

Surveillance Report of the 2003/04 Ontario Influenza and Respiratory Infection Outbreak Surveillance Season

Background

Under the Ontario Regulation 559/91 and amendments to the *Health Protection and Promotion Act (HPPA)*, "Respiratory Infection Outbreaks in Institutions" were included among the specified Reportable Diseases in 2001. As a result, since the 2001/02 influenza and respiratory infection outbreak surveillance season, all respiratory infection outbreaks in institutions, irrespective of the causative organism (including those of unknown cause), are being reported to the Public Health Branch (PHB) (now Public Health Division) of the Ministry of Health and Long Term Care (MOHLTC). Reporting of non-influenza respiratory infection outbreaks in institutions is necessary to assess the complete epidemiology of respiratory infection outbreaks, which is essential for adequate and timely control measures.

Data Summary

There were a total of 929 respiratory infection outbreaks in institutions in Ontario between September 1, 2003 and August 31, 2004. Of these, 397 (42.7%) were due to influenza, 40 (4.3%) were caused by parainfluenza virus (PIV), 54 (5.8%) were due to respiratory syncytial virus (RSV), 36 (3.9%) were caused by rhinovirus, 11 (1.2%) were caused by a combination of organisms, and in 391 (42%) outbreaks the causative organism was not known.

During the 2003/04 active influenza and respiratory infection outbreak surveillance season (November 1, 2003 – April 30, 2004), the Centre for Infectious Disease Prevention and Control (CIDPC), Health Canada reported 11,045 isolates tested positive for influenza across Canada. Of the 11,045 for the 2003-2004 season, 10,916 (98.8%) were influenza A and 129 (1.2%) were influenza B. This was a 477% increase in the total number of positive influenza isolates as compared to Canada's 2002/03 season, when a total of 1,915 isolates tested positive for influenza between November 2, 2002 and April 30, 2003.

Between October 1, 2003 and April 30, 2004, a total of 5,353 laboratory-confirmed influenza cases were reported through Ontario's Reportable Disease Information System (RDIS). This was a 486% increase in reported influenza cases as compared to 913 laboratory-confirmed cases of influenza reported during the same time period in the previous season. Of these 5,353 cases, 5,314 (99.3%) were influenza A and 39 (0.7%) were influenza B.

Introduction

Influenza has been a reportable disease in Ontario since 1923 and a provincial surveillance program is conducted annually. The objectives of the 2003/04 influenza and respiratory infection outbreak surveillance were:

- o To identify the strains of influenza circulating in Ontario and determine the incidence and prevalence of influenza viruses in the various geographical regions of Ontario and their relationship to the national and international viral activity;
- o To monitor antigenic drift and shift in circulating influenza virus strain/s as early as possible to determine their ability to spread and cause disease including detection of the onset of an influenza pandemic;
- o To monitor and rapidly identify other respiratory organisms, including emerging and re-emerging diseases, in order to institute appropriate infection control measures;
- o To determine the onset, duration and severity of the influenza season and of outbreaks due to emerging and re-emerging organisms;
- o To assess the effectiveness of outbreak control measures in the control of respiratory infection outbreaks in long-term care facilities and other institutions.
- o To provide accurate and timely information about influenza and other respiratory infection activity to necessary stakeholders;
- o To assess the epidemiology of respiratory infection outbreaks in order to apply adequate and timely control measures
- o To improve the quality of diagnostic investigations, including laboratory diagnosis
- o To establish baseline morbidity and mortality data needed for the introduction of new, effective vaccines against some of the organisms responsible for respiratory infection outbreaks.

2003/04 was the fourth season for the *Universal Influenza Immunization Program (UIIP)*, where all Ontarians more than six months of age who live, work, or go to school in Ontario were eligible to receive free influenza vaccine. A continued emphasis of this program was the immunization of people at high-risk for complications associated with influenza including:

- o Healthy children aged 6 months to 23 months
- o Adults and children with cardiac or pulmonary disease or chronic conditions such as diabetes mellitus, cancer, immunodeficiency, or immunosuppression
- o People of any age who were residents of nursing homes and other chronic care facilities
- o People ≥ 65 years of age
- o Children and adolescents (aged 6 months to 18 years) receiving long term acetylsalicylic acid (ASA) therapy

Methods

The PHB of the MOHLTC used various data sources to track influenza activity in Ontario. The five components of influenza surveillance for the 2003/04 season included the following:

- o Laboratory surveillance, conducted by the CIDPC in conjunction with the National Microbiology Laboratory, Health Canada;
- o Reportable Disease Information System (RDIS) reports of laboratory-confirmed influenza cases across Ontario;

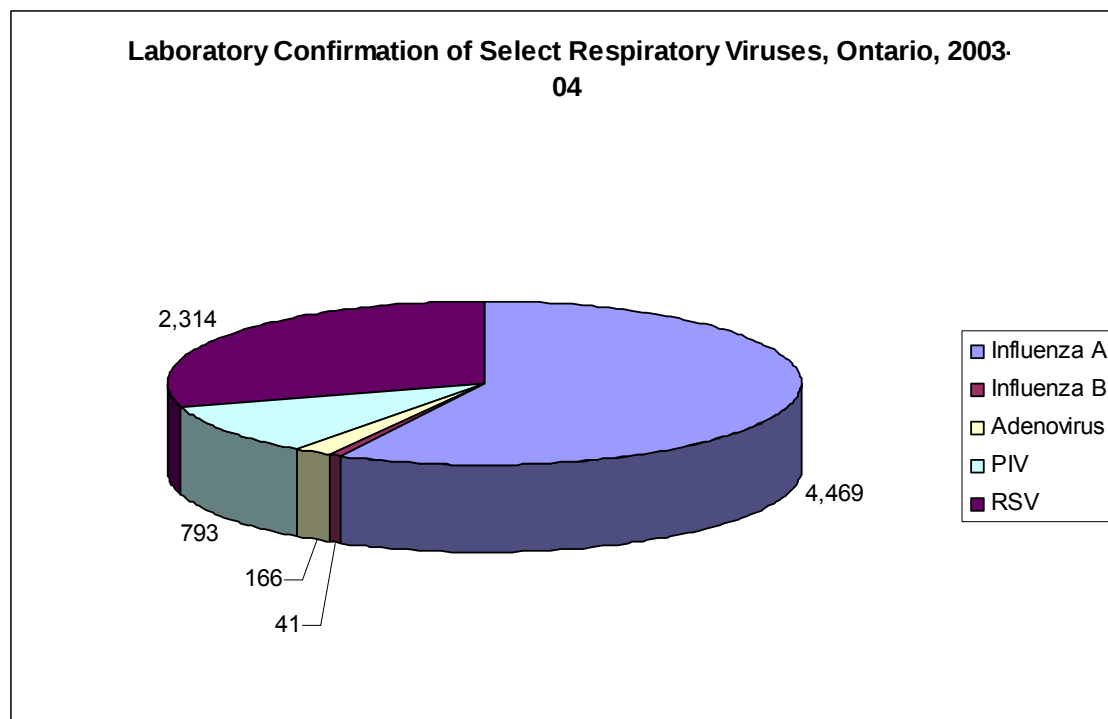
- o Reports of institutional respiratory infection outbreaks from health units across Ontario;
- o Influenza activity level reports from health units across Ontario;
- o Sentinel Physician ILI consultation rates by Health Canada / College of Family Physicians of Canada (CFPC) as part of the *FluWatch* Program.

In addition to the above, influenza vaccination rates in Long-Term Care Facilities and hospital staff are included in this report.

1. Laboratory Surveillance of Influenza

The laboratory surveillance component involved the reporting of positive influenza and other respiratory virus isolates from select Ontario laboratories to the CIDPC. Reports include results from both outbreak-associated and sporadic cases of respiratory infection. These data are then reported weekly to the PHB of the MOHLTC. During the 2003/04 influenza surveillance season, 15 laboratories in Ontario participated in laboratory surveillance. The participating laboratories included: public health laboratories in Toronto, Kingston, Timmins, Windsor, Thunder Bay, Sault Ste. Marie, Orillia, Ottawa, Peterborough, and Hamilton. Participating hospital-based laboratories included: Children's Hospital of Eastern Ontario (Ottawa), Toronto Medical Laboratory, Women's College Hospital, Hospital for Sick Children (Toronto), and St. Joseph's Hospital (London). All laboratory data were published in the Public Health Branch's *Ontario Influenza Bulletin* throughout the season.

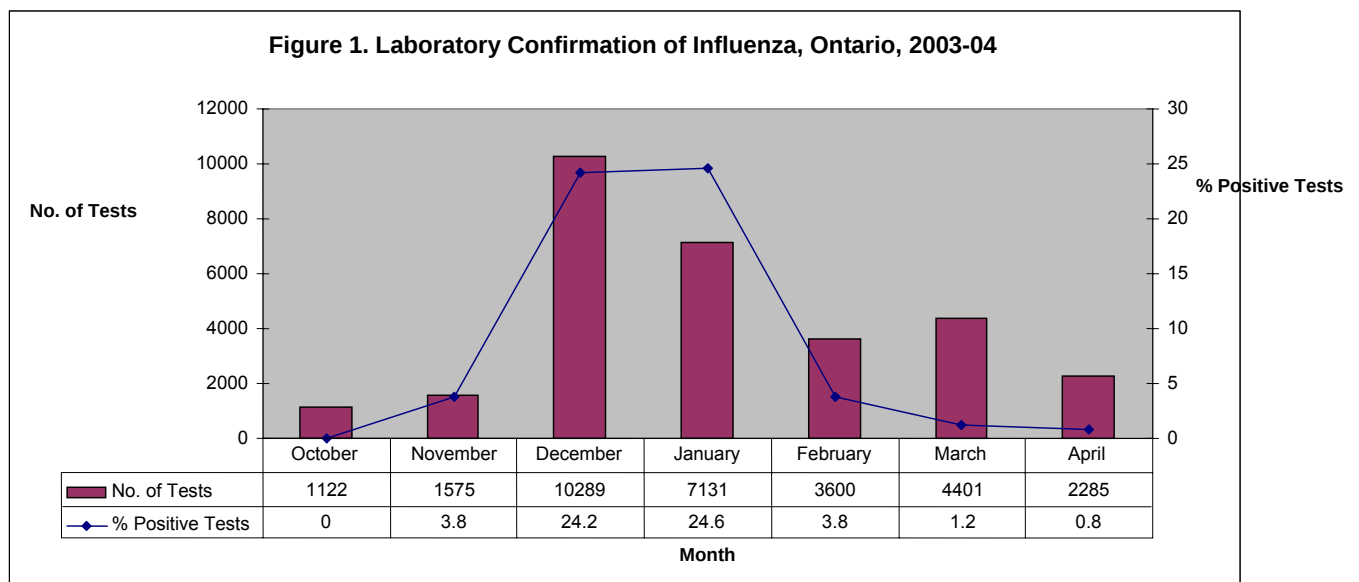
Results



Source: Centre for Infectious Disease Prevention and Control

Influenza, Ontario

For the 2003/04 influenza season, influenza activity in Ontario began in the second week of November and peaked in December and the first 3 weeks of January. Ontario's participating laboratories reported a total of 30,403 isolates tested for influenza between the week ending November 1, 2003 and April 30, 2004 (the period during which the national and Ontario's active surveillance period most closely overlapped). Of these, 4,469 (14.7%) tested positive for influenza A, and 41 (0.13%) were tested positive for influenza B. This represented a 403% increase in isolates that tested positive for influenza over the previous season's 892 (Figure 1). The total number of laboratory isolates reported represent both outbreak-associated and sporadic cases.

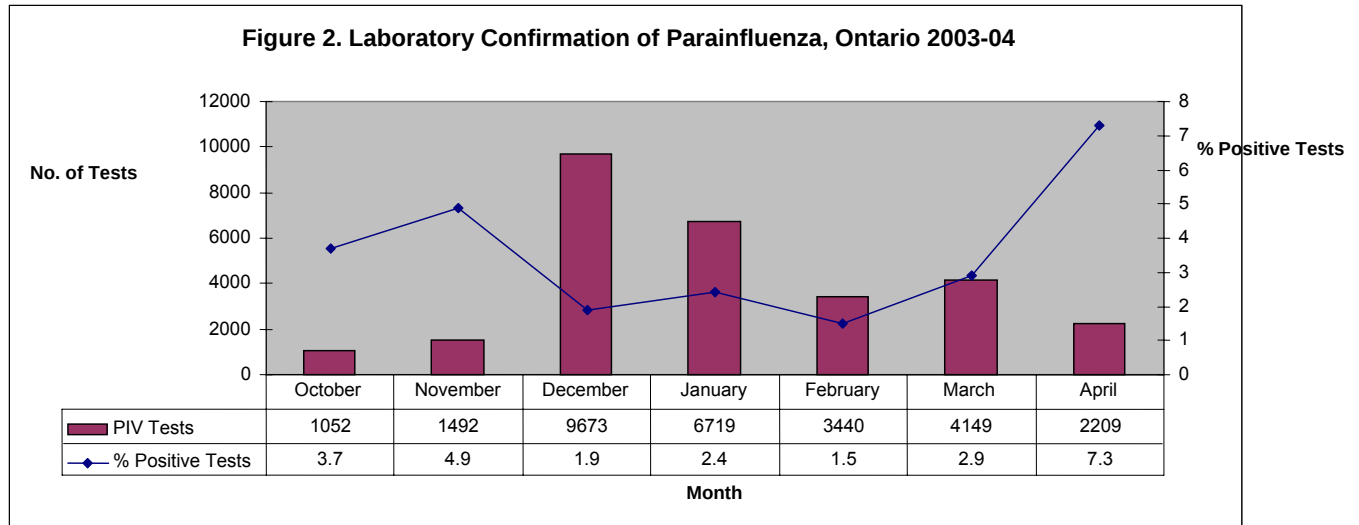


Source: Centre for Infectious Disease Prevention and Control

Non-Influenza Organisms, Ontario

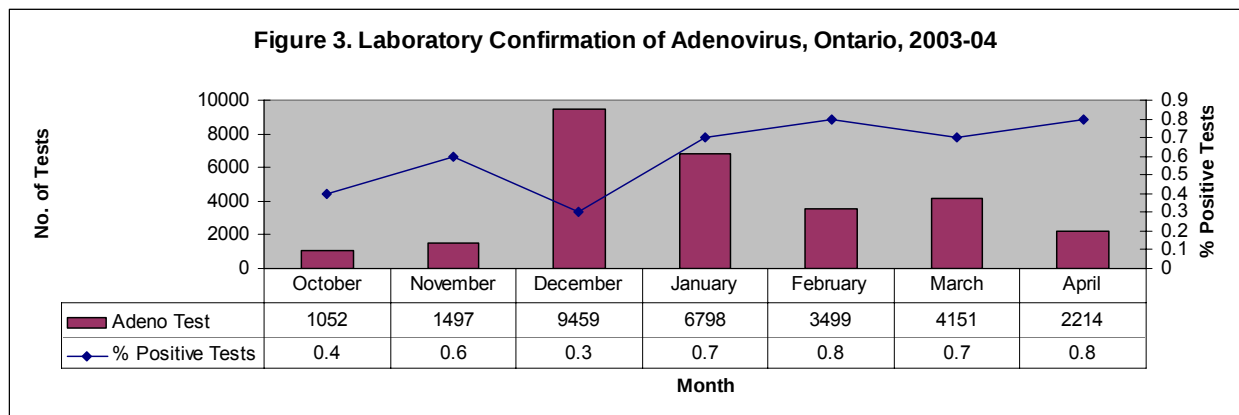
Other respiratory viruses isolated during the season (weeks ending November 1, 2003 to April 30, 2004) included parainfluenza viruses (PIV), adenoviruses, and respiratory syncytial virus (RSV), the three viral respiratory organisms for which routine testing was conducted.

A total of 28,734 tests for PIV were performed, of which 793 (2.8%) tested positive (Figure 2).



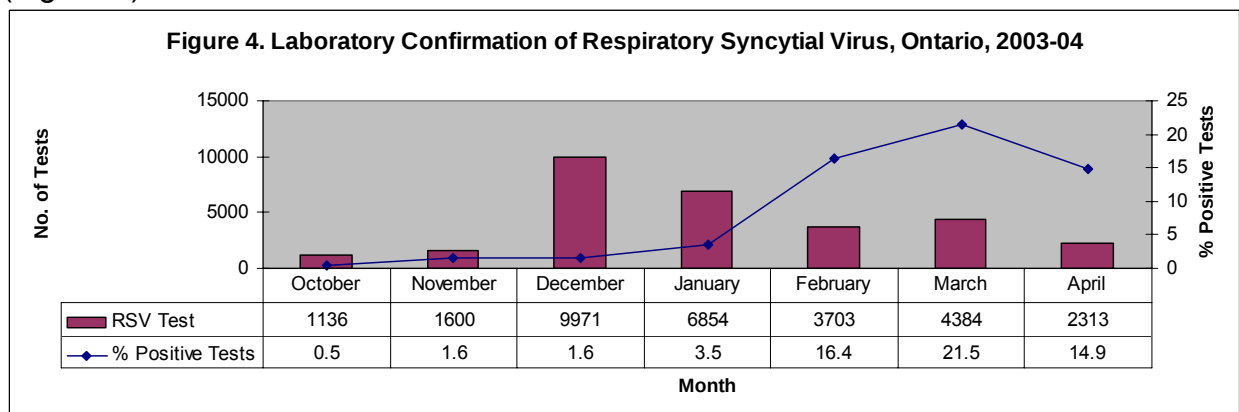
Source: Centre for Infectious Disease Prevention and Control

A total of 28,670 tests for adenovirus were performed, of which 166 (0.6%) tested positive (Figure 3).



Source: Centre for Infectious Disease Prevention and Control

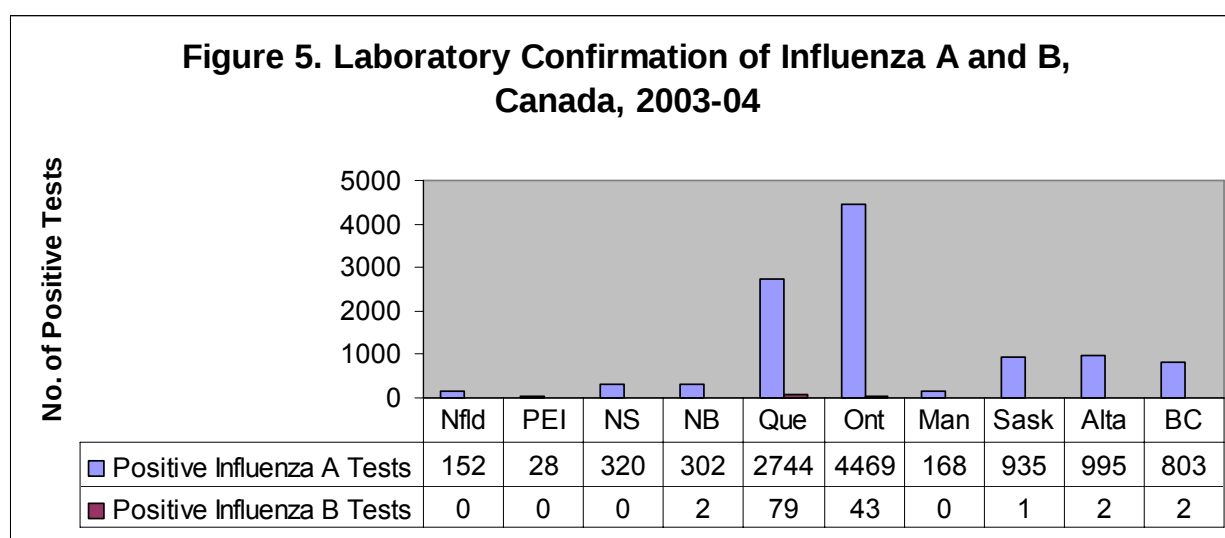
A total of 29,961 tests for RSV were performed, of which 2314 (7.7%) tested positive (Figure 4).



Source: Centre for Infectious Disease Prevention and Control

Influenza, Canada

During the 2003/04 surveillance season, the CIDPC reported 11,045 isolates which tested positive for influenza (10,916 (98.8%) influenza A and 129 (1.2%) influenza B). This figure represented a 477% increase in the total number of positive influenza isolates as compared to Canada's 2002/03 data, when a total of 1,915 isolates tested positive for influenza. Ontario reported the highest numbers of laboratory-confirmed influenza with 4,512 positives (4,469 influenza A [41% of all influenza A isolates], 43 influenza B [33% of all influenza B isolates]), while PEI reported the lowest numbers: 28 influenza A isolates [0.3% of all influenza A isolates] and 0 influenza B. The majority of positive influenza A isolates came from Ontario, whereas the majority of positive influenza B isolates were from Quebec, with a total of 79 laboratory-confirmed isolates (Figure 5).



Source: Centre for Infectious Disease Prevention and Control

Non-Influenza Organisms, Canada

During the 2003/04 surveillance season, the CIDPC reported 1,861 laboratory-confirmed PIV isolates, 753 laboratory-confirmed adenovirus, and 6,618 laboratory-confirmed RSV. The majority of laboratory-confirmed PIV isolates came from Ontario with 782, whereas the majority of laboratory-confirmed RSV and adenovirus came from Quebec with 2,435 and 220 isolates respectively.

Composition of the 2003/04 Canada Influenza Vaccine

The influenza vaccine for the 2003/04 season was developed based on antigenic characteristics of current and emerging influenza virus strains. The trivalent influenza vaccine developed for the 2003/04 season included the following: A/Panama/2007/99 (H3N2)-like, A/New Caledonia/20/99 (H1N1)-like, and B/Hong Kong/330/2001-like.

Influenza Strains Circulating in Canada

The predominant circulating influenza strain in Canada during the 2003/04 surveillance season was A/Fujian/411/2002 (H3N2)-like, a new variant of the A(H3N2) strain that was not included in the 2003/04 trivalent influenza vaccine. Additional circulating strains included A/Panama/2007/99 (H3N2)-like, A/New Caledonia/20/9/9-like (H1N1), A (H1N2), B/Hong Kong/330/2001 and B/Sichuan/379/99.

During the period between October 1, 2003 and August 17, 2004, the National Microbiology Laboratory (NML) at Health Canada sub-typed and characterized 805 influenza A isolates and 40 influenza B isolates.

Of the 805 influenza A isolates: 776 (96.4%) were A/Fujian/411/2002 (H3N2)-like, 25 (3.1%) were A/Panama/2007/99 (H3N2)-like, three were A/New Caledonia/20/9/9-like (H1N1), and one was an influenza A (H1N2) subtype. Of the 40 influenza B isolates: 7 were B/Hong Kong/330/2001 and 33 were B/Sichuan/379/99 (Table 1).

Table 1. Influenza A & B Strains Circulating in Canada, 2001/02 to 2003/04 Seasons		
<u>Season</u>	<u>Main Circulating Strains</u>	<u>Vaccine Strains</u>
2001/02	A/Panama/2007/99-like (H3N2) B/Hong Kong/22/01-like B/Sichuan/379/99-like	A/Panama/2007/99 (H3N2)-like virus A/New Caledonia/20/99 (H1N1) like B/Victoria/504/2000-like virus
2002/03	A/Panama/2007/99-like (H3N2) A/(H1N2)* A/New Caledonia/20/99-like (H1N1) B/Hong Kong/330/01-like	A/Panama/2007/99 (H3N2) like A/New Caledonia/20/99 (H1N1) like B/Hong Kong/330/2001 like
2003/04	A/Fujian/411/2002 (H3N2)-like A/Panama/2007/99-like (H3N2) A/New Caledonia/20/9/9-like (H1N1) A/(H1N2)* B/Hong Kong/330/2001 B/Sichuan/379/99	A/Panama/2007/99 (H3N2) like A/New Caledonia/20/99 (H1N1) like B/Hong Kong/330/2001 like
* Note: The influenza A (H1N2) virus strain is a reassortment virus derived from the influenza A (H1N1) and A (H3N2) virus strains.		
Source: National Microbiology Laboratory (NML), Population and Public Health Branch, Health Canada		

Influenza Strains Circulating in Ontario

In Ontario, a total of 369 strains were characterized by NML. There was one A/New Caledonia/20/99-like isolate, 346 A/Fujian/411/02-like, 4 B/Hong Kong/330/02-like, and 19 B/Sichuan/379/99-like isolates.

2. Reportable Disease Information System (RDIS): Laboratory-Confirmed Cases of Influenza

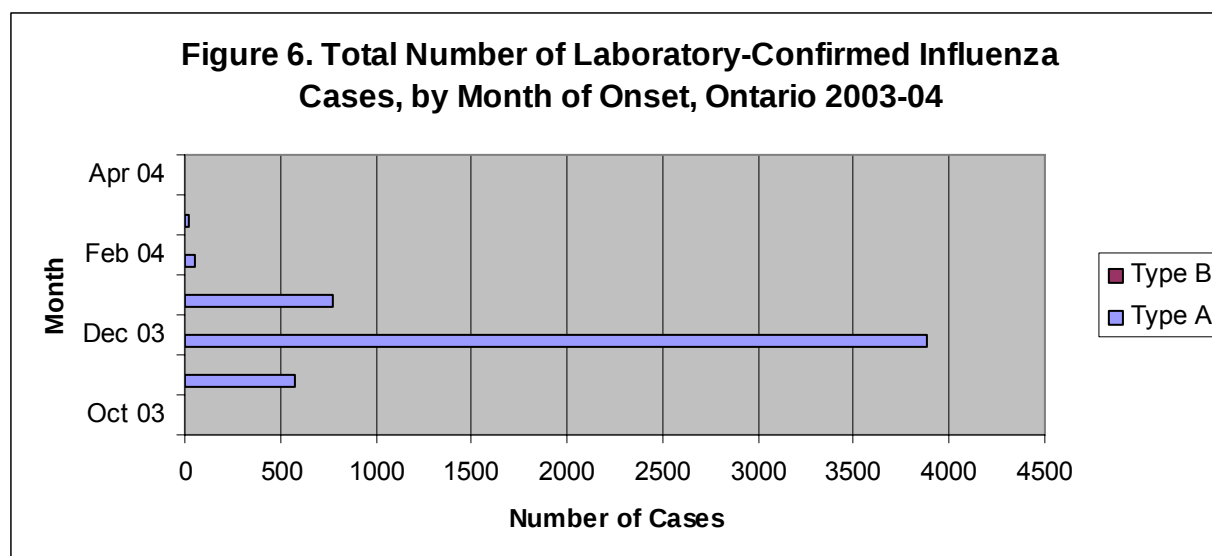
In Ontario, influenza is a reportable disease under Regulation 559/51 of the *Health Protection and Promotion Act (HPPA)* and in 2003/2004 boards of health were required to transmit data on all laboratory-confirmed cases of influenza to the PHB through RDIS. Since only laboratory-confirmed cases of influenza were entered through RDIS, this number represents only a portion of the true number of influenza cases in Ontario. Information obtained from reports on institutional outbreaks adds to the picture of the total number of cases of influenza in the province.

The RDIS influenza case definition was:

- Clinically compatible signs and symptoms of influenza with either:
 - o laboratory confirmation by detection or isolation of influenza virus in pharyngeal or nasal secretions;
- or
- o demonstration of a four-fold or greater increase in hemagglutination antibody titres to influenza (seroconversion).

RDIS Results

Between October 1, 2003 and April 30, 2004, a total of 5,353 laboratory-confirmed influenza cases were reported through RDIS. This was a 486% increase in influenza cases reported through RDIS as compared to the 913 cases of influenza reported during the same time period in the previous season. Of these 5,353 cases, 5,314 (99.3%) were influenza A and 39 were influenza B (0.7%). Peak activity occurred in December, with a total of 3,890 laboratory-confirmed cases reported. Of these 5,353, 3,883 (99.8%) were influenza A (Figure 6).



Source: Reportable Disease Information System (RDIS), Public Health Branch

During the 2003/04 surveillance season, numbers of influenza cases per capita were highest in the Northern regions of the province; the regional rate of influenza cases was 82.2/100,000 population. The Central East and Southwest regions of the province demonstrated the lowest regional rates at 37.88/100,000 population and 38.1/100,000 population respectively (Table 2). Rates of influenza during the 2003/04 surveillance season were much higher than the 2002/03 season, in which the highest regional rates were 9.1/100,000 population and 9/100,000 population in the Northern and Central West regions of the province respectively, and the lowest rate being 5/100,000 population in the Eastern region.

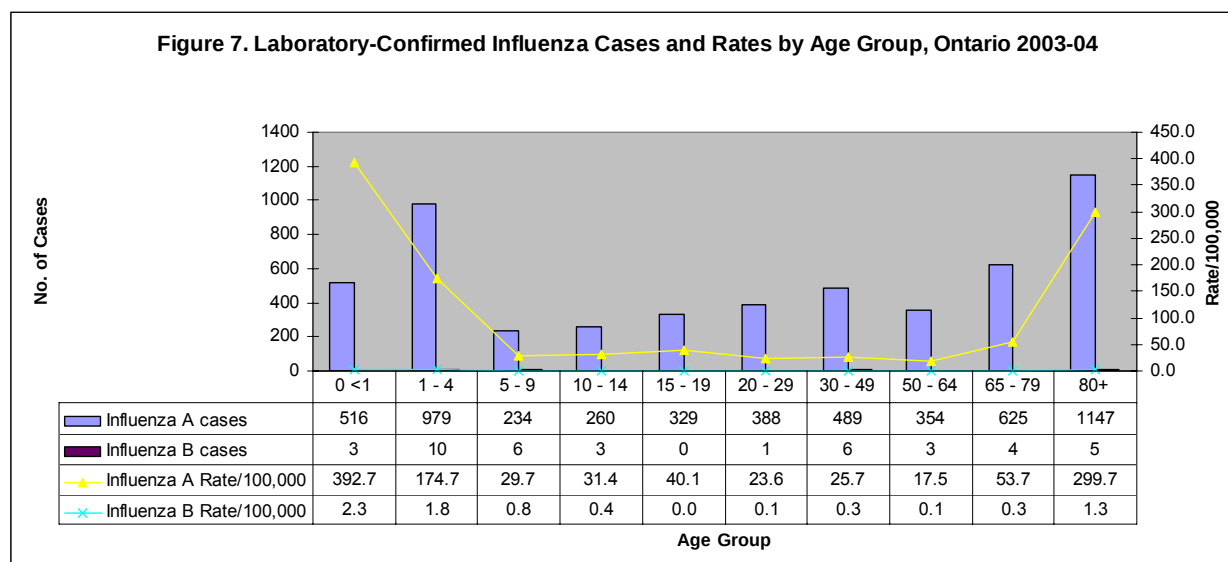
Table 2. Laboratory-Confirmed Influenza Cases by Health Unit and Region, Ontario, 2003-04 (RDIS data)				
Health Region	Health Unit	Population 2003*	Number of Confirmed Influenza Cases (A&B)	Rate per 100,000 population
Northern	Algoma	119,929	136	113.40
	North Bay	96,453	114	118.19
	Northwestern	81,874	34	41.53
	Porcupine	89,876	97	107.93
	Sudbury	196,787	184	93.50
	Thunder Bay	159,592	32	20.05
	Timiskaming	35,415	44	124.24
	Region Total	779,926	641	82.18
Eastern	Eastern Ontario	197,370	61	30.91
	Hastings-Prince Edward	160,658	200	124.49
	Kingston-Frontenac	188,219	99	52.60
	Leeds-Grenville	167,762	18	10.73
	Ottawa-Carleton	823,608	241	29.26
	Renfrew	100,075	37	36.97
	Region Total	1,637,692	656	40.06
Central East	Durham	547,759	183	33.41
	Haliburton-Kawartha	170,627	117	68.57
	Muskoka-Parry Sound	84,805	85	86.47
	Peel Region	1,122,959	557	49.60
	Peterborough	132,615	100	75.41
	Simcoe County	411,024	267	64.96

	Toronto	2,611,661	614	23.51
	York	852,035	325	38.14
Region Total		5,933,485	2,248	37.88
Southwest	Grey Bruce	160,624	94	58.52
	Elgin-St. Thomas	86,096	15	17.42
	Huron	61,896	43	69.47
	Chatham-Kent	110,124	35	31.78
	Lambton	132,664	46	34.67
	Middlesex-London	428,628	217	50.63
	Oxford	103,880	41	39.47
	Perth	77,265	81	104.83
	Windsor-Essex	400,540	23	5.74
Region Total		1,561,717	595	38.10
Central West	Brant	131,721	40	30.37
	Haldiman-Norfolk Region	109,756	61	55.58
	Halton Region	413,454	223	53.94
	Hamilton-Wentworth	516,776	418	80.89
	Niagara Region	429,949	201	46.75
	Waterloo Region	470,022	153	32.55
	Wellington-Dufferin	253,802	139	54.77
Region Total		2,325,480	1,235	53.11
Provincial Total		12,238,300	5,375	43.91

* Source: Provincial Health Planning Data Base (PHPBD) Version 14.15, October, 2004

Age distribution of influenza cases showed that most of the RDIS reported cases occurred among persons ≥ 65 years of age and children ≤ 4 years of age. Persons ≥ 65 years of age represented 33.1% of cases (1,772 influenza A and 9 influenza B cases), whereas children ≤ 4 years of age represented 28% of all laboratory-confirmed influenza cases (1,495 influenza A and 13 influenza B cases). Young children and adolescents were also affected by the influenza virus with a total of 240 cases among 5-9 year olds (4.5% of total cases); 263 among those aged 10-14 (4.9%) and 329 cases among 15-19 year olds (6.1%). The majority of influenza A cases were in persons ≥ 80 years of age with 1,147 cases (21.3% of total cases). The majority of influenza B cases

were in persons aged 1-4 years with a total of 10 cases, with the rest of the cases distributed among all age groups (Figure 7).



Source: Reportable Disease Information System (RDIS), Public Health Branch

3. Reports of Influenza and Respiratory Infection Outbreaks in Institutions, Ontario, 2003/04 Season

Since 2001, in addition to reporting influenza outbreaks, health units have been required to report all respiratory infection outbreaks caused by known or unknown respiratory organisms occurring in Long-Term Care Facilities (LTCFs) and health care institutions in their jurisdictions.

Data were collected and analyzed for outbreaks that occurred in LTCFs, retirement homes (RH) with more than 10 residents, acute care hospitals (ACH), chronic care hospitals (CCF), psychiatric hospitals, and schedule I and II facilities (the latter two facilities designated as “other”).

As was done for the 2001/02 and 2002/03 surveillance seasons, for this year’s surveillance period (September 1, 2003 – August 31, 2004), data on combined LTCFs (i.e. nursing homes / homes for the aged, nursing homes / retirement homes, hospitals / nursing homes) were included in LTCF reports. Reports prior to 2001/02 surveillance season included nursing homes and homes for the aged only.

Continuous home-wide surveillance is required to establish baseline levels of infection throughout the year. “Potential” outbreaks are recognized when infection rates increase above the baseline. Criteria for a “potential” influenza outbreak in a LTCF were:

- o one laboratory confirmed case – residents, patients, or staff with an organism such as influenza virus isolated or detected from a nasopharyngeal swab or with 4-fold or greater hemagglutination antibody titre; or

- o two cases of acute respiratory tract illness occurring within 48 hours in a geographic area; or
- o more than one unit (in a facility) having a case of acute respiratory illness within 48 hours.

Any further progression of the “potential” outbreak is to be considered a “confirmed” outbreak. Both laboratory-confirmed and epidemiologically-linked cases are also included in the total number of cases for institutional respiratory infection outbreaks.

Final reports on respiratory infection outbreaks in institutions include epidemiologic information on residents/patients and staff such as influenza immunization coverage rates, morbidity and mortality attributes, duration, seasonal distribution of outbreaks, and antiviral usage for prophylaxis or therapy to control an outbreak. Preliminary reports were faxed to the Public Health Branch, MOHLTC, by health units within 24 hours of outbreak notification. Preliminary reports were useful for warning purposes and for monitoring respiratory infection outbreak activity in the province.

Final reports were submitted within three weeks of the outbreaks being declared over, and were used in the formulation of this summary report.

Results

There were a total of 929 confirmed institutional respiratory infection outbreaks reported to the MOHLTC during the year-round 2003/04 surveillance season (September 1, 2003 – August 31, 2004), of which 397 were attributed to influenza. The 2003/04 surveillance season was the first year that these data were reported year-round, while data from previous seasons were reported for the active influenza season only (November to April).

Between October 27, 2003 and April 30, 2004, there were a total of 764 institutional respiratory infection outbreaks reported to the MOHLTC, of which 391 outbreaks were caused by influenza, and 373 were non-influenza organisms. In comparison to 2002/03 data (October 28, 2002 – April 30, 2003), this represented a 313% increase in the number of respiratory infection outbreaks and a 1,464% increase in the number of influenza outbreaks over the previous season’s 185 institutional respiratory infection outbreaks, of which 25 were attributed to influenza.

The 2003/04 season was more severe than the past three surveillance seasons according to a comparison of national surveillance indicators (laboratory surveillance, reporting of provincial and territorial activity levels, and outbreak activity), likely due to a new variant of the A(H3N2) strain of the influenza virus (A/Fujian/411/2002 (H3N2)-like), although the large number of outbreaks reported may have been due to increased reporting post Severe Acute Respiratory Syndrome (SARS). All thirty-seven health units reported at least one respiratory infection outbreak this season, with the majority of outbreaks occurring in LTCFs.

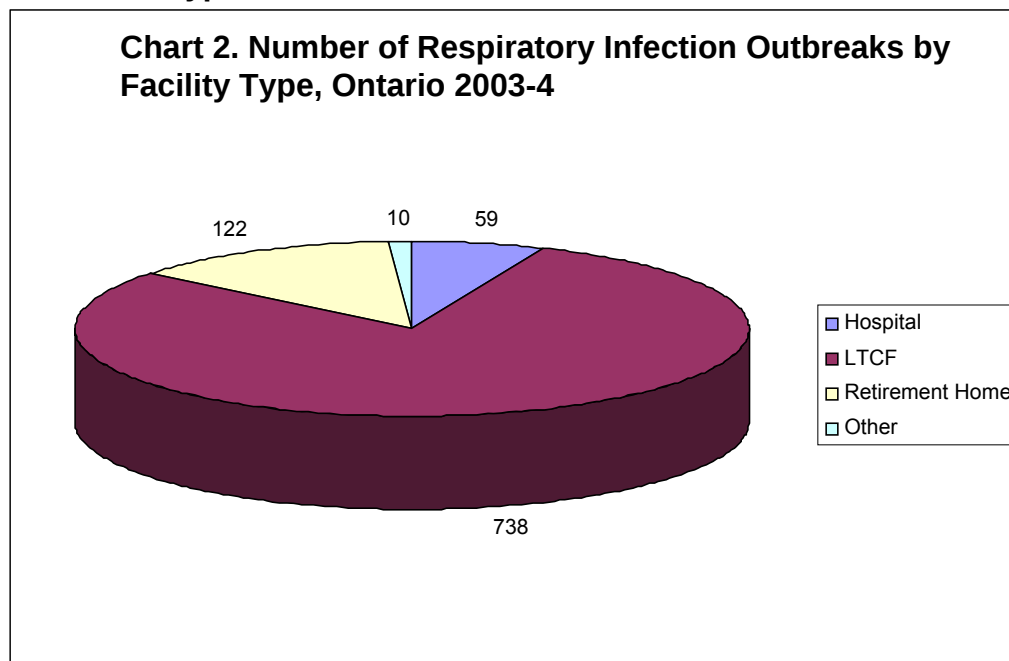
Data Analysis

Causative Organisms

Of the 929 reported respiratory infection outbreaks, 397 (42.6%) were laboratory-confirmed influenza. Influenza A was determined to be the causative organism in 386 outbreaks, influenza B in 4, and influenza A was combined with other organisms (PIV, RSV, rhinovirus, and *M. Pneumoniae*) in seven. A number of non-influenza organisms were identified in 141 outbreaks: 40 PIV, 54 RSV, 36 rhinovirus, one *S. Pneumoniae*, one *M. Pneumoniae*, four *Chlamydia Pneumoniae*, four outbreaks combined both PIV and rhinovirus, and one outbreak combined PIV and RSV. The causative organism was unknown for 391 (42%) of the respiratory infection outbreaks (Table 3).

Table 3. Number of Respiratory Infection Outbreaks, by Causative Organisms, Ontario, 2003-04		
Causative Organisms	# of Outbreaks	% of Total Outbreaks
Influenza A	386	41.5
Influenza B	4	0.4
Influenza A & PIV	3	0.3
Influenza A & RSV	1	0.1
Influenza A & Rhinovirus	2	0.2
Influenza A & RSV & <i>M.Pneumoniae</i>	1	0.1
Influenza (A&B) Outbreaks	397	42.6
PIV	40	4.3
PIV & Rhinovirus	4	0.4
PIV & RSV	1	0.1
RSV	54	5.8
Rhinovirus	36	3.9
<i>S. Pneumoniae</i>	1	0.1
<i>Chlamydia Pneumoniae</i>	4	0.4
<i>M. Pneumoniae</i>	1	0.1
Unknown	391	42.0
Non-Influenza Outbreaks	532	57.1

Institution Type



There were 929 respiratory infection outbreaks reported in institutions in Ontario during the 2003/04 season. Of the total number of respiratory infection outbreaks, 59 (6.4%) occurred in hospitals, 738 (79.4%) in LTCFs, and 132 (14.2%) in “other” facilities

Of the 59 respiratory infection outbreaks that occurred in hospitals, 18 (30.5%) occurred in acute care hospitals, while 23 (39%) occurred in chronic care facilities (Table 4).

Table 4. Number of Respiratory infection outbreaks, by Type of Hospital, Ontario, 2003-04		
Type of Hospital	# of Outbreaks	% of Outbreaks
Acute Care	18	30.5
Chronic Care	23	39
Combined acute and chronic care	10	16.9
Rehabilitation	2	3.4
Psychiatric	6	10.2
TOTAL	59	100

Of the total number of respiratory infection outbreaks, 738 (79.4%) occurred in LTCFs. Of these, 233 (25%) occurred in homes for the aged, 349 (37.6%) in nursing homes, and 156 (16.8%) occurred in combined facilities, which were either combined nursing home / home for the aged or combined nursing home / retirement home or hospital / nursing home (Table 5).

Table 5. Number of Respiratory infection outbreaks, by Type of LTCF, Ontario, 2003-04		
Type of LTCF	# of Outbreaks	% of LTCF Outbreaks
Home for the Aged	233	31.6
Nursing Home	349	47.3
Combined Facility (NH/HFA; NH/RH; hospital/NH)	156	21.1
TOTAL	738	100

Influenza Outbreaks

A total of 397 influenza infection outbreaks were reported in institutions. Of all the influenza outbreaks, 38 (9.6%) occurred in hospitals; the majority occurring in acute care facilities (Table 6).

Table 6. Number of Influenza Outbreaks, by Type of Hospital, Ontario, 2003-04		
Type of Hospital Setting	# of Influenza Outbreaks	% of Hospital Influenza Outbreaks
Acute Care	15	39.5
Chronic Care	14	36.8
Combined acute and chronic care	7	18.4
Rehabilitation	2	5.3
TOTAL	38	100

A total of 269 influenza outbreaks in LTCFs were reported, which made up 67.8% of influenza outbreaks; with the majority occurring in nursing homes (Table 7).

Table 7. Number of Influenza Outbreaks, by Type of LTCF, Ontario, 2003-04		
Type of LTCF	# of Influenza Outbreaks	% of Total LTCF Influenza Outbreaks
Home for the Aged	70	26.0
Nursing Home	128	47.6
Combined Facility	71	26.4
TOTAL	269	100

A total of 90 (22.7%) influenza outbreaks occurred in “other” facilities.

Non-Influenza Outbreaks

A total of 532 outbreaks were attributed to non-influenza organisms (including those of unknown causative organism), 21 (3.9%) of which occurred in hospitals (Table 8).

Table 8. Number of Outbreaks Caused by Non-Influenza Organisms, by Type of Hospital, Ontario, 2003-04		
Type of Hospital	# of Outbreaks	% of Total Outbreaks Attributed to Non-Influenza Organisms
Acute Care	3	14.3
Chronic Care	9	42.9
Combined acute and chronic care	3	14.3
Rehabilitation	0	0
Psychiatric	6	28.6
TOTAL	21	100

Of all the non-influenza outbreaks, a total of 469 (88.1%) occurred in LTCFs (Table 9).

Table 9. Number of Outbreaks Caused by Non-Influenza Organisms, by Type of LTCF, Ontario, 2003-04		
Type of LTCF	# of Outbreaks	% of Total Outbreaks Attributed to Non-Influenza Organisms
Home for the Aged	163	34.8
Nursing Home	221	47.1
Combined Facility	85	18.1
TOTAL	469	100

A total of 42 (7.9%) non-influenza outbreaks occurred in “other” facilities.

Outbreak Duration

Outbreak duration was defined as the number of days from the onset of illness in the first case until the outbreak was declared over. Due to the wide range of data results, median results are reported.

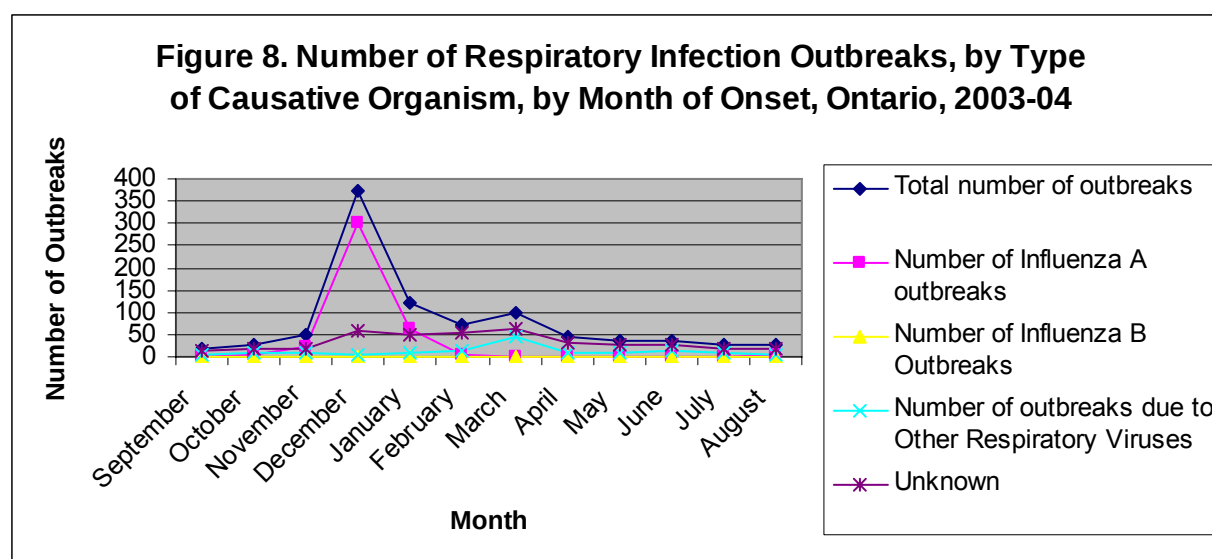
For the 929 respiratory infection outbreaks, median duration was 18 days (range 1-109 days). Median duration of outbreaks caused by influenza A and B were 17 days (range 4-69 days) and 19 days (range 13-25 days) respectively. For the 2002/03 influenza and respiratory infection outbreak season, the median duration for influenza A outbreaks was 19 days, there were no influenza B outbreaks reported for that season.

Median duration of respiratory infection outbreaks caused by non-influenza organisms was 21 days for PIV, 18 days for rhinovirus, and 24 days for RSV. The median duration for outbreaks in which the causative organism/s was unknown was 18 days (range 1-62 days) (Table 10).

Table 10. Median Duration of Outbreaks, by Type of Causative Organism, Ontario, 2003-04		
Type of Causative Organism	Median (days)	Range (days)
All types of organisms	18	1-109
Influenza A	17	4-69
Influenza B	19	13-25
PIV	21	4-68
Rhinovirus	18	10-71
RSV	24	8-67
Unknown Organism	18	1-62

Occurrence of Respiratory Infection Outbreaks, including influenza

Peak activity for all institutional respiratory infection outbreaks occurred in December, with a total of 374 outbreaks. Of these, 299 (80%) were due to influenza. Outbreak activity due to non-influenza organisms (outbreaks due to unknown organisms excluded) was at the highest in March, with 43 outbreaks (Figure 8).



Attack Rates for All Institutional Respiratory Infection Outbreaks

Patients/Residents

During the year-round 2003/04 surveillance season, 14,057 cases were reported among 124,637 exposed patients/residents. The overall attack rate for the season (total number for resident cases for all outbreaks/total number of residents in affected areas of institutions involved in the outbreak) was 11.3%. The resident attack rate in LTCFs was 11.6% with 11,900 cases among 102,164 exposed residents. The patient attack rate in hospitals was 5.6% with 590 cases among 10,462 exposed patients. Attack rates

of patients/residents ranged from 0.7% to 71.4%. The outbreak with the highest attack rate (71.4%) occurred in a retirement home where 15 of 21 at-risk residents experienced influenza A infections.

Between October 27, 2003 and April 30, 2004, there were a total of 11,714 cases among 99,614 exposed patients/residents, which translated into an attack rate of 11.8%. The year's attack rate was lower than the attack rate of 16.7% among patients/residents during the same time period in 2002/03.

There were insufficient data to determine attack rates among staff in outbreak institutions.

Attack Rates for Influenza Outbreaks

Patients/Residents

There were 397 influenza outbreaks between September 1, 2003 and August 31, 2004. There were 6,047 patient/resident cases among 52,083 exposed in the outbreak institutions. The overall attack rate for influenza outbreaks was 11.6%. Attack rates of patients/residents ranged from 0.7% to 71.4%.

Of the 397 influenza outbreaks, 38 occurred in hospitals. The overall attack rate of influenza in hospital patients was 6.8%.

A total of 269 influenza infection outbreaks occurred in LTCFs, of which the overall resident attack rate was 12.2%.

A total of 90 influenza outbreaks occurred in "other" facilities, in which the attack rate was 13.2%.

Between October 27, 2003 and April 30, 2004, a total of 391 influenza outbreaks occurred as compared to 25 outbreaks during the same time period in the previous surveillance season. The attack rate among patients/residents in institutions with influenza outbreaks was 11.8% in comparison to 19.9% in 2002/03.

Attack Rates for Non-Influenza Outbreaks

Patients/Residents

Between September 1, 2003 and August 31, 2004 there were 532 non-influenza outbreaks with 8,010 patient/resident cases among 72,554 exposed in the outbreak institutions. The overall attack rate for non-influenza infection outbreaks was 11%. Attack rates for patients/residents ranged from 0.7% to 63.6%. The highest attack rate for a non-influenza outbreak occurred in a nursing home, where 21 of 33 at-risk patients/residents experienced parainfluenza infections.

Of the 532 non-influenza outbreaks, 21 occurred in hospital settings. The overall attack rate of non-influenza outbreaks among hospital settings was 4.2%.

A total of 469 non-influenza outbreaks occurred in LTCFs, in which the overall attack rate was 11.4%.

A total of 42 non-influenza outbreaks occurred in “other” facilities, in which the attack rate was 13.3%.

Between October 27, 2003 and April 30, 2004, a total of 532 non-influenza outbreaks occurred, as compared to 160 outbreaks during the same time period in the previous season; this represented a 233% increase. The attack rate among patients/residents in institutions with non-influenza outbreaks was 11.7% in comparison to 16.2% in 2002/03.

Complications and Mortality among Patients/Residents for Respiratory Infection Outbreaks

During the 2003/04 surveillance season, a total of 520 deaths were attributed to institutional respiratory infection outbreaks. The majority of deaths occurred in LTCFs, with 453 (87.1%) deaths. The remaining deaths occurred in hospitals with 27, and 40 deaths in “other” facilities. The mean case fatality rate for all institutions that reported outbreaks was 3.7%. The case fatality rate for hospitals, LTCFs, and “other” facilities were 4.5%, 3.8%, and 2.6% respectively.

For all institutional respiratory infection outbreaks, the number of cases hospitalized as a consequence of the outbreak was 898, of which 623 (69.4%) were in LTCFs.

There were 761 radiologically-confirmed cases of pneumonia as a result of respiratory infection outbreak activity, of which 624 (82%) occurred in LTCFs.

Between October 27, 2003 and April 30, 2004, there were a total of 465 deaths attributed to outbreak activity, 465 hospitalizations and 590 radiologically-confirmed cases of pneumonia as a result of outbreak activity. These were significant increases in comparison to the 79 deaths, 113 hospitalizations, and 132 radiologically-confirmed cases of pneumonia related to outbreak activity during the same time period in the previous season. This is not unexpected given that there was a 313% increase in the number of institutional respiratory infection outbreaks as compared to the previous season.

Complications and Mortality among Patients/Residents, Influenza Outbreaks

In institutions reporting influenza outbreaks, there were a total of 316 deaths, or 60.8% of the total number of deaths attributed to respiratory infection outbreaks. There were 313 radiologically-confirmed cases of pneumonia (41.1% of the total number of cases),

and a total of 523 cases were hospitalized (58.2%) as a consequence of influenza outbreaks.

LTCFs represented a significant proportion of institutions reporting complications as a result of an influenza outbreak. Of the 316 deaths that occurred as a result of influenza outbreaks, 261 (82.6%) occurred in LTCFs. Of the 313 radiologically-confirmed cases of pneumonia, 214 (68.4%) occurred in LTCFs. Similarly, LTCFs represented 287 of 523 (55%) influenza related hospitalizations.

Complications and Mortality among Patients/Residents, Non-Influenza Outbreaks

Institutions reporting non-influenza outbreaks noted 204 patient/resident deaths (39.2% of the total number of deaths in all respiratory infection outbreaks), 448 (58.9%) radiologically-confirmed cases of pneumonia, and a total of 375 (41.8%) patients/residents hospitalized as a consequence of the outbreak.

Of the 204 deaths attributed to non-influenza outbreaks, 187 (91.6%) occurred in LTCFs. Of the 448 radiologically-confirmed cases of pneumonia, 409 (91.3%) occurred in LTCFs. Similarly, LTCF residents represented 333 of 375 (89%) non-influenza outbreak related hospitalizations.

Antivirals

In Ontario, antivirals have been in use for the prophylaxis and treatment of influenza A infections since 1988. Amantadine can be used for prophylaxis and treatment of influenza A only. The 2003/04 influenza season was the first season in which oseltamivir (Tamiflu®) was licensed for use for prophylaxis in Canada. Neuraminidase inhibitors are effective against both influenza A and B. Studies indicate that when used for treatment, both amantadine and oseltamivir should be given within 48 hours of onset of symptoms for maximum benefit.

Patients/Residents Antiviral Use

Of the 397 influenza outbreaks, 364 (91.7%) institutions reported having used antivirals for patients/residents either as prophylaxis or treatment during outbreaks. Proportionately, antiviral use was lower during the 2003-04 season than the previous season as antivirals were administered in 24 of 25 (96%) of outbreaks. Given that antiviral use reported for residents in 2003/04 was proportionately lower than was used for staff, it is possible that antivirals were used for resident treatment/prophylaxis but were not reported.

Antivirals as Prophylaxis in Patients/Residents

Nine outbreak institutions reported that they did not use either amantadine or oseltamivir (Tamiflu®) as prophylaxis. Amantadine alone was administered as prophylaxis in 35 influenza outbreaks; average length of amantadine prophylaxis use

was 12 days (range 5-24 days). Oseltamivir alone was administered for prophylactic use in 304 outbreaks; the average length in use of oseltamivir for prophylaxis was 12.5 days (range 3-31 days) when used as the sole antiviral. In 16 outbreaks, both amantadine and oseltamivir were used as prophylaxis for patients/residents; average length of amantadine use for prophylaxis was 10 days (range 1-19 days) and average length of oseltamivir use for prophylaxis was 11.7 days (range 5-22 days).

Antivirals as Treatment in Patients/Residents

In 38 institutional influenza outbreaks, institutions did not report use of either amantadine or oseltamivir as treatment for their patients/residents. Amantadine alone was administered for treatment in 22 influenza outbreaks; average length of amantadine use for treatment was 9.9 days (range 3-14 days) when used as the sole antiviral. Oseltamivir alone was administered as treatment in 292 outbreaks; the average length of oseltamivir use for treatment was 5.7 days (range 1-28 days). Amantadine and oseltamivir were used simultaneously in 12 outbreaks; the average length of amantadine treatment was 8.7 days (2-19 days) and the average length of oseltamivir treatment was 5.2 days (4-8 days). Note: The recommended length of treatment with oseltamivir or amantadine is 5 days.

Staff Antiviral Use

Of the 397 influenza outbreaks, 391 (98.5%) reported antivirals were used for staff for outbreak control.

Antivirals as Prophylaxis in Staff

One hundred and twelve outbreak institutions reported that they did not use either amantadine or oseltamivir (Tamiflu ®) as prophylaxis for their staff. Amantadine alone was administered as prophylaxis in 25 influenza outbreaks; average length of amantadine prophylaxis use was 11.4 days (range 5-21 days). Oseltamivir alone was administered for prophylactic use in 216 outbreaks; the average length of use of oseltamivir as prophylaxis was 12 days (range 1-30 days). In 38 outbreaks, both amantadine and oseltamivir were used as prophylaxis for staff; average length of amantadine for prophylactic use was 13.5 days (range 6-30 days) and average length of oseltamivir for prophylactic use was 12.6 days (range 5-30 days).

Antivirals as Treatment in Staff

In 309 influenza outbreaks, institutions did not report use of either amantadine or oseltamivir as treatment for their staff. Amantadine alone was administered as treatment in 22 influenza outbreaks; average length of amantadine treatment was 7.9 days (range 2-14 days). Oseltamivir alone was administered as treatment in 292 outbreaks; the average use of oseltamivir as treatment was six days (range 5-15 days). Amantadine and oseltamivir were used simultaneously in one outbreak.

4. Influenza Activity Level Reporting

Every week, influenza activity was assessed and reported from each health unit to the Public Health Branch. The data were then mapped and published in the *Ontario Influenza Bulletin*. Suggested indicators for determining local influenza activity included the following: community (e.g. day care facilities) outbreaks, institutional (e.g. long-term care facilities) outbreaks and results from local virology laboratories.

For reporting purposes, influenza activity is defined as the level of influenza-like illness (ILI) prevalent in the local community. ILI is defined by acute onset of respiratory illness with fever and cough and with one or more of the following - sore throat, arthralgia, myalgia, or prostration which could be due to influenza virus. In children under five, gastrointestinal symptoms may also be present. In patients under five or 65 and older, fever may not be prominent.

Influenza activity was categorized into one of the following four levels:

- o “No Activity”
- o “Sporadic Activity” (sporadically occurring ILI and lab-confirmed influenza with no outbreaks detected)
- o “Localized Activity” (outbreaks affecting a single geographic area within the health unit jurisdiction; these can be institution-based and/or community outbreaks)
- o “Widespread Activity” (outbreaks affecting multiple/non-adjacent geographic areas within the health unit jurisdiction, and involving two or more regions in a health unit.

Results

Activity levels fluctuated from “no activity” to “sporadic activity” from late October and progressed to “localized activity” by late November. “Widespread activity” was being reported in early December and continued until the end of February.

5. Health Canada / College of Family Physicians of Canada (CFPC) *FluWatch* Program

Established in the 1999/2000 influenza surveillance season, the Ontario Sentinel Physician Influenza Surveillance (SPIS) was discontinued for the 2000/01 season. In place of SPIS, sentinel physician data were collected, collated and disseminated through the national *FluWatch* program. The College of Family Physicians of Canada (CFPC) recruited 72 physicians by census divisions across Ontario, for the *FluWatch* program. Sentinel physicians were asked to report the number of consultations for influenza-like-illness (ILI) per age group for one day each week, and the total number of patient visits per age group for the same day. The rates of consultations to sentinel physicians for ILI ranged from 25.1 to 79.5 visits of ILI per 1000 patients seen.

Vaccination Rates in LTCFs and Hospitals

The *Mandatory Health Programs and Services Guidelines (MHPSG)* issued under the HPPA 1990, state that all LTCFs should achieve the provincial influenza immunization target rate of 95% for residents and 70% for health care workers in contact with high-risk individuals. Under the “Influenza Prevention and Surveillance Protocol for Ontario Long-Term Care Facilities” released by the MOHLTC in November 1999 and the “Influenza Surveillance Protocol for Public Hospitals” issued by the Ontario Hospital Association in July 2000, influenza vaccine coverage rates as of November 15 of each year for residents and staff of LTCFs and staff of public hospitals are to be reported to the local medical officer of health by December 1st of each year. The rates are then reported to the province by the health units.

Residents

Resident immunization data were available for 576 of 597 LTCFs in Ontario. The median vaccination coverage rate among residents was 94.9% (range 77.4% - 100%). In 2002, the median rate was 95% (range 38.9-100%).

Staff

Staff immunization data were available for 576 of 597 LTCFs in Ontario. The median influenza vaccination coverage rate among staff was 83.9% (range 13.3% - 100%). In 2002, the median rate was 82.9% (range 23.5-100%).

Immunization data were also available for 170 of 228 hospital sites in Ontario. The median vaccination coverage rate among staff was 55.3% (range 13.3% - 97.3%). The median rate for staff vaccination in 2002 was 44% (range 16.1-92.6%).

LTCF Influenza Outbreak Policies

Of the 397 influenza outbreaks, there were sufficient data from 392 outbreaks to determine the presence of a facility immunization policy. A total of 344 (87.8% of the 392 outbreaks) facilities that experienced an influenza outbreak had a policy requiring staff influenza immunization. The majority of facilities, 358 (91.3%) offered influenza vaccine to staff on-site during the 2003/04 season, of which 286 (80%) facilities offered the vaccine on-site after onset of the outbreak.

A total of 230 facilities reported excluding staff from work during an outbreak because they were not immunized and not receiving antiviral medication. In 227 of 230 (98.7%) outbreaks, staff were excluded in accordance with institutional policy. In three outbreaks, an order issued by the local medical officer of health under section 22 of the *Health Protection and Promotion Act* was used to exclude unimmunized staff from work.

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