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INFLUENZA IN CANADA — 1996-1997 SEASON

Introduction

From October each year to the following May, the Laboratory Centre for Disease Control (LCDC) maintains a national influenza surveillance program. This program has elements which include reporting by laboratories and provincial and territorial epidemiologists who collaborate by exchanging information on cases, laboratory identifications, and outbreaks. Since the 1995-1996 season, information on influenza-like illness (ILI) has been reported weekly by sentinel physicians from across Canada. The sentinel physician reporting program, FluWatch, was developed to provide rapid, consistent national data and information on the incidence and geographic spread of ILI in Canada using an agreed-upon case definition. The surveillance of influenza is based, therefore, on a series of indicators which, when considered together, provide a national picture of influenza activity. A detailed description and summary of the 1996-1997 FluWatch program will be presented in a future issue.

A number of mechanisms were used to disseminate information on influenza activity to public-health professionals and the public. Weekly summaries of influenza surveillance data were made available via *FAXlink*; tabulated details of isolations by laboratories as well as graphic representation of reporting trends were included. In addition, weekly summaries of influenza activity worldwide and, in particular, in North America and Europe were included in the weekly *News Brief* sent to provincial and territorial epidemiologists and laboratory directors. Bi-monthly summary reports, which included an assessment of laboratory data and ILI reporting by FluWatch, mapped the geographic distribution of ILI across Canada and summarized international influenza activity; these summary reports were available through *FAXlink* and Health Canada's Website. Surveillance reports on respiratory virus activity, including influenza, were published periodically in the *Canada Communicable Disease Report* (CCDR).

This report summarizes case-by-case data on laboratory-confirmed influenza infection and reports of ILI for the 1996-1997 season. Comparison is made with the previous four seasons: 1992-1993, 1993-1994, 1994-1995, and 1995-1996[1-4].

Methods

Laboratory-confirmed influenza: Laboratories participating in the surveillance program were asked to report the numbers of isolations and identifications made by direct antigen detection and seroconversion, i.e. ≥ four-fold rise in titre by any method. Data for laboratory-confirmed cases were presented by the province from which the specimen originated (some laboratories received out-of-province samples), and were analyzed by week of onset of illness and the age of the case.

Influenza-like illness reported by sentinel physicians: A total of 230 sentinel physicians, approximately one per census division, contributed weekly to the ILI monitoring program, FluWatch. Since there were 290 census divisions in Canada during the 1996-1997 influenza season, not all had a sentinel physician; however, the majority of well populated urban and rural divisions were represented. The total included the sentinel physician reporting systems in British Columbia (43 sites) and Calgary, Alberta, (5 sites); they also collaborated in this project by weekly contribution of data. The majority of physicians were recruited through the National Research System (NaReS) of the College of Family Physicians of Canada.

Physicians were asked to record, on one clinic day each week, total consultations and cases diagnosed as fulfilling the case definition for ILI by age, and to fax the totals to LCDC. The case definition for ILI was *"respiratory illness characterized by one or more of the following: cough, fever, chills, arthralgia, myalgia or prostration which in the opinion of the attending physician could be due to influenza virus."* Data were compiled weekly and incorporated every two weeks into a report sent to participating physicians and provincial, territorial, federal, and international health authorities. Weekly reports of ILI diagnoses were presented as standardized rates per 1,000 physician consultations. The curve obtained was smoothed using the technique of Hanning[5].

Results

Laboratory-confirmed influenza: During the 1996-1997 influenza surveillance period (1 October 1996 to 31 May 1997), a total of 1,930 cases were reported to LCDC by 13 laboratories in seven provinces (Table 1). This compared with 1,075 cases reported by 10 laboratories in 8 provinces for the previous season (1995-1996). The variation in numbers of confirmed cases and distribution of viruses among provinces should be interpreted with caution; these numbers are likely to reflect differences in reporting practices and criteria, and the availability of diagnostic services as well as population size and distribution.

Table 1
Laboratory-confirmed cases of influenza reported to LCDC, by laboratory, Canada, 1996-1997

Province	Laboratory	Number of cases
Nova Scotia	Queen Elizabeth II Health Science Centre – Victoria General Site, Halifax	104
Quebec	*Laboratoire de santé publique du Québec*, Sainte-Anne-de-Bellevue	305
Ontario	Kingston Public Health Laboratory	72
	Central Public Health Laboratory	414
	Hospital for Sick Children, Toronto	45
	Windsor Public Health Laboratory	3
	Thunder Bay Public Health Laboratory	3
Manitoba	Cadham Provincial Laboratory, Winnipeg	122
Saskatchewan	Department of Health, Regina	201
	Department of Health, Saskatoon	30
Alberta	Provincial Laboratory of Public Health for Northern Alberta, Edmonton	183
	Provincial Laboratory of Public Health for Southern Alberta, Calgary	157
British Columbia	Division of Laboratories, Health Branch, Vancouver	246
Total		**1,930**

Table 2 shows the number and types of virus identified by province. Although the majority of isolates, 1,227 (64%), were of type A virus, a significant proportion, 703 (36%), were of type B. These results indicated an increase in the reporting of laboratory-confirmed influenza A and influenza B virus infections when compared with the previous season. Of the 1,227 influenza A virus identifications, 204 were further characterized; 198 were of the H3N2 subtype and 6 were of the H1N1 subtype. A detailed description of the strains characterized in the 1996-1997 season was published in CCDR[6].

Figure 1 shows totals of laboratory-confirmed cases for five regions: Atlantic Canada, Quebec, Ontario, the Prairies, and British Columbia. Although early, confirmed cases were recorded in September in British Columbia and Quebec, these preceded any significant increases in reporting by 8 to 12 weeks. Peak activities of both influenza A and B viruses showed a progression from west to east, following peaks in British Columbia and the Prairies in December 1996. The largest number and proportion of cases were recorded in Ontario, 537 cases (28%); Quebec, 350 cases (18%); Alberta, 340 cases (18%); and British Columbia, 246 cases (13%). Marked peaks in influenza A reporting were evident in both the Prairies and in Ontario. Significant reporting of influenza B virus infections began in January 1997 and accounted for the majority of cases from March 1997 to the end of May 1997.

Figure 2 shows the distribution of cases by age; most laboratory-confirmed infections were recorded in children < 10 years of age (39%) and in persons aged ≥ 65 years (18.7%). This represents a 10% decrease in the number of cases in children < 10 years of age, compared with the previous season when 49% of cases were in this age group, and an increase in the ≥ 65-year-old age group which accounted for 8% of cases during the previous season.

Laboratory confirmations: Virus isolation, 1,414 reports (73%), and direct antigen detection, 306 reports (16%), were the most commonly recorded methods for laboratory confirmation of influenza infection. The remaining cases, 210 reports (11%) for which information was available, were confirmed by serology. This distribution is very similar to the previous season, 1995-1996, when 73% of confirmations were by virus isolation, 16% by direct antigen detection, and 10% by serology.

In the 1996-1997 season, the majority (99%) of confirmations in young children (aged < 5 years), those aged 5 to 44 years (88%), and adults aged ≥ 45 years (75%) were by virus isolation or direct antigen detection. This distribution is almost identical to that recorded in the previous influenza season.

Table 2
Laboratory-confirmed cases of influenza, by province and influenza type and subtype, Canada, 1996-1997

Influenza Type	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	**Total**
Type A Not subtyped		3	52	16	192	383	65	80	112	120	**1,023**
H1N1										6	**6**
H3N2						36	2	64	72	24	**198**
Total type A		**3**	**52**	**16**	**192**	**419**	**67**	**144**	**184**	**150**	**1,227**
Type B	3	10	17	3	158	118	55	87	156	96	**703**
Total	**3**	**13**	**69**	**19**	**350**	**537**	**122**	**231**	**340**	**246**	**1,930**

Figure 1
Laboratory-confirmed cases of influenza, by region, type, and week of onset, Canada, 1996-1997

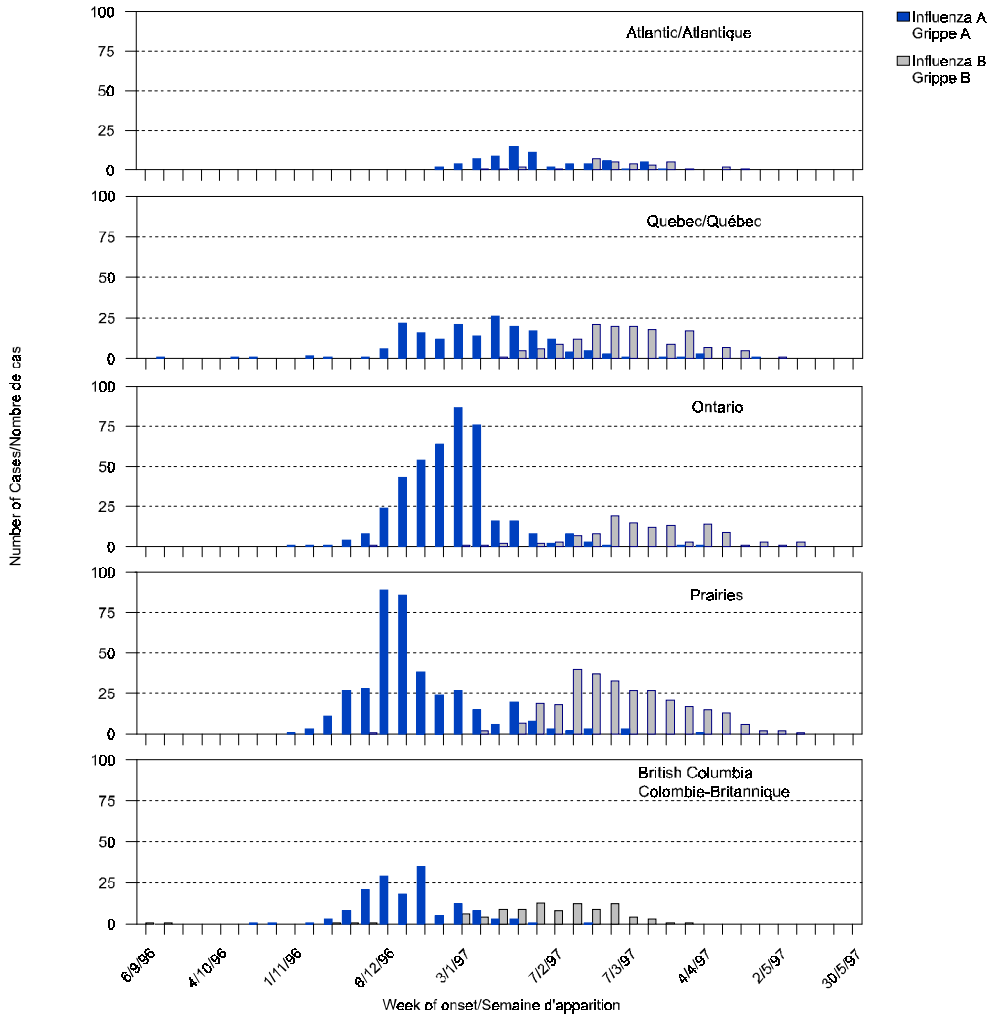
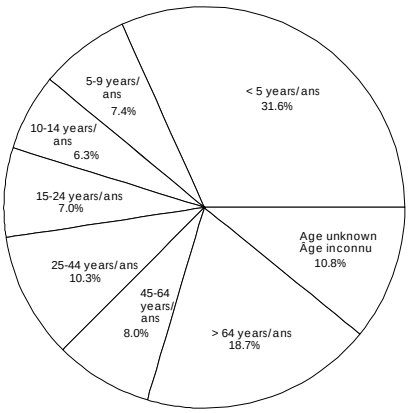


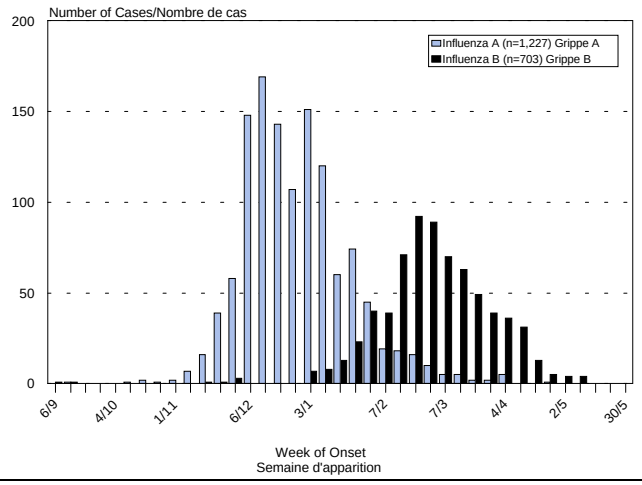
Figure 2
Proportionate distribution of laboratory-confirmed cases of influenza, by age group, Canada, 1996-1997



Types of influenza virus circulating during the 1996-1997 season: Figure 3 shows the distribution of virus identifications reported to LCDC for all regions. Two distinct peaks occurred during the 1996-1997 influenza season. In the earliest peak, which spanned the period October 1996 to January 1997, influenza A virus predominated. In a second, smaller peak, recorded between January and May 1997, influenza B virus predominated.

Figure 4 compares the 1996-1997 influenza season with the previous four seasons. The 1996-1997 season shows a bimodal pattern similar to that observed in the previous season, although the total number of confirmed cases was higher. All but one of the 223 influenza A isolates submitted to the Influenza and Viral Exanthemata, National Laboratory for Special Pathogens, LCDC, for strain typing were identified as A/Wuhan/ 359/95-like (H3N2). A similar homogenecity was found for influenza B; all of the 62 isolates submitted for typing were characterized as B/Beijing/184/ 93-like[6].

Figure 3
Laboratory-confirmed influenza cases, by type and by week of onset, Canada, 1996-1997



Influenza-like illness reported by sentinel physicians: The extent of ILI activity was reported weekly, using an agreed-upon case definition, by sentinel physicians in all jurisdictions. During the 1996-1997 influenza season, a total of 3,818 diagnoses of ILI were reported from 89,952 patients seen (42.5 per 1,000 patients seen). The weekly data were consistent with laboratory reporting of confirmed influenza infections and indicated two peaks in activity, one during the Christmas holiday season and one in mid- to late March (Figure 5).

Discussion

The 1996-1997 season saw the highest number of laboratory-confirmed cases recorded by LCDC for any winter in the period 1978 to 1997[1-4,7,8]. This increase in cases was unlikely to have been substantially affected by the small increase in the number of reporting laboratories, which totalled less than in some previous influenza seasons. The previous highest numbers of cases were recorded in the 1985-1986 and 1992-1993 seasons when 1,602 and 1,568 laboratory-confirmed infections were reported, respectively.

Figure 4
Seasonal distribution of laboratory-confirmed influenza cases, Canada, 1992-1997

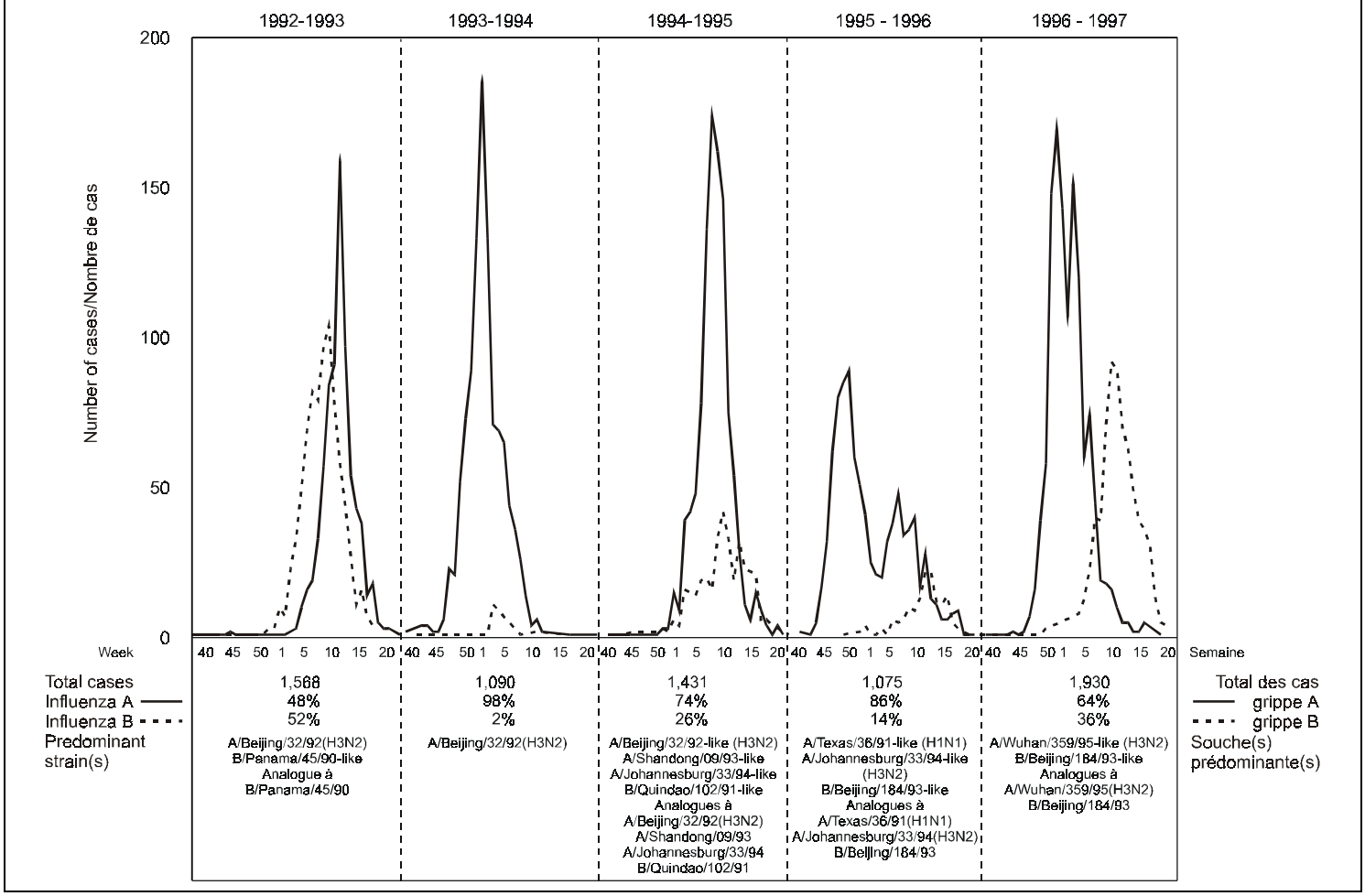
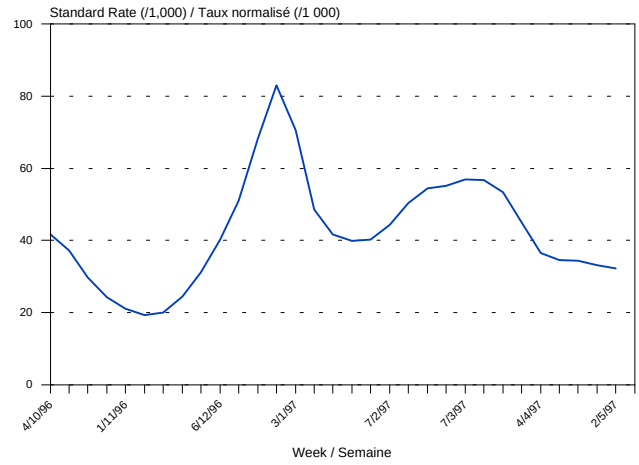


Figure 5
Influenza-like illness, Canada, weekly standardized reporting rates



Reporting of virus types in the 1996-1997 influenza season continued to follow the pattern of the previous season. The first peak of influenza A virus infection was followed by a later peak due to influenza B virus infection. The proportion of influenza B virus isolates (36%) was greater than in the three previous seasons (14%, 26%, and 2%, respectively). Strain characterization showed almost total homogenecity, with a single type A and type B strain predominating in Canada. The trends observed in Canada were generally similar to those in the United States, with the main peak in activity continuing through mid-December 1996 and January 1997. The majority of virus identifications in the United States were of influenza A (86%); however, the proportion of influenza B identifications increased in January and, in the last week of that month, accounted for 31% of the total. Influenza A virus also reached a peak in reporting in early January in most of Europe. This peak was followed by a second wave from late January due to influenza B virus. In general, the H3N2 subtype of influenza A virus was more widely reported than the H1N1 subtype in North America and Europe, and influenza B was widespread in both regions[9].

The sentinel physician program, FluWatch, showed similar reporting trends to those exhibited by the laboratory reporting of confirmed influenza infection. Despite some variation in response rate and coverage in some regions, the observation of similar trends in both ILI reporting and laboratory confirmations of influenza viruses indicated that FluWatch reflects national influenza activity. The aim of the FluWatch program is to improve the representiveness of the sentinel sites and to encourage more consistent reporting by physicians during the 1997-1998 season.

The impact of influenza cannot be underestimated both in terms of morbidity and mortality, and the economic cost of illness. Estimates of 70,000 to 75,000 hospitalizations and 6,000 to 7,000 deaths attributed to pneumonia and influenza were proposed for an average year in Canada[10]. These totals could be multiplied several times in an epidemic year. Consequently, the surveillance of influenza in Canada is being developed to contribute to the early detection of illness in the community; the identification and monitoring of the influenza virus types and strains circulating in the community; the assessment of morbidity and mortality; and the evaluation of control programs. This latter activity will become more important as vaccination is better targetted and wider treatment options for influenza become available.

To further develop and coordinate influenza surveillance activities across Canada, a meeting of provincial and federal representatives was held in Ottawa in the spring 1997 to assess current surveillance activities, and to consider future development in a collaborative approach to surveillance and information dissemination. FluWatch was also adopted to describe the range of national influenza surveillance activities including laboratory reporting of virus identifications, sentinel physician reporting of ILI, provincial assessment of the level of influenza activity in the community, and monitoring of international trends in influenza.

Information from the surveillance programs is available weekly from the LCDC *FAXlink* (dial 613-941-3900 from a telephone-equipped fax machine). Summary reports go bi-monthly to all program participants and health authorites, and respiratory disease surveillance articles appear monthly in the CCDR. Laboratories wishing to participate in the surveillance program should contact Mr. Peter Zabchuk, Division of Disease Surveillance, Bureau of Infectious Diseases, LCDC, at 613-952-9729. Regular updates on influenza activity in Canada are also posted on Health Canada's Website <http://www.hc-sc.gc.ca> and are updated every 2 weeks.

Acknowledgements

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