	1	74	491	383	4	13	69
Peterborough	128,881		7	35	50	2		2
Simcoe	377,405		11	247	100	3	6	9
Toronto - total	2,542,844	11	241	548	1529	11	31	451
<i>North</i>	627,021		68	175	316	3	6	62
<i>South</i>	688,584	7	83	91	577	2	9	229
<i>West</i>	509,302	3	56	50	397	5	8	89
<i>East</i>	717,937	1	34	232	239	1	8	71
York	724,969		70	194	164	9	13	24
Total - Central East	5,548,871	12	423	1784	2432	31	78	571
Grey Bruce	157,664		11	29	22		1	
Elgin-St. Thomas	84,182		2	35	29			1
Huron	61,097		2	84	1	2		
Chatham-Kent	112,897		6	42	38	1	1	
Lambton	131,643				19			1
Middlesex-London	412,976		23		152	7	5	21
Oxford	102,561		4		17			3
Perth	75,238		5	66	22		2	
Windsor-Essex	381,672		21	226	108	3	1	8
Total - Southwest	1,519,930		74	482	408	13	10	34
Brant	126,481		6	201	62		1	5
Haldimand-Norfolk	109,536		3	116	21			1
Halton	375,705		13	19	68	1	5	7
Hamilton	498,553	1	13	274	242	10	7	30
Niagara	423,600	1	24	321	130	1		9
Waterloo	446,833		25	192	177	7	4	25
Wellington-Dufferin-Guelph	241,777		14	114	48	3	1	1
Total - Central West	2,222,485	2	98	1237	748	22	18	78
1st Quarter 2002	11,669,344	16	683	4533	4401	80	130	746
* Total YTD 2002	-	16	683	4533	4401	80	130	746
* Total YTD 2001	-	34	772	4031	4113	91	119	727

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* Adjusted for deletions and late reports.

Summary of Reportable Diseases in Ontario - 1st Quarter 2002

Health Units by Region	Population 2000	PPNG	Hepatitis A	Hepatitis B	Hepatitis C	Hib	Influenza	Measles	Meningo-coccal
Algoma	125,109				17		39		
North Bay	93,505				6		153		1
Northwestern	91,920				6		1		
Porcupine	93,680		2		4		41		
Sudbury	199,619		1	1	30		17		
Thunder Bay	158,698	2		1	24		28		
Timiskaming	37,721						7		1
Total - Northern	800,252	2	3	2	87		286		2
Eastern Ontario	194,945			1	14		51		
Hastings & Prince Edward	159,088				6		17		
Kingston, Frontenac & Lennox	180,225		1		41		72		
Leeds, Grenville & Lanark	163,143			2	17	1	79		1
Ottawa	779,274		1		109	1	280		2
Renfrew	101,131				5		25		
Total - Eastern	1,577,806		2	3	192	2	524		3
Durham	512,271		2				55		
Haliburton-Kawartha	168,120			1	33		7		
Muskoka-Parry Sound	86,218				18		11		
Peel	1,008,163	4	5	3	87		138		
Peterborough	128,881			1	22		13		
Simcoe	377,405	5			37		63		
Toronto - total	2,542,844	39	11	11	365		245		4
<i>North</i>	<i>627,021</i>	<i>1</i>	<i>5</i>	<i>1</i>	<i>67</i>		<i>72</i>		
<i>South</i>	<i>688,584</i>	<i>31</i>	<i>1</i>	<i>7</i>	<i>142</i>		<i>70</i>		<i>2</i>
<i>West</i>	<i>509,302</i>	<i>4</i>	<i>2</i>	<i>1</i>	<i>80</i>		<i>49</i>		<i>1</i>
<i>East</i>	<i>717,937</i>	<i>3</i>	<i>3</i>	<i>2</i>	<i>76</i>		<i>54</i>		<i>1</i>
York	724,969	11	2		56	1	43		
Total - Central East	5,548,871	59	20	16	618	1	575		4
Grey Bruce	157,664			2	13		24		
Elgin-St. Thomas	84,182				2		6		
Huron	61,097						23		
Chatham-Kent	112,897				2		2		
Lambton	131,643				1		1		
Middlesex-London	412,976				46		34		
Oxford	102,561				6		8		1
Perth	75,238				1		48		
Windsor-Essex	381,672	1	2		29		10		
Total - Southwest	1,519,930	1	2	2	100		156		1
Brant	126,481	2			2		5		
Haldimand-Norfolk	109,536				7		6		
Halton	375,705		1		40		44		1
Hamilton	498,553	5	5	1	65		111		
Niagara	423,600	2		1	73		109		
Waterloo	446,833	1			25		38		1
Wellington-Dufferin-Guelph	241,777			2	17		65		1
Total - Central West	2,222,485	10	6	4	229		378		3
1st Quarter 2002	11,669,344	72	33	27	1,226	3	1919		13
* Total YTD 2002	-	72	33	27	1,226	3	1919		13
* Total YTD 2001	-	40	30	49	1,389	2	693	6	41

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* A adjusted for deletions and late reports.

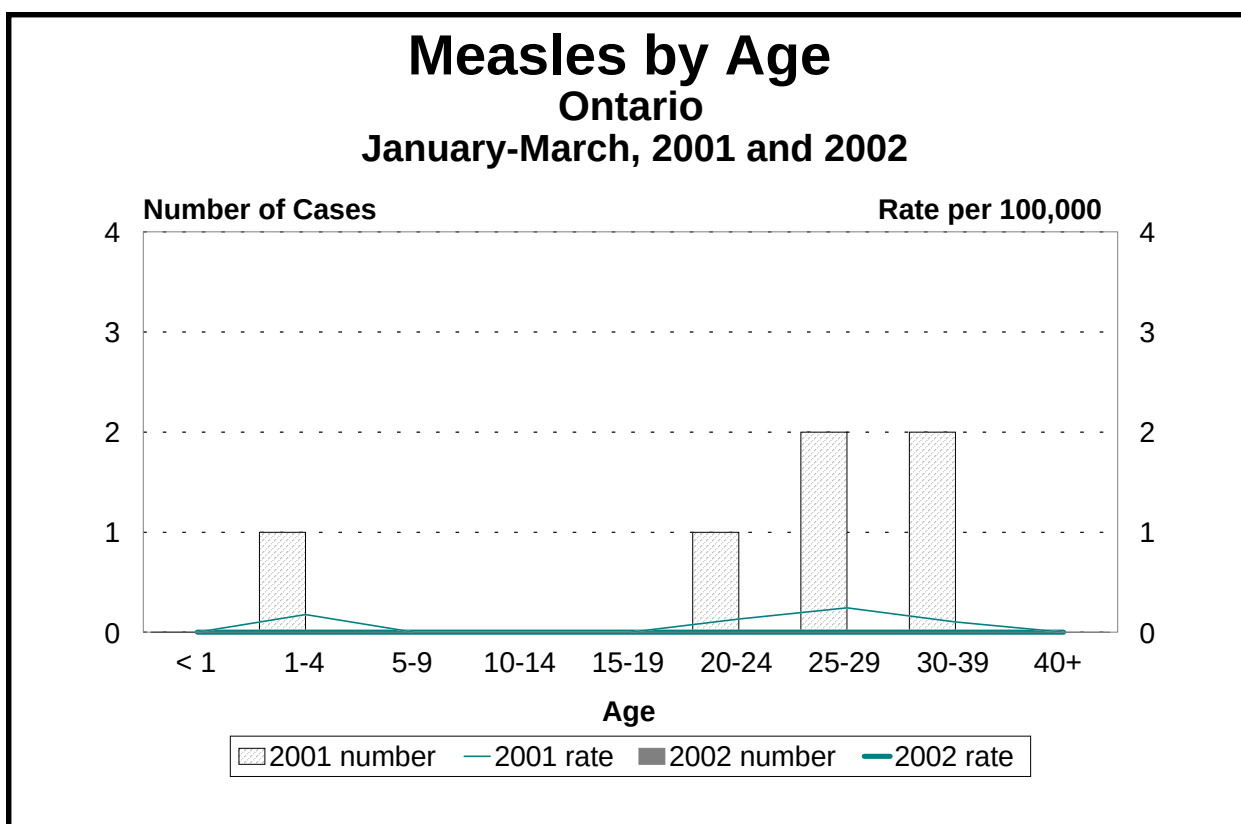
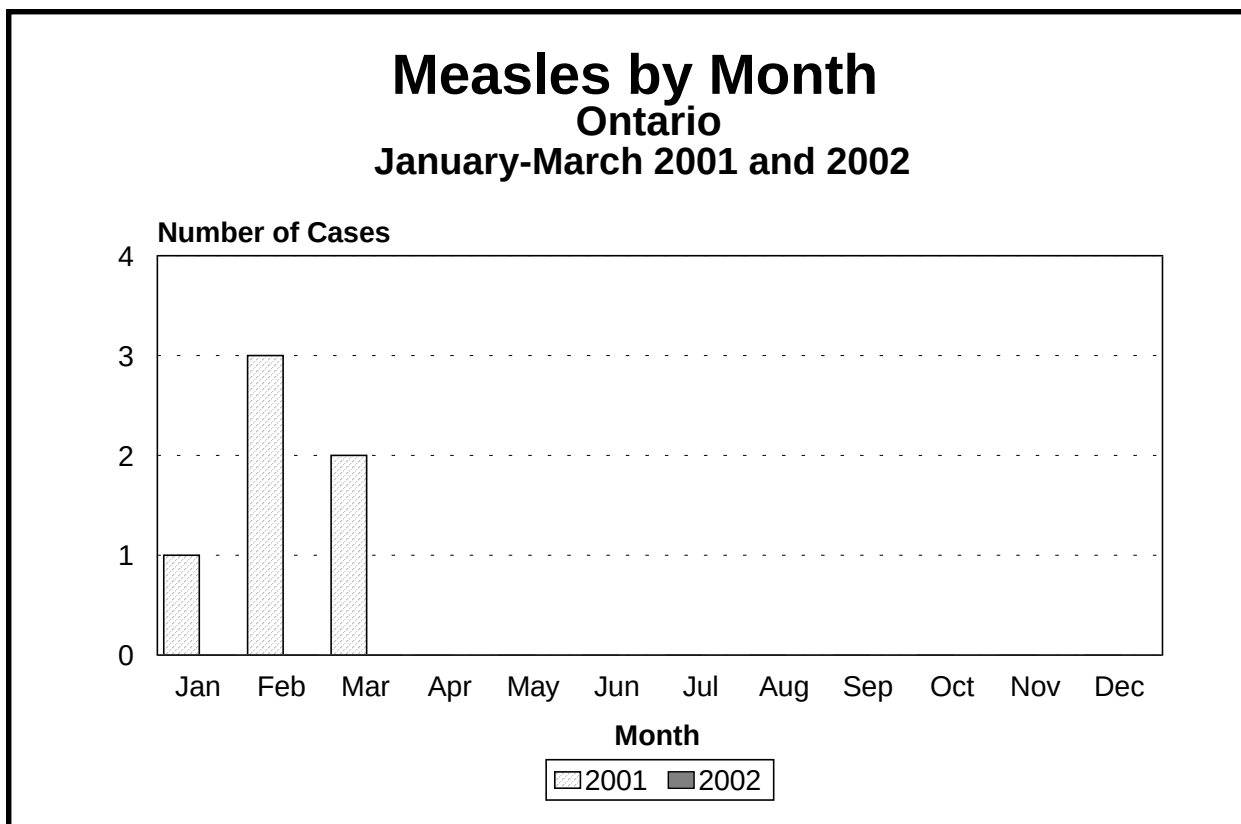
Summary of Reportable Diseases in Ontario - 1st Quarter 2002

Health Units by Region	Population 2000	Mumps	Pertussis	Rubella	Salmon.	Shigellosis	Syphilis (Prim/Sec)	VTEC
Algoma	125,109		1		2			
North Bay	93,505				5			
Northwestern	91,920		3		3			
Porcupine	93,680		1		2			
Sudbury	199,619		3		3			
Thunder Bay	158,698		1		3			
Timiskaming	37,721							
Total - Northern	800,252		9		18			
Eastern Ontario	194,945		3		8	1		1
Hastings & Prince Edward	159,088				5			
Kingston, Frontenac & Lennox	180,225		12		4			2
Leeds, Grenville & Lanark	163,143		1		3			1
Ottawa	779,274		13		33	7	4	
Renfrew	101,131		2		5			
Total - Eastern	1,577,806		31		58	8	4	4
Durham	512,271	1	8		17	1	1	
Haliburton-Kawartha	168,120		1		5			
Muskoka-Parry Sound	86,218		1		2			
Peel	1,008,163	2	1		45	4		1
Peterborough	128,881		4		12			
Simcoe	377,405		1		11	1		
Toronto - total	2,542,844	1	15	1	111	24	6	8
<i>North</i>	<i>627,021</i>		2	<i>1</i>	<i>27</i>	<i>8</i>		<i>3</i>
<i>South</i>	<i>688,584</i>	<i>1</i>	2		33	7	6	2
<i>West</i>	<i>509,302</i>		9		37	7		1
<i>East</i>	<i>717,937</i>		2		14	2		2
York	724,969		3		48	4		2
Total - Central East	5,548,871	4	34	1	251	34	7	11
Grey Bruce	157,664	1			7			
Elgin-St. Thomas	84,182		1		1			
Huron	61,097				6			
Chatham-Kent	112,897				6			
Lambton	131,643							
Middlesex-London	412,976		2		15	1		1
Oxford	102,561				4			
Perth	75,238				3			1
Windsor-Essex	381,672		2		20	2		
Total - Southwest	1,519,930	1	5		62	3		2
Brant	126,481				3			
Haldimand-Norfolk	109,536		1		6			
Halton	375,705		2		23			
Hamilton	498,553		1		26	3		1
Niagara	423,600		2		24	4		2
Waterloo	446,833		2		20		1	1
Wellington-Dufferin-Guelph	241,777		1		7	4		3
Total - Central West	2,222,485		9		109	11	1	7
1st Quarter 2002	11,669,344	5	88	1	498	56	12	24
* Total YTD 2002	-	5	88	1	498	56	12	24
* Total YTD 2001	-		116	8	552	65	1	48

The Toronto City regions above are now defined as: North - former North York; South - former City of Toronto; West - former Etobicoke and City of York; East - former Scarborough and East York

* Adjusted for deletions and late reports.

Vaccine Preventable and Other Diseases

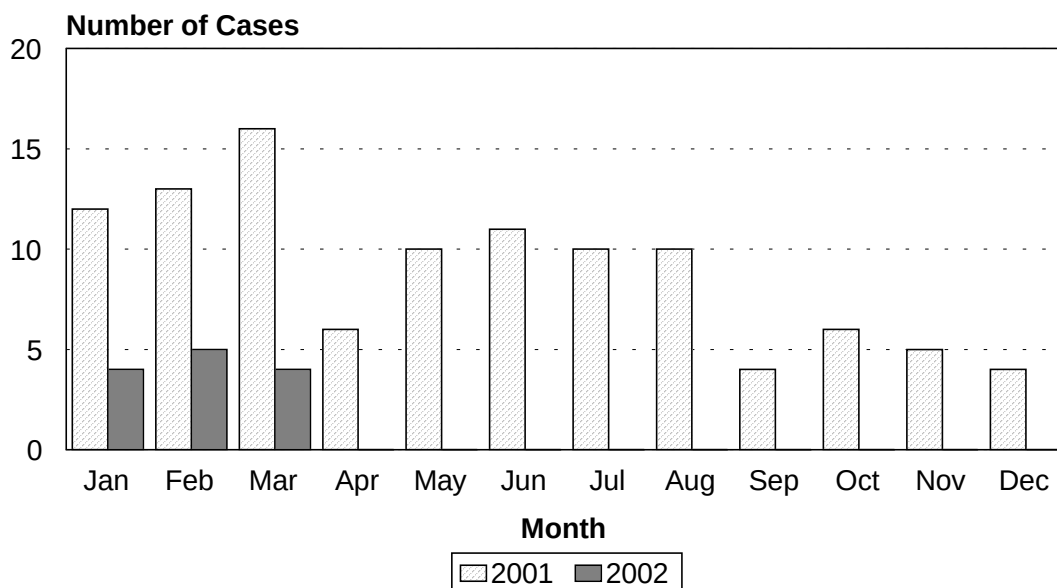


Vaccine Preventable and Other Diseases

Meningococcal Disease by Month

Ontario

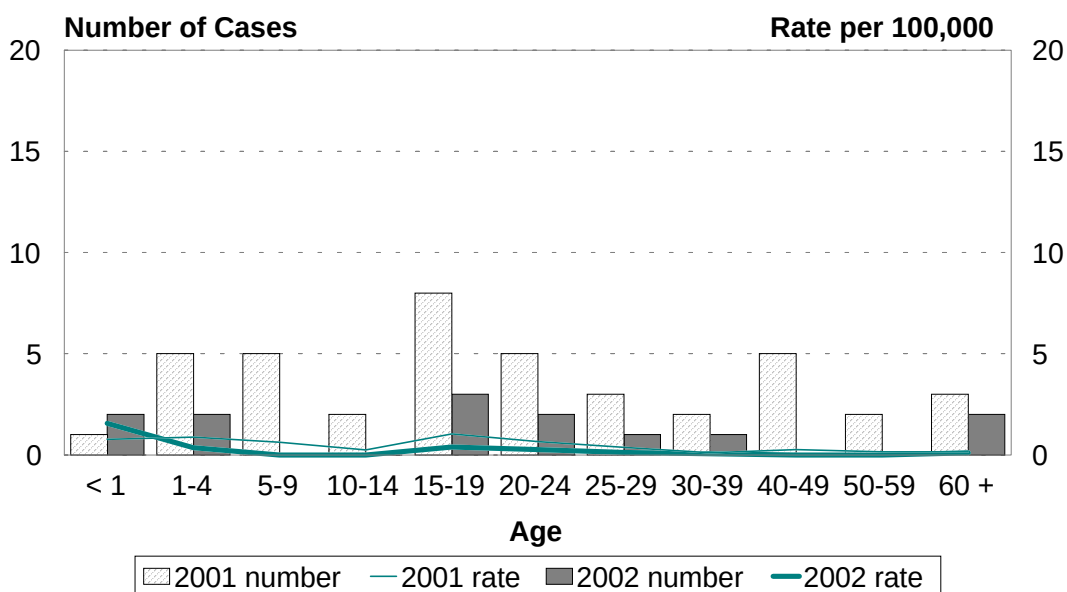
January-March 2001 and 2002



Meningococcal Disease by Age

Ontario

January-March, 2001 and 2002

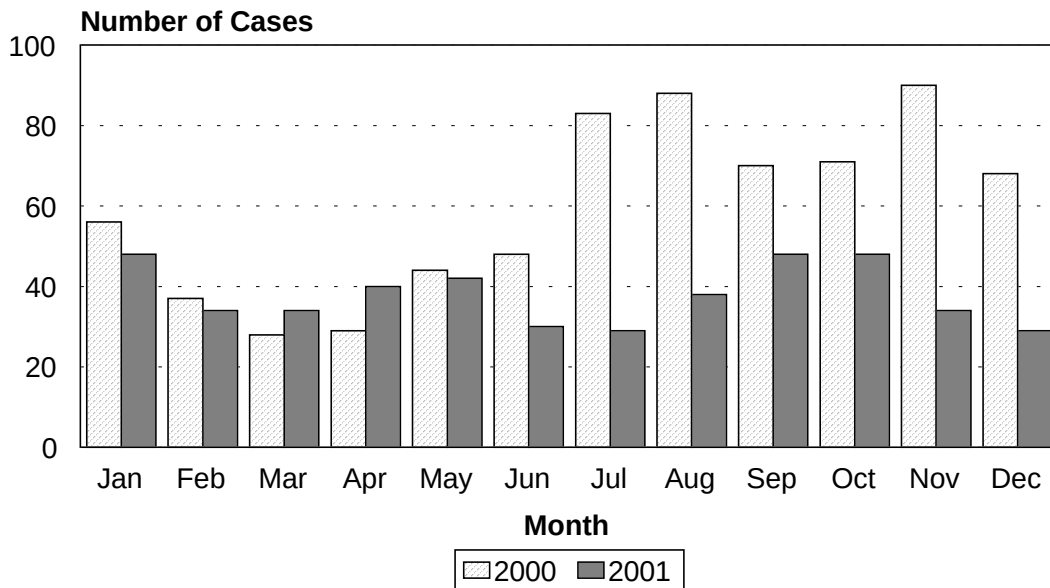


Vaccine Preventable and Other Diseases

Pertussis by Month

Ontario

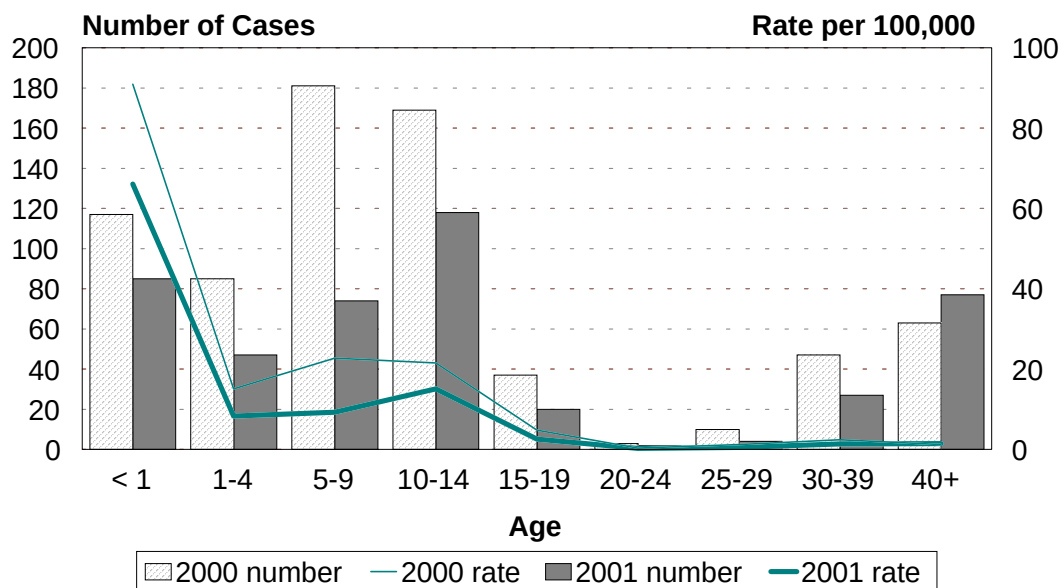
January-March, 2001 and 2002



Pertussis by Age

Ontario

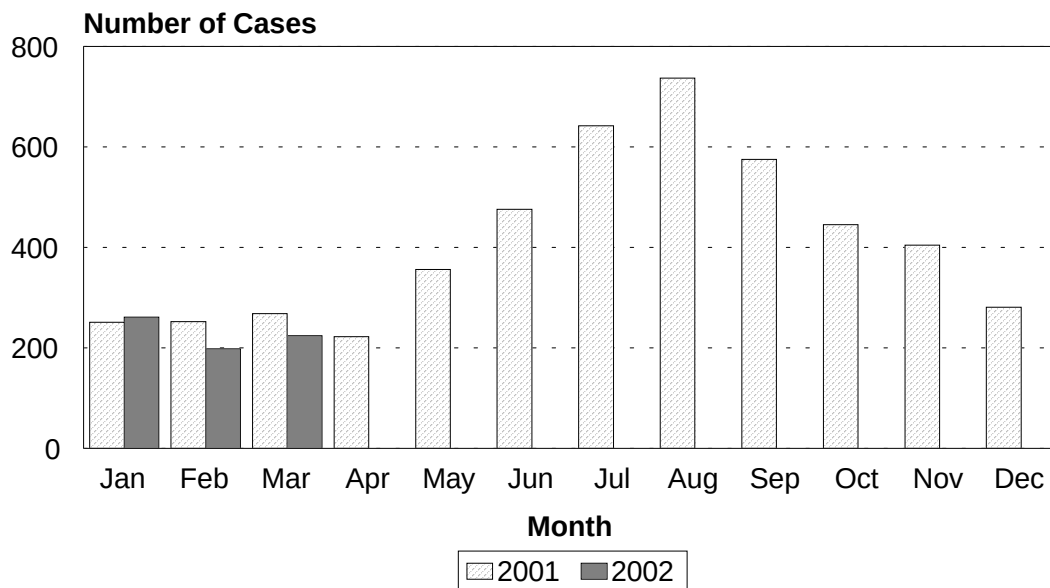
January-March, 2001 and 2002



Enteric Diseases

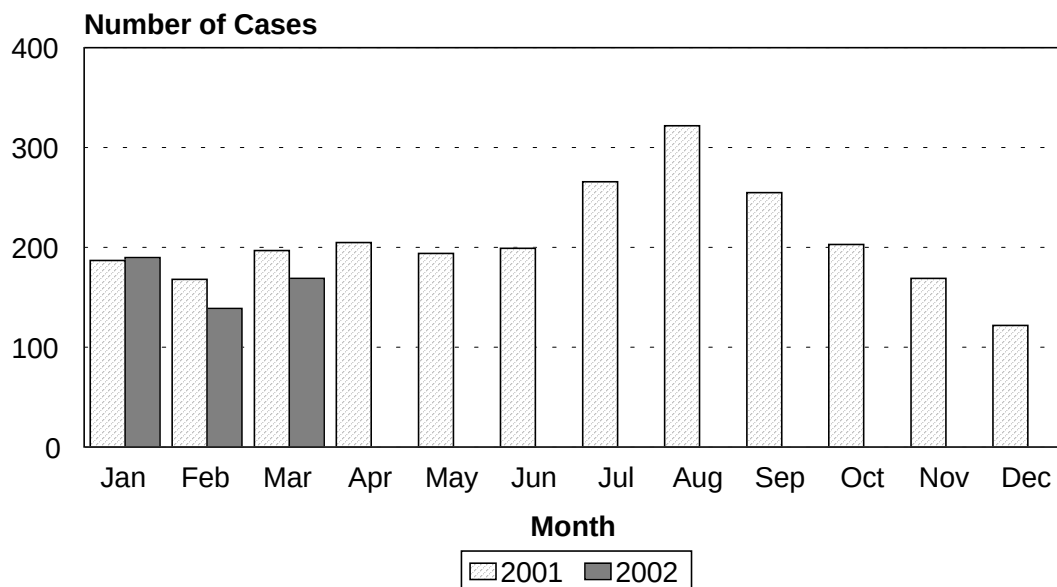
Campylobacter by Month

Ontario
2001 to 2002



Salmonellosis by Month

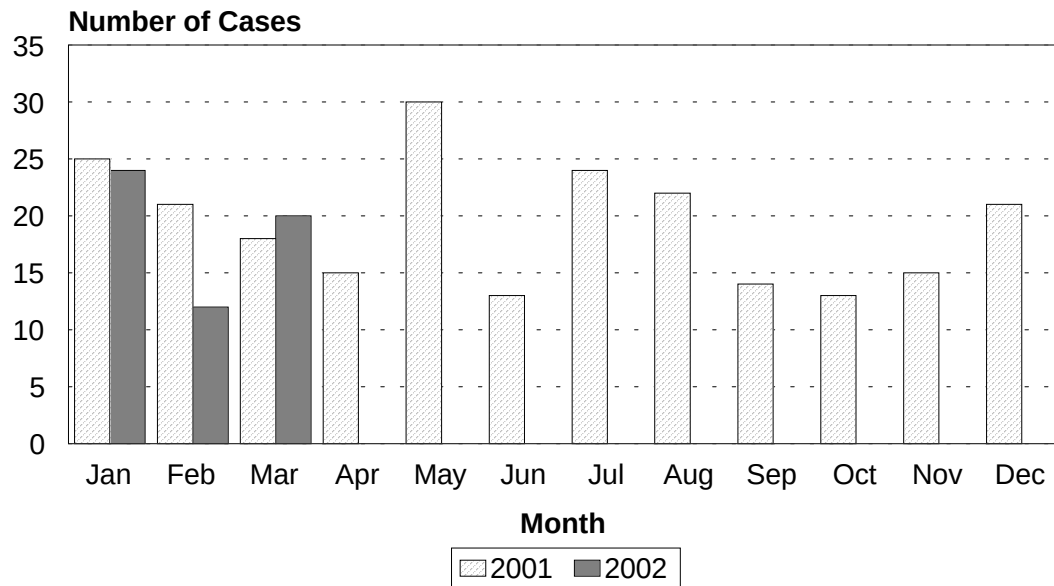
Ontario
2001 to 2002



Enteric Diseases

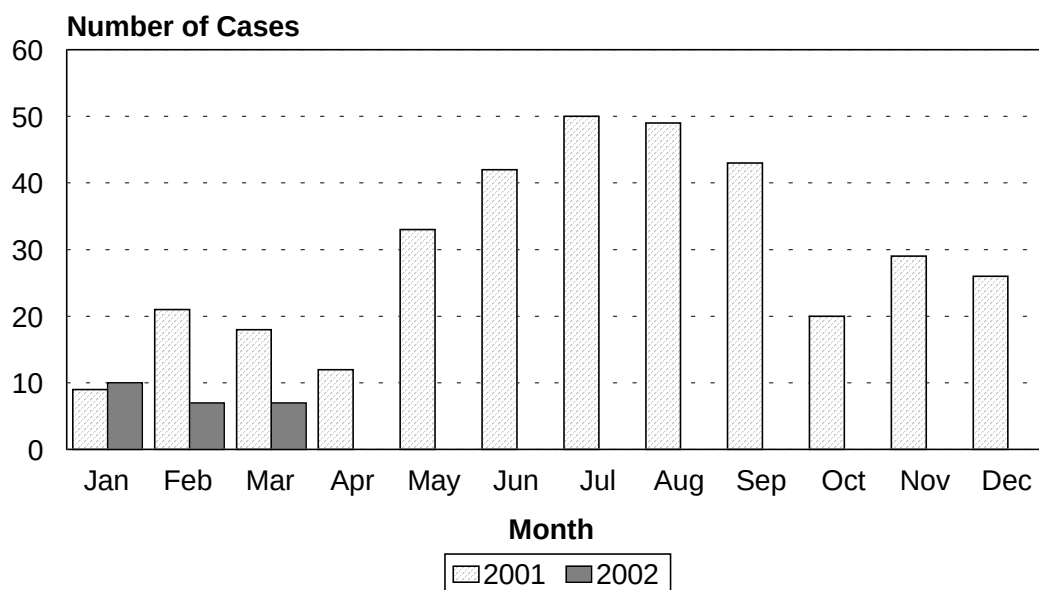
Shigellosis by Month

Ontario
2001 to 2002



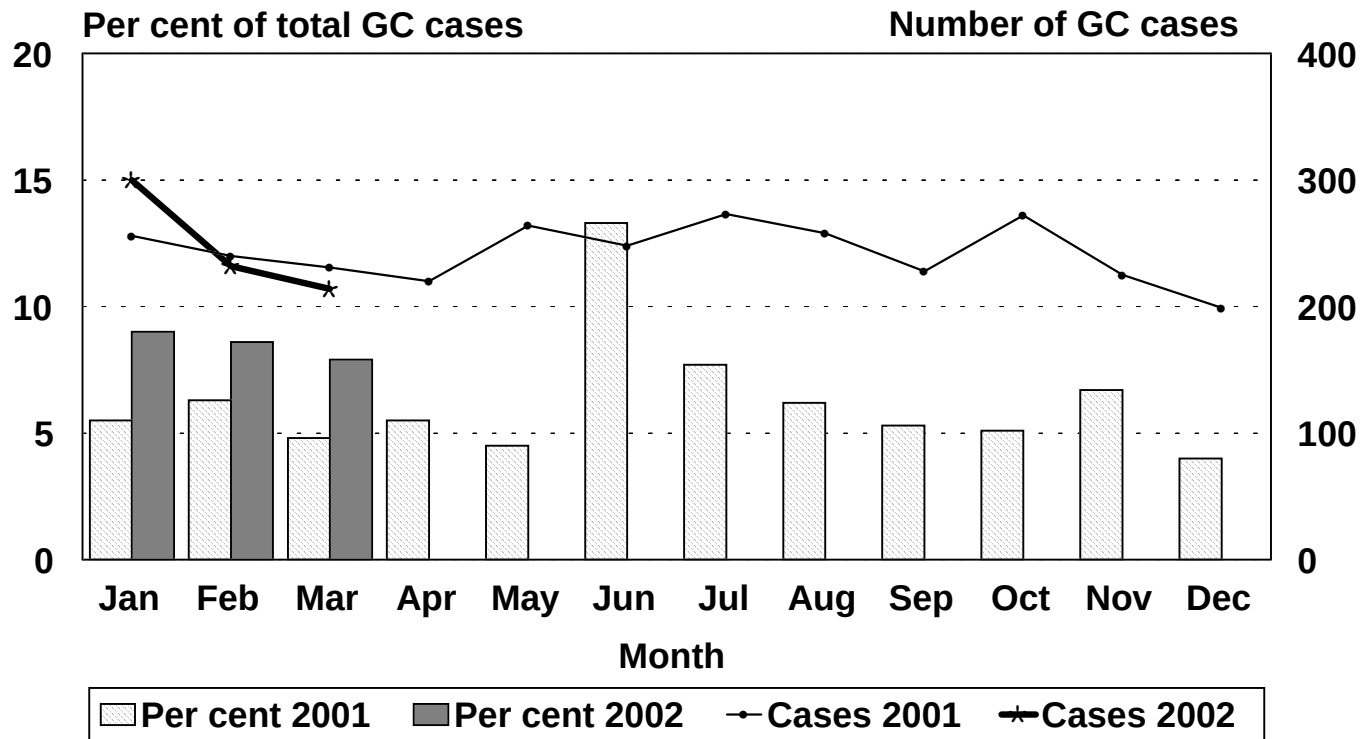
Verotoxin-Producing E. coli Infections

Ontario
2001 to 2002



PPNG as a Proportion of Total Gonorrhea

Ontario
2001 to 2002



**Reportable Disease Summary for First Nations and Inuit Health Branch
Ontario Region, January 1 - March 31, 2002**

DISEASE	0 - 4		5 - 9		10 - 14		15 - 19		20 - 24		25 - 29		30 - 39		40 - 49		50 - 59		Over 60		UNK	Total
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
Chickenpox (varicella)	20	22	20	9	1	1	1															74
Chlamydia Trachomatis infections						3	8	31	9	31	8	12	4	6								112
Congenital CMV	1																					1
Gonorrhea							4	4		5	2	1		1								17
GAS	1																	1				2
Hepatitis A	1																					1
Hepatitis C														2								2
Influenza	1	1																				2
Pertussis (whooping cough)				1																		1
Salmonellosis						1																1
Tuberculosis		1														1				2		4

On-Reserve Population - Ontario Region = 67,854