REPORTABLE DISEASE SUMMARY – Monthly Report

Period ending June 30, 2009

Released: August 27, 2009

The York Region Surveillance Unit (YRSU), formerly the Infectious Diseases Surveillance Unit, is a component of the Community and Health Services Department. Encompassing many existing and new initiatives, the YRSU is tasked with coordinating all aspects of both chronic and infectious disease surveillance. This document is intended to capture current reportable disease information for York Region and to compare it to historical data on a monthly basis.

What's New in this Report?

Section A: York Region … at a glance. This section briefly highlights significant disease trends that are emerging in York Region. A brief summary of the context of any trends and possible factors that may be influencing these trends are provided in this section. Table 1 presents the counts and rates of reportable diseases in York Region by month for the current year. As well, it provides the 'Year-to-Month' counts and disease rates for the previous two years as a historical comparison. Finally, it also presents the overall disease counts for the previous two years.

- Data in this report have been updated for the period ending June 30, 2009.

Section B: Summary of York Region Outbreaks. Every three months, this section provides a brief summary of the number of outbreak investigations conducted in York Region. It also examines any trends and factors that may influence these outbreaks.

- Data in this report has been updated and reflects outbreaks occurring between January 1 and June 30, 2009.

Section C: Focus Report. Every month, this section highlights a different disease or disease category in more detail than is permitted in Section A. The topics explored are chosen based on the current issues in York Region and/or Ontario.

- The focus of this month's report is on Verotoxin-producing *Escherichia coli* (VTEC)

Section D: Infectious Disease Activity. This section provides a brief summary of events related to infectious disease activity at several levels of geography that have the potential of influencing disease activity within York Region.

The statistics presented in this report represent the most current confirmed disease counts in York Region and they supersede all previous monthly report statistics. Please note that numbers and rates calculated for certain reportable diseases may differ significantly from previous York Region summary reports. This is a result of data cleaning efforts to validate disease counts and, unless otherwise stated, do not reflect an actual increase in disease incidence within the population during this time period. Statistical significance of disease trends were examined using PEPI Version 4.0.[1]

[1] Abramson, J H and Gahlinger, P M. Computer Programs for Epidemiologists: PEPI. [4.0]. 2001. Salt Lake City, Utah: Sagebrush Press.

Table 1: Reportable Diseases in York Region, 2009

DISEASE	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2009 YTD	2009 YTD Rate per 100,000	2008 YTM	2008 YTM Rate per 100,000	% Diff. from 2008	2008 Total	2007 YTM	2007 YTM Rate per 100,000	% Diff. from 2007	2007 Total
CDs																						
CMV, congenital	1	-	-	-	-	-							**1**	*0.10*	**-**	-	-	**-**	**1**	*0.10*	-5	**2**
Encephalitis[3]	1	2	1	1	-	2							**7**	*0.68*	**20**	*2.00*	-66	**30**	**11**	*1.13*	-40	**26**
Hib, invasive	-	-	-	-	-	-							**-**	-	**-**	-	-	**-**	**-**	-	-	**-**
Influenza	28	34	31	48	248	300							**689**	*67.00*	**185**	*18.46*	263	**198**	**89**	*9.12*	635	**131**
Legionellosis	-	-	-	-	-	-							**-**	-	**-**	-	-	**4**	**1**	*0.10*	-	**2**
Leprosy	-	-	-	-	-	-							**-**	-	**-**	-	-	**-**	**-**	-	-	**-**
Lyme Disease	-	-	-	-	-	1							**1**	*0.10*	**2**	*0.20*	-51	**2**	**4**	*0.41*	-76	**4**
Malaria	3	-	2	-	-	1							**6**	*0.58*	**3**	*0.30*	95	**10**	**5**	*0.51*	14	**8**
Measles	-	-	-	-	-	-							**-**	-	**1**	*0.10*	-	**1**	**-**	-	-	**-**
Meningococcal disease, invasive	-	-	1	-	1	-							**2**	*0.19*	**1**	*0.10*	95	**1**	**4**	*0.41*	-53	**7**
Mumps	-	-	-	-	-	-							**-**	-	**2**	*0.20*	-	**2**	**5**	*0.51*	-	**6**
Pertussis	3	1	2	-	1	1							**8**	*0.78*	**79**	*7.88*	-90	**146**	**79**	*8.10*	-90	**182**
Q Fever	-	-	-	-	-	-							**-**	-	**-**	-	-	**-**	**-**	-	-	**-**
Rubella	-	1	-	-	-	-							**1**	*0.10*	**-**	-	-	**-**	**-**	-	-	**-**
Rubella, cong. syndr.	-	-	-	-	-	-							**-**	-	**-**	-	-	**-**	**-**	-	-	**-**
Strep, Group A	3	2	4	2	1	-							**12**	*1.17*	**11**	*1.10*	6	**16**	**10**	*1.02*	14	**15**
Strep, Group B neonatal	-	-	-	-	-	-							**-**	-	**2**	*0.20*	-	**6**	**2**	*0.20*	-	**3**
Strep pneumo, inv.	2	4	4	6	3	3							**22**	*2.14*	**28**	*2.79*	-23	**56**	**18**	*1.84*	16	**35**
Tetanus	-	-	-	-	-	-							**-**	-	**-**	-	-	**-**	**-**	-	-	**-**
WNv	-	-	-	-	-	-							**-**	-	**-**	-	-	**1**	**-**	-	-	**1**
Enterics																						
Amebiasis	1	1	2	2	-	-							**6**	*0.58*	**13**	*1.30*	-55	**27**	**16**	*1.64*	-64	**30**
Brucellosis	-	-	-	-	-	-							**-**	-	**1**	*0.10*	-	**1**	**-**	-	-	**-**
Campylobacter	14	15	13	13	21	11							**87**	*8.46*	**137**	*13.67*	-38	**328**	**155**	*15.88*	-47	**368**
Cholera	-	-	-	-	-	-							**-**	-	**-**	-	-	**-**	**-**	-	-	**-**
Creutzfeldt-Jakob Disease	-	-	-	-	-	-							**-**	-	**-**	-	-	**1**	**-**	-	-	**-**
Cryptosporidiosis	1	1	3	1	1	2							**9**	*0.88*	**1**	*0.10*	777	**17**	**4**	*0.41*	114	**26**
Cyclosporiasis	1	-	-	-	2	1							**4**	*0.39*	**8**	*0.80*	-51	**12**	**3**	*0.31*	27	**5**
Food Poisoning	2	-	-	-	-	-							**2**	*0.19*	**3**	*0.30*	-35	**3**	**2**	*0.20*	-5	**2**
Giardia	8	9	2	3	2	3							**27**	*2.63*	**35**	*3.49*	-25	**70**	**43**	*4.41*	-40	**80**
Hepatitis A	1	-	-	1	-	-							**2**	*0.19*	**5**	*0.50*	-61	**5**	**4**	*0.41*	-53	**7**
Listeriosis	-	-	1	1	-	-							**2**	*0.19*	**2**	*0.20*	-3	**5**	**1**	*0.10*	90	**1**
Paratyphoid Fever	1	-	-	-	-	1							**2**	*0.19*	**4**	*0.40*	-51	**6**	**-**	-	-	**3**
Salmonellosis	16	11	25	20	14	17							**103**	*10.02*	**94**	*9.38*	7	**199**	**101**	*10.35*	-3	**242**
Shigellosis	5	3	-	1	3	1							**13**	*1.26*	**6**	*0.60*	111	**18**	**16**	*1.64*	-23	**25**
Typhoid Fever	-	-	-	-	-	-							**-**	-	**2**	*0.20*	-	**5**	**3**	*0.31*	-	**5**
VTEC (E.Coli)	-	-	1	-	2	1							**4**	*0.39*	**2**	*0.20*	95	**12**	**11**	*1.13*	-65	**17**
Yersiniosis	5	1	5	2	4	4							**21**	*2.04*	**32**	*3.19*	-36	**50**	**28**	*2.87*	-29	**48**
STIs																						
AIDS/HIV	-	-	1	2									**3**	*0.29*	**3**	*0.30*	-3	**13**	**6**	*0.61*	-53	**16**
Chlamydia	131	114	128	107	104	121							**705**	*68.56*	**594**	*59.28*	16	**1307**	**573**	*58.71*	17	**1138**
Gonorrhea	6	7	8	8	5	6							**40**	*3.89*	**57**	*5.69*	-32	**118**	**59**	*6.05*	-36	**102**
Hepatitis B (acute)	-	-	-	1									**1**	*0.10*	**-**	-	-	**2**	**3**	*0.31*	-68	**5**
Hepatitis B (chronic)	29	25	34	35									**123**	*11.96*	**150**	*14.97*	-20	**375**	**156**	*15.99*	-25	**444**
Hepatitis C	19	18	21	21	18	23							**120**	*11.67*	**115**	*11.48*	2	**240**	**112**	*11.48*	2	**228**
Herpes, neonatal	-	-	-	-	-	-							**-**	-	**1**	*0.10*	-	**1**	**-**	-	-	**-**
Ophthalmia neonatorum	-	-	-	-	-	-							**-**	-	**-**	-	-	**-**	**-**	-	-	**-**
Syphilis	11	4	7	4									**26**	*2.53*	**18**	*1.80*	41	**80**	**32**	*3.28*	-23	**94**
TB																						
Tuberculosis	7	5	2	1	2	1							**18**	*1.75*	**29**	*2.89*	-40	**59**	**38**	*3.89*	-55	**64**
Other																						**0**
Adverse Vaccine Event	-	-	-	-	-	-							**-**	-	**6**	*0.60*	-51	**11**	**3**	*0.31*	-5	**7**
TOTAL	**299**	**258**	**298**	**280**	**432**	**500**							**2067**	*201.29*	**1652**	*164.87*	22	**3438**	**1598**	*163.75*	23	**3379**

Data Source: integrated Public Health Information System (iPHIS), York Region Community and Health Services Department, as of August 12, 2009. Rates were calculated using population estimates from Statistics Canada and population projections from the Ontario Ministry of Finance, 2007. [York Region Population Statistics: 2009=1,028,370; 2008=1,001,990; 2007=975,906].

Notes: YTD refers to 'Year-To-Date'; YTM refers to 'Year-To-Month'; % Difference calculated using formula (([2009 rate]-[2008 or 2007 rate])/{2008 or 2007 rate]) * 100%

† Encephalitis data includes the following iPHIS fields: Encephalitis (primary viral), Encephalitis/Meningitis, Meningitis (bacterial), Meningitis (viral).

^ Data for chronic hepatitis B, HIV/AIDS, and syphilis cases are reported up to April 30, 2009 due to the increased investigation period required to follow-up these cases.

‡ These tuberculosis statistics represent confirmed cases only. They do not reflect the volume of tuberculosis investigations carried out by York Region Community and Health Services Department.

* Due to ongoing investigations, some disease counts for the most recent months of reporting may change due to re-classification of cases.

Section A: York Region…at a glance

Given the small number of confirmed cases for certain reportable diseases in a given year, the percentage difference between years can change dramatically with the addition of several more cases without being statistically significant.

Communicable Diseases – General

- A statistically significant increase in the 2009 rate of confirmed influenza compared to the 2008 and 2007 year-to-month rates has been observed due to the novel H1N1 influenza A virus pandemic. To date, the rate in 2009 (67.00 cases per 100,000, based on 689 confirmed cases) is 263% higher compared to the year-to-month rate in 2008 (18.46 cases per 100,000, based on 185 cases). Similarly, the year-to-date rate in 2009 is 635% higher compared to the year-to-month rate in 2007 (9.12 cases per 100,000, based on 89 cases).
- A statistically significant decrease in the 2009 rate of confirmed encephalitis compared to the 2008 year-to-month rate has been observed. To date, the rate in 2009 (0.68 cases per 100,000, based on 7 confirmed cases) is 66% lower compared to the year-to-month rate in 2008 (2.00 cases per 100,000, based on 20 cases). The 2009 and 2007 year-to-month rates are statistically similar.
- Statistically significant decreases in the 2009 rate of confirmed pertussis compared to the 2008 and 2007 year-to-month rates have been observed. To date, the rate in 2009 (0.78 cases per 100,000, based on 8 confirmed cases) is 90% lower compared to the year-to-month rate in 2008 (7.88 cases per 100,000, based on 79 cases) and 90% lower compared to the year-to-month rate in 2007 (8.10 cases per 100,000, based on 79 cases). This decrease may be due to a recent change in the reporting of laboratory results for *Bordetella pertussis* polymerase chain reaction (PCR) testing that was implemented January 1, 2009.[2]
- The number of confirmed cases reported for all other respiratory diseases remains statistically similar to the number of confirmed cases reported in previous years.

Communicable Diseases – Enteric

- A statistically significant decrease in the 2009 rate of confirmed amebiasis compared to the 2007 year-to-month rate has been observed. To date, the rate in 2009 (0.58 cases per 100,000, based on 6 confirmed cases) is 64% lower compared to the year-to-month rate in 2007 (1.64 cases per 100,000, based on 16 cases). The 2009 and 2008 year-to-month rates are statistically similar.
- Statistically significant decreases in the 2009 rate of confirmed campylobacteriosis compared to the 2008 and 2007 year-to-month rates have been observed. To date, the rate in 2009 (8.46 cases per 100,000, based on 87 confirmed cases) is 38% lower compared to the year-to-month rate in 2008 (13.67 cases per 100,000, based on 137 cases), and 47% lower than the 2007 year-to-month rate (15.88 cases per 100,000, based on 155 cases).
- The number of confirmed cases reported for all other enteric diseases remains statistically similar to the number of confirmed cases reported in previous years.

[2] Ontario Agency of Health Protection and Promotion. Bordetella Molecular Testing - Changes to Result Reporting. *Labstract.* 2008; LAB-SD-047-000

Sexually Transmitted Infections

- Statistically significant increases in the 2009 rate of confirmed chlamydia compared to the 2008 and 2007 year-to-month rates have been observed. To date, the rate in 2009 (68.56 cases per 100,000, based on 705 confirmed cases) is 16% higher compared to the year-to-month rate in 2008 (59.28 cases per 100,000, based on 594 cases), and 17% higher than the 2007 year-to-month rate (58.71 cases per 100,000, based on 573 cases).
- Statistically significant decreases in the 2009 rate of confirmed hepatitis B (chronic) compared to the 2008 and 2007 year-to-month rates have been observed. To date, the rate in 2009 (11.96 cases per 100,000, based on 123 confirmed cases) is 20% lower compared to the year-to-month rate in 2008 (14.97 cases per 100,000, based on 150 cases), and 25% lower than the 2007 year-to-month rate (15.99 cases per 100,000, based on 156 cases).
- A statistically significant decrease in the 2009 rate of confirmed gonorrhea compared to the 2007 year-to-month rate has been observed. To date, the rate in 2009 (3.89 cases per 100,000, based on 40 confirmed cases) is 36% lower compared to the year-to-month rate in 2007 (6.05 cases per 100,000, based on 59 cases). The 2009 and 2008 year-to-month rates are statistically similar.
- The number of confirmed cases reported for all other sexually transmitted infections remains statistically similar to the number of confirmed cases reported in previous years.

Tuberculosis

- A statistically significant decrease in the 2009 rate of confirmed tuberculosis compared to the 2007 year-to-month rate has been observed. To date, the rate in 2009 (1.75 cases per 100,000, based on 18 confirmed cases) is 55% lower compared to the year-to-month rate in 2007 (3.89 cases per 100,000, based on 38 cases). The 2009 and 2008 year-to-month rates are statistically similar.

Section B: Summary of York Region Outbreaks

- Between January 1 and June 30, 2009, York Region Community and Health Services Department investigated a total of 67 confirmed outbreaks (Table 2). Of these 67 outbreaks, 39 (58.2%) were classified as enteric[3] and 28 (41.8%) were classified as respiratory.[4]
- The number of outbreaks between January 1 and June 30, 2009 has increased by 26% compared to the same period in 2008, during which 53 confirmed outbreaks were investigated (27 enteric (44%); and 26 respiratory (8%)).

[3] Enteric outbreak investigations were initiated according to the following criteria:
- For community outbreak investigations, when three or more individuals develop similar gastro-intestinal symptoms within 7 days from a suspected meal/event within the community.
- For institutional outbreak investigations, when three or more cases of illness with similar gastro-intestinal symptoms occur within a 48-hour period in a facility/institution.

Personal Communication - Motica, E, Newmarket, ON: Infectious Diseases Control Division, York Region Community and Health Services. Sent February 4, 2008.

[4] Respiratory outbreak investigations in an institutional setting were initiated according to the following criteria:
- One laboratory confirmed case of influenza; or
- Three cases of acute respiratory tract illness occurring within 48 hours in a geographic area (e.g., unit, floor); or
- More than one unit having a case of acute respiratory illness within 48 hours.
- In addition, an outbreak can be declared at anytime by the MOH or designate or the Medical Director of the LTCH.

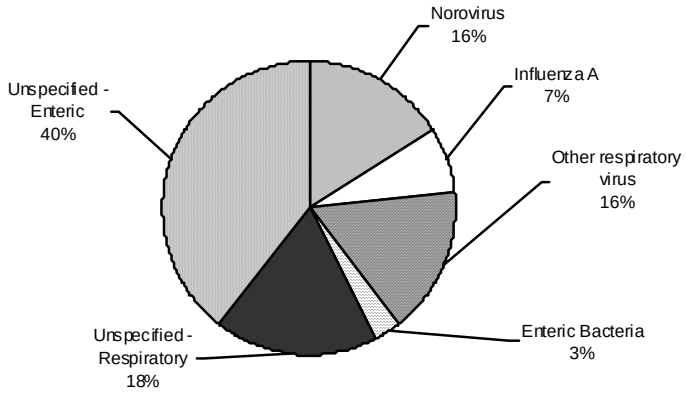
Public Health Division and Long-Term Care Homes Branch. (2004) A Guide to the Control of Respiratory Disease Outbreaks in Long-Term Care Homes. Toronto, ON: Ontario Ministry of Health and Long-Term Care.

Table 2: Number of reported outbreaks in York Region, by outbreak type, January to June 2009 (n=67)

Type of Outbreak	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Enteric	14	6	5	9	2	3							39
Respiratory	7	4	5	4	5	3							28
Total	21	10	10	13	7	6							67

- At least one laboratory specimen was submitted in 48 (71.6%) of the outbreaks investigated by the Region during the six-month period. At least one organism was isolated in 29 (43.2%) outbreaks (Figure 1). When examined by type of outbreak, at least one causative agent was isolated in 57.1% of respiratory outbreaks and 33.3% of enteric outbreaks.
- Between January and June 2009, the most frequent organism associated with enteric outbreaks was norovirus, reported in 11 outbreaks (28.2% of enteric outbreaks). The most frequent organism associated with respiratory outbreaks was both enterovirus/rhinovrius and influenza A; each reported in 4 outbreaks (14.3% of respiratory outbreaks, together forming 28.6% of respiratory outbreaks).
- The majority of outbreaks occurred in long-term care homes (56.7%), followed by retirement/special care homes and childcare facilities (20.9% in each facility type).
- The average duration of respiratory outbreaks was 17.4 days (range: 2 to 31 days); whereas the average duration of enteric outbreaks was 14.1 days (range: 1 to 29 days).

Figure 1: Percentage of reported outbreaks in York Region by causative agent, January to June 2009.



Note: 'Influenza A' category includes all influenza A subtypes'

Other respiratory virus' category includes the following causative agents: Meta-pneumovirus, Parainfluenza – type 2, Parainfluenza – type 3, Enterovirus/Rhinovirus, RSV

'Enteric Bacteria' category includes the following causative agents: *Clostridium difficile*, rotavirus

Data Source: Case Assignment Database, York Region Community and Health Services Department, as of August 13, 2009.

It is important to note that the number of outbreaks does not necessarily reflect the magnitude of individual outbreak investigations or burden of outbreak-related illness in York Region. The number of outbreaks that occur in the Region is potentially under-reported as it is dependent on the severity of symptoms experienced by affected individuals. Those who are able to tolerate symptoms from certain infections may not seek medical attention and these outbreaks of diseases would not be captured in these statistics.

Section C: Focus Report – Verotoxin-producing *Escherichia coli* (VTEC)

Escherichia coli (*E. coli*) is a bacteria that usually colonizes the intestines of healthy humans and animals. Although most *E. coli* strains are harmless, six major groups of *E. coli* strains can cause diarrhea in humans: enterohemorrhagic; enterotoxigenic; enteroinvasive; enteropathogenic; enteroaggregative; and diffuse-adherent.[5] This report focuses on enterohemorrhagic strains of *E. coli*, given their highly contagious nature and the severe complications that may develop upon infection. These strains of *E. coli* are also known as verotoxin producing *E. coli* (VTEC) or Shiga-like toxin producing *E. coli*. The most common strain in North America that produces disease in this category is *E. coli* O157:H7.

The importance of VTEC in causing human disease was first recognized in 1982 during an outbreak of bloody diarrhea in the United States. VTEC acts by producing toxins that resemble the toxin produced by *Shigella dysenteriae* type 1. Verotoxin-producing *E. coli* and Shiga-like toxin-producing *E. coli* belong to the same category, with the term "verotoxin" or "verocytotoxin" being linked to historical studies on *E. coli* strains.[5, 6]

Given that the natural reservoir of VTEC is the intestinal tracts of domestic animals such as cattle, VTEC can be present in a number of food sources including undercooked meats, milk, cheese, raw vegetables, unpasteurized apple cider and contaminated water. If a person consumes contaminated food or water, the infection can spread from person-to-person by faecal-oral contact. VTEC outbreaks have been associated with undercooked ground beef and unpasteurized milk,[7,8] contamination during food preparation,[9] grocery produce (including melons, fresh spinach, coleslaw, apple cider and alfalfa sprouts contaminated through faecal-based fertilizers),[5] a treated municipal water supply,[10] recreational water settings,[11,12] and petting zoos.[13]

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[5] Heymann DL. (2008). Control of Communicable Diseases Manual, 19th edition. American Public Health Association: Washington, DC. p.181-195.

[6] Griffin PM, RV Tauxe. The Epidemiology of Infectious Caused by *Escherichia Coli* O157:H7, Other Enterohemorrhagic *E. coli*, and the Associated Hemolytic Uremic Syndrome. *Epidemiologic Reviews*. 1991; 13: 60-98.

[7] Sutcliffe P, L Picard, B Fortin, D Malaviarachchi, J Hohenadel B O'Donnell. *Escherichia Coli* O157:H7 Outbreak at a Summer Hockey Camp, Sudbury 2004. *Canada Communicable Disease Report*. 2004; 30(22): 189-194.

[8] Karmali MA, Gannon V, Sargeant JM. Verocytotoxin-producing Escherichia coli (VTEC). Veterinary Microbiology [online], 2009, April 10, epub ahead of print.

[9] Bolduc D, LF Srour, L Sweet, A Neatby, E Galanis, S Isaacs, G Lim. Severe Outbreak of *Escherichia Coli* O157:H7 in Health Care Institutions in Charlottetown, Prince Edward Island, Fall 2002. *Canada Communicable Disease Report*. 2004; 30(9): 81-88.

[10] Bruce-Grey-Owen Sound Health Unit et al. Waterborne outbreak of gastroenteritis associated with a contaminated municipal water supply, Walkerton, ON, May-June 2000. *Canada Communicable Disease Report*. 2000; 26(20): 170-173.

[11] Gilbert M, L Srour, A Paccagnella, L MacDougall, J Fung, E Nelson, M Fyfe. An Outbreak of *Escherichia Coli* O157:H7 Associated with a Children's Water Spray Park and Identified by Two Rounds of Pulsed-Field Gel Electrophoresis Testing. *Canada Communicable Disease Report*. 2005; 31(12): 133-140.

[12] Bruneau A, H Rodrigue, J Ismael, R Dion, R Allard. Outbreak of *E. Coli* O157:H7 Associated with Bathing at a Public Beach in the Montréal-Centre Region. *Canada Communicable Disease Report*. 2004; 30(15): 133-136.

[13] David ST, L MacDougall, K Louie, L McIntyre, AM Paccagnella, S Schleicher, A Hamade. Petting Zoo-Associated *Escherichia Coli* O157:H7 – Secondary Transmission, Asymptomatic Infection, and Prolonged Shedding in the Classroom. *Canada Communicable Disease Report*. 2004; 30(20): 173-180.

Most recently, a large outbreak of *E. coli O157:H7* occurred in North Bay, Ontario during October and November 2008.[14] The outbreak was linked to the local fast food restaurant, which indicated contaminated onions as a point source. Although the initial source of contamination was not identified, the source of infection was present for a week or more. Inconsistent cleaning of the onion dicer may have prolonged the contamination for several days. During the outbreak period, there were a total of 47 confirmed cases, 59 probable cases, 118 suspect cases and 11 secondary cases in which 3 were confirmed. No deaths were associated with the outbreak.

Symptoms of *E. coli* infection generally begin 2 to 10 days (average 3-4 days) after infection. Infected adults typically remain contagious for one week or less, though it is possible for some infected children to continue to shed the bacteria for 3 weeks or longer. Symptoms include stomach cramps, diarrhea that ranges from mild with no blood to severe with bloody stool, nausea, and vomiting. The lack of fever in most infected individuals can help to differentiate this infection from other enteric diseases.[3] Most individuals recover within 5 to 10 days after exposure without any antibiotic treatment. During this recovery period, fluid and electrolyte replacement are the cornerstone of therapy for diarrhea associated with VTEC infections. There is conflicting evidence as to whether children infected with VTEC should be treated with antibiotics.[8, 15,16,17]

The most severe complication of VTEC infections is hemolytic uremic syndrome (HUS), which occurs in approximately 15% of children with *E. coli* O157:H7 diarrhea, and a much smaller proportion of adults.[5] HUS is characterized by anemia due to the sudden breakdown of red blood cells, low platelet counts, and kidney failure. Very young and elderly indivduals are most susceptible to this complication. Once HUS has developed, treatment focuses on good supportive care to maintain hydration, electrolyte balance, and nutrition, as well as the management of critical complications that may arise.[13,18]

Since 1990, the rate of reported cases of VTEC across Canada has generally decreased, from 7.02 cases of VTEC per 100,000 population in 1991 to 3.36 cases of VTEC per 100,000 in 2004, the last year of national data available.[19] The exception to this observation is a spike in 2000 of 9.81 VTEC cases per 100,000 which coincides with a VTEC outbreak in Walkerton, Ontario that resulted in 1,346 reported cases of gastroenteritis of which 167 cases submitted stool samples that were eventually confirmed to have *E. coli* O157:H7.[7] Similar to these national trends, York Region has experienced a slight decrease in the rate of confirmed VTEC cases since 1990 (Figure 2). During this 10-year period, a peak of 4.33 cases per 100,000 was observed in 2002 compared to a low of 1.20 cases per 100,000 observed in 2008.

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[14] North Bay Parry Sound District Health Unit. Investigative Summary of the Escherichia coli outbreak associated with a Restaurant in North Bay, Ontario October to November 2008 [online] cited July 20, 2009 from http://www.healthunit.biz/docs/Ecoli%20Outbreak/2008%20NBPSDHU%20Ecoli%20Report_June%202009_Formatted.pdf.

[15] Wong CS, S Jelacic, RL Habeeb, SL Watkins, PI Tarr. The risk of the hemolytic-uremic syndrome after antibiotic treatment of *Escherichia coli* O157:H7 infections. *New England Journal of Medicine*. 2000; 342(26): 1930-1936.

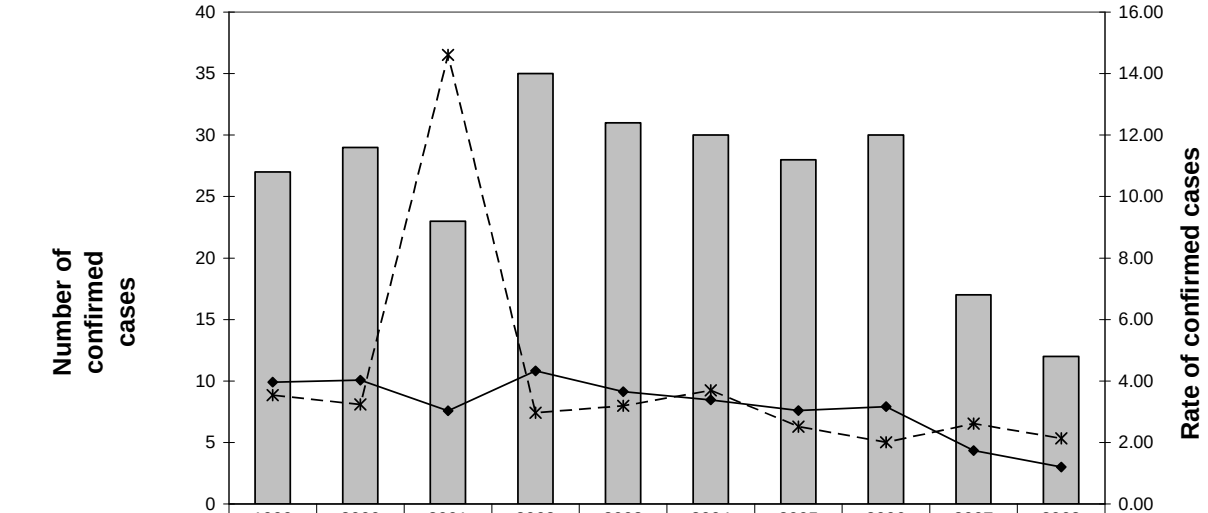
[16] Safdar N, A Said, RE Gangnon, DG Maki. Risk of hemolytic uremic syndrome after antibiotic treatment of *Escherichia coli* O157:H7 enteritis: A meta-analysis. *Journal of the American Medical Association*. 2002; 288(8): 996-1001.

[17] Noris M, G Remuzzi. Hemolytic Uraemic Syndrome. *Journal of the American Society of Nephrology*. 2005; 16(4): 1035-1050.

[18] Fitzpatrick M. Haemolytic uraemic syndrome and *E. coli* O157. *British Medical Journal*. 1999; 318(7185): 684-685.

[19] Public Health Agency of Canada. Notifiable Diseases On-Line – Chart Query Result: Verotoxigenic *E. coli*, Both Sexes Combined (Incl. Not Specified), All Ages (Incl. Not Specified), Canada, 1989-2004. [online] cited August 13, 2009 from <http://dsol-smed.phac-aspc.gc.ca/dsol-smed/cgi-bin/ndischart2?DATA_TYPE=R&YEAR_FROM=89&YEAR_TO=04&CAUSE=147&AREA=00&AGE=0&SEX=3&CTIME1=View+Chart>

Figure 2: Number and Rate per 100,000 population of Confirmed Cases of Verotoxin Producing *E. coli* in York Region (1999-2008)



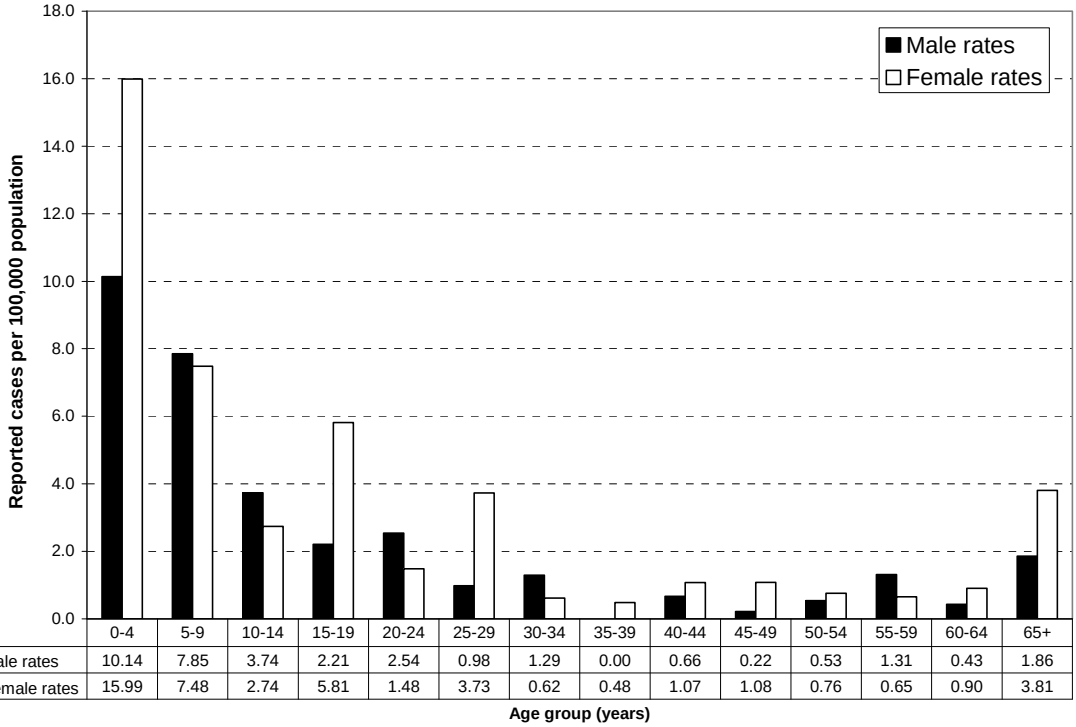
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
York Region cases	27	29	23	35	31	30	28	30	17	12
York Region rates	3.96	4.03	3.03	4.33	3.65	3.38	3.03	3.17	1.74	1.20
Ontario rates	3.54	3.23	14.61	2.97	3.19	3.69	2.51	2.01	2.62	2.13

Data Source: integrated Public Health Information System (iPHIS), York Region Health Services, as of August 14, 2009**.** Rates were calculated using population projections & estimates from IntelliHEALTH ONTARIO, Ontario Ministry of Health and Long-Term Care.

In York Region, children aged 0-4 years old were most frequently diagnosed with VTEC infections, followed by children aged 5-9 years old (Figure 3). This observation can be attributed to increased susceptibility to this illness and increased exposure to the bacteria for these age groups. The annual incidence in York Region of VTEC also shows a seasonal trend that peaks each year during the warmer months (Figure 4). This seasonal difference may partially reflect behaviour and lifestyle changes that can increase individuals' exposure to VTEC through consumption of high risk foods (e.g., barbequed foods, salads, buffets) and increased outdoor activities (e.g., swimming, camping) that increase contact with environmental sources of VTEC. This finding is consistent with summer increases in the rates of other enteric diseases (e.g., campylobacteriosis, salmonellosis) that are predominantly foodborne or waterborne illnesses.[20]

[20] Rajda Z, D Middleton. Descriptive Epidemiology of Enteric Illness for Selected Reportable Diseases in Ontario, 2003. *Canada Communicable Disease Report*. 2006; 32(23): 275-285.

Figure 3: Age-specific rates of Verotoxin producing *E. coli* by sex (1999-2008)

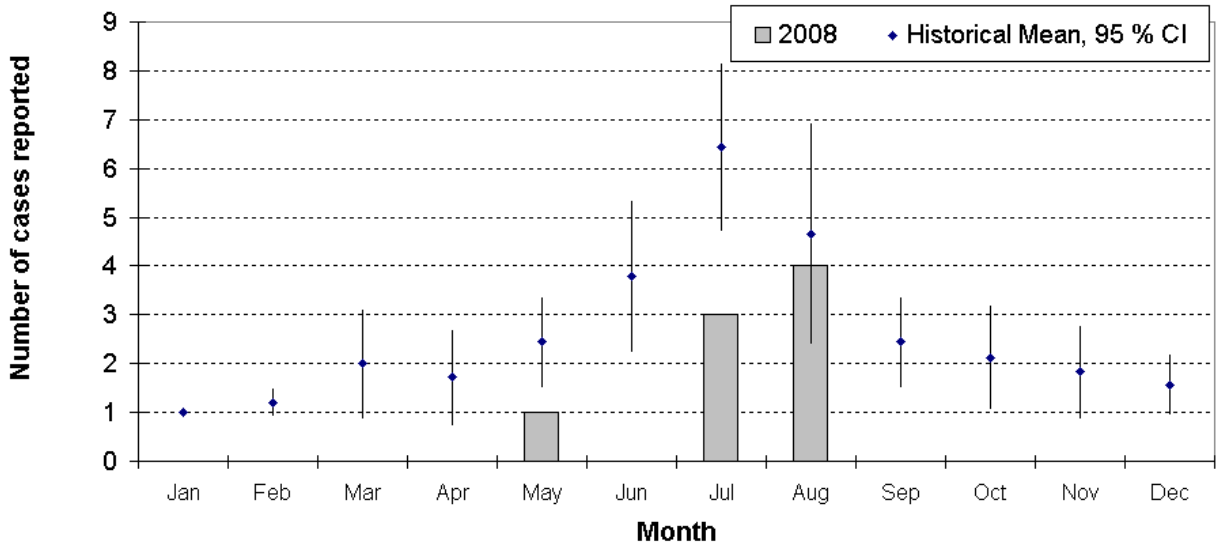


	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
■ Male rates	10.14	7.85	3.74	2.21	2.54	0.98	1.29	0.00	0.66	0.22	0.53	1.31	0.43	1.86
□ Female rates	15.99	7.48	2.74	5.81	1.48	3.73	0.62	0.48	1.07	1.08	0.76	0.65	0.90	3.81

Age group (years)

Data Source: integrated Public Health Information System (iPHIS), York Region Health Services, as of August 14, 2009**.** Rates were calculated using population projections & estimates from IntelliHEALTH ONTARIO, Ontario Ministry of Health and Long-Term Care.

Figure 4: Seasonal distribution of confirmed cases of Verotoxin Producing *E. coli* in York Region by month (2008 compared to 1999-2007 average)



Data Source: integrated Public Health Information System (iPHIS), York Region Health Services, as of August 14, 2009**.**

To optimize control of VTEC, all stages of food production should be considered, from farm to fork.[8] This includes on-farm strategies such as identifying and modifying management approaches with faecal shedding, and increasing herd resistance to infection among cattle. In the abattoir, contamination into the food chain should be minimized by using antimicrobial products, washing, steam pasteurization and good manufacturing practices in the processing line.

Public health policies geared towards decreasing the rate of VTEC infections focus on primary and secondary infection prevention. The risk of VTEC infection can be greatly reduced through safe food handling and proper cooking techniques. Strategies to prevent the transmission of VTEC infections include:[21,22]

- Thorough hand washing after using the toilet, handling diapers, pets, livestock, or before preparing food;
- Avoiding the preparation or handling of foods if ill with diarrhea;
- Cooking ground beef thoroughly to an internal temperature of 71^{o}C or until the juices run clear and the meat is no longer pink;
- Avoiding cross contamination by using separate work surfaces and utensils for preparing raw and cooked foods;
- Cleaning and sanitizing surfaces and utensils that may have been contaminated by uncooked meat;
- Keeping cold foods at 4^{o}C or lower and hot foods at 60^{o}C or higher;
- Limiting milk and apple cider consumption to pasteurized products;
- Washing all fruits and vegetables before eating; and
- Drinking water from a safe supply.

Section D: Infectious Disease Activity

Around the World …

Novel H1N1 influenza A virus/human swine flu – As of July 2009, the World Health Organization (WHO) no longer issues global tables showing the numbers of confirmed cases for all countries. Thus, the reported cases presented below may underestimate the true incidence and will not be comparable to one another. Globally, there have been 134,503 confirmed cases, with 816 deaths (as of July 27, 2009). In North America, the number of cases are as follows:

- 43,771 confirmed and probable human cases in the United States, 302 deaths (as of July 24, 2009)
- 16,442 confirmed human cases in Mexico, 146 deaths (as of July 31, 2009)
- 10,156 confirmed human cases in Canada, 45 deaths (as of July 15, 2009)

[21] Ontario Ministry of Health and Long-Term Care. Public Information – Publications – *E. coli* Bacteria. [online] cited April 11, 2007 from <http://www.health.gov.on.ca/english/public/pub/disease/ecoli.html>

[22] Centers for Disease Control and Prevention. Disease Listing, *Escherichia coli* O157:H7, Gen Info – CDC Bacterial, Mycotic Diseases. [online] cited April 11, 2007 from <http://www.cdc.gov/ncidod/dbmd/diseaseinfo/escherichiacoli_g.htm>

As of July 29, 2009, 6,556 cases of novel H1N1 influenza A have been confirmed in Ontario, with 290 hospitalizations and 18 deaths. As of August 13, 2009, a total of 491 cases of novel H1N1 influenza A have been confirmed in York Region, with 33 hospitalizations and no deaths in York Region residents.

Sources: Public Health Agency of Canada. [online] cited from <http://www.phac-aspc.gc.ca/alert-alerte/swine-porcine/surveillance-eng.php>; World Health Organization. [online] cited from <http://www.who.int/en/>; http://www.oahpp.ca/Documents/H1N1%20Weekly%20Synthesis%20July%2031,%2009.pdf; http://www.cdc.gov/swineflu/index.htm.

Around the province…

Measles – Waterloo Health Unit has confirmed 6 cases of measles. The index case, with a rash onset date of May 21, 2009, likely acquired measles in the United States from a child with measles visiting from the U.K. Two cases are children from the same family as the index case, and two other unrelated cases were exposed to the index case at a shopping centre. One of these unrelated cases infected their sibling, who had a later onset date of June 17, 2009. In Waterloo, the last case of measles occurred in 1996. Between January 1st and July 31st, 2009, there has only been one confirmed case, which was also travel-related. Health units are being asked to enter all measles cases into iPHIS and notify the VPD program area at the Ministry within one business day of receiving initial notification. *Source: Ontario Ministry of Health and Long-Term Care, iPHIS Weekly Notice #181 Vol.4(31)- released July 31, 2009; Canadian Integrated Outbreak Surveillance Centre Public Health Alert (*EA-001833*) posted July 24, 2009.*

Cyclosporiasis – The Ontario Ministry of Health and Long-Term Care has been notified of two cyclosporiasis clusters occurring in Simcoe Muskoka District Health Unit and Toronto Public Health. Between May 1, 2009 and July 30, 2009, 63 confirmed cases of cyclosporiasis cases were reported by 16 health units across the province. The number of reported cases in June is significantly above the past 3-year average for Ontario, with a total of 40 reported cases in June. Food frequency analyses show a relatively high consumption of fresh berries and other fresh fruits and vegetables. However a provincial outbreak has not been declared. Public health units are being asked to continue to use a shot-gun questionnaire to interview cyclosporiasis cases. *Sources: Canadian Integrated Outbreak Surveillance Centre Public Health Alert (*EA-001812*) posted July 31, 2009; Ontario Ministry of Health and Long-Term Care, iPHIS Weekly Notice #181 Vol.4(31)- released July 31, 2009.*

***Salmonella* Cubana –** The Ontario Ministry of Health and Long-Term Care is investigating an increase in the number of reported cases of *Salmonella* Cubana. Between January and July, 2009, a total of 8 *S.* Cubana cases were confirmed in the province, with 4 cases being reported in June. Typically, Ontario reports two cases per year. The PFGE patterns for five of these cases are shared among them, which also matches the PFGE patern isolated from broccoli sprouts by the Canadian Food Inspection Agency during routine sampling. Given the rarity and concurrent identification of this serotype, the Ministry has declared an outbreak. An enhanced surveillance directive has been issued by the MOHLTC, and a standardized questionnaire is available for use during case investigation. *Source: Ontario Ministry of Health and Long-Term Care, iPHIS Weekly Notice #181 Vol.4(31)- released July 31, 2009.*

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Any questions, suggestions, or requests for further information pertaining to this monthly report may be directed to:

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