Influenza surveillance in Victoria, 2005

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Abstract

Influenza activity remained within normal seasonal activity with a well-defined peak at week 29 (beginning 18 July) during the Victorian influenza season from May to September 2005. Surveillance was based on sentinel general practice influenza-like illness (ILI) notifications with laboratory confirmation, medical locum service ILI notifications and laboratory notification of influenza detections. One thousand and eighty-seven consultations for ILI were reported from 38 general practices, while medical practitioners from the locum service reported 317 consultations for ILI. The average weekly rate of ILI from sentinel surveillance was 7.3 per 1,000 consultations. Similar numbers of influenza A subtypes H1N1 and H3N2 were detected; 45 per cent of which were A/California/7/2004-like (H3), 44 per cent were A/New Caledonia/20/99-like (H1) and 11 per cent were A/Wellington/1/2004 (H3). Of the influenza B samples, 67 per cent were B/Hong Kong/330/2001-like and 33 per cent were B/Shanghai/361/2002-like. The influenza vaccine for 2005 contained: A/New Caledonia/20/99(H1N1)-like virus, A/Wellington/1/2004(H3N2)-like virus, and B/Shanghai/361/2002-like virus. Although the predominant H3 and B circulating strains were not included in the vaccine, there was reasonable serological cross protection between vaccine and circulating strains. *Commun Dis Intell* 2006;30:137–143.

Keywords: disease surveillance, epidemiology, influenza

Introduction

Influenza surveillance in Victoria is conducted by the Victorian Infectious Diseases Reference Laboratory (VIDRL) and the Department of Human Services (DHS). Surveillance comprises notifications of laboratory confirmed influenza, sentinel general practice (GP) surveillance for influenza-like illness (ILI) with laboratory testing of selected cases, and surveillance of ILI through the Melbourne Medical Locum Service (MMLS).

The objectives of the influenza surveillance system are to:

- monitor the epidemiology of laboratory confirmed influenza in Victoria;
- identify the onset, duration and magnitude of annual influenza seasons in Victoria;
- characterise the circulating influenza strains in the community to assist in the evaluation of the current season's and formulation of the following season's vaccine; and
- provide a role in early recognition of new influenza viruses and new or emerging respiratory diseases.

Laboratory confirmed influenza in Victoria is a group B notifiable disease in accordance with the Health (Infectious Diseases) Regulations 2001. This report describes the results from influenza surveillance in Victoria for 2005 and comparison with previous years.

Methods

General Practice Sentinel Surveillance (coordinated by VIDRL)

In 2005, 74 general practitioners (GPs) from 23 metropolitan and 15 rural practices were recruited for sentinel ILI surveillance (Figures 1a and 1b), aiming to achieve a coverage of approximately one practice per 200,000 population in metropolitan Melbourne and one practice per 100,000 population in rural areas.[1] Participating GPs were provided with an incentive of Continuing Professional Development points from the Royal Australian College of General Practitioners or the Australian College of Rural and Remote Medicine. GPs were required to submit weekly reports on the total number of consultations; report the age, sex and vaccination status of patients presenting with ILI (defined as fever/history of feverishness, cough and fatigue/malaise); take a nose and throat swab from at least five patients with an ILI for respiratory virus testing at VIDRL; and complete an evaluation questionnaire.

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Figure 1a. Distribution of sentinel surveillance sites in metropolitan Victoria

Figure 1b. Distribution of sentinel surveillance sites in rural Victoria

General practice sentinel surveillance was conducted for 22 weeks between 2 May and 2 October 2005 (weeks 18–39 inclusive). ILI activity for the year was described using a set of threshold values: normal baseline activity <2.5 ILI cases per 1,000 patients per week, normal seasonal activity between 2.5–15, higher than expected >15–35, and epidemic activity above 35.[2]

GPs were asked to collect swabs from patients within three days of onset of ILI symptoms and forward them in viral transport medium to VIDRL with data on: the patient's age; vaccine status; date of illness onset; and the GP's clinical impression of the likelihood of influenza. Specimens were transported to VIDRL by a dedicated courier from metropolitan practices and through a network of commercial pathology laboratories from regional and rural practices. Specimens were tested at VIDRL using an in-house respiratory multiplex polymerase chain reaction (PCR) identifying influenza, adenovirus, picornavirus (enterovirus and rhinovirus), respiratory syncytial virus and parainfluenza viruses.[3] In 2004, oligonucleotide primers to detect all known influenza viruses replaced primers aimed specifically at currently circulating H1 and H3 sub-types. Aliquots of all specimens positive for influenza were forwarded to the WHO Collaborating Centre for Reference and Research on Influenza, Parkville, Melbourne, for virus strain identification.

Melbourne Medical Locum Service Surveillance (coordinated by VIDRL)

ILI surveillance using MMLS data commenced in 2003. The MMLS provides a 24-hour, seven days a week medical locum service to patients within an approximate 35 kilometre radius of metropolitan Melbourne. Data were collected on cases with a final diagnosis reference to 'flu' or 'influenza'. ILI rates were calculated per 1,000 call-outs per week. Data from MMLS are collected all year.

Notifications of laboratory confirmed influenza (coordinated by DHS)

Cases of laboratory confirmed influenza are notified to the Department of Human Services under the Health (Infectious Diseases) Regulations 2001. In addition to VIDRL, which provided about half of all notifications, 11 other laboratories notified laboratory confirmed influenza. Notifications were extracted by date of notification from the Notifiable Infectious Diseases Surveillance database at DHS.

Data collation and reporting

All data from sentinel surveillance and MMLS were collected and collated weekly. ILI surveillance data were forwarded to the Australian Government Department of Health and Ageing weekly, and summary reports were prepared fortnightly and on an annual basis. Reports were distributed to interested health professionals, participating GPs and state and commonwealth departments of health. They were also posted on the VIDRL website (http://www.vidrl.org.au). Summary reports of laboratory confirmed influenza notifications made to the Victorian Department of Human Services were updated daily and posted on the Communicable Diseases Section website (http://www.health.vic.gov.au/ideas/surveillance/daily.htm).

Other influenza related studies

Two other studies were completed in 2005. The first study evaluated influenza surveillance in Victoria for the years 2002–04 using the evaluation framework for public health surveillance systems from the US Centers for Disease Control and Prevention.[4] The second study compared five available data sources for influenza and ILI in Victoria for timeliness and information provided. In addition to the three sources reported here, that is, notification of laboratory confirmed influenza, GP sentinel surveillance and MMLS surveillance, the comparison included data on emergency department admissions and hospitalisations for influenza and ILI.

Results

Participating sentinel practices

On average, 31 sentinel practices (82% of participating sites) reported each week from the 38 participating sentinel practices. There were 149,018 consultations of which 1,087 (0.7%) were for ILI during the reporting period, 2 May to 2 October 2005. The average weekly ILI consultation rate for the season was 7.3 per 1,000 cases: 7.5 per 1,000 cases in metropolitan sites and 6.4 per 1,000 cases in rural sites (Figure 2). The increase in ILI rates from the GP sentinel surveillance and the MMLS preceded the increase in notifications of laboratory confirmed influenza by two and four weeks respectively.

Figure 3 compares the ILI consultation rate in 2005 with rates from 1997 onwards. ILI in 2005 quickly rose to normal seasonal activity at week 19 (beginning 9 May). The consultation rate peaked at 13.1 per 1,000 cases, in the range of normal seasonal activity, similar to the 1999 season. Where gender was recorded, the male to female ratio for ILI in 2005 was 1:1.2 (502 and 582 consultations respectively).

Figure 2. Weekly reporting of notified cases of laboratory confirmed influenza and influenza-like illness from the Melbourne Medical Locum Service, metropolitan and rural sentinel sites, weeks 18 to 39, 2005

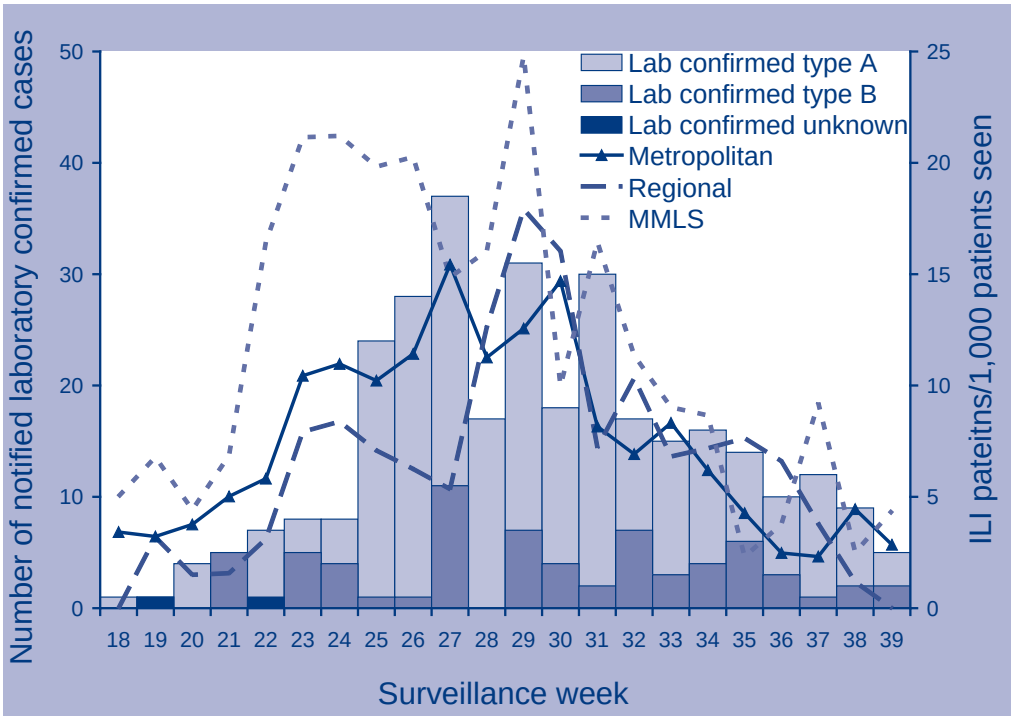
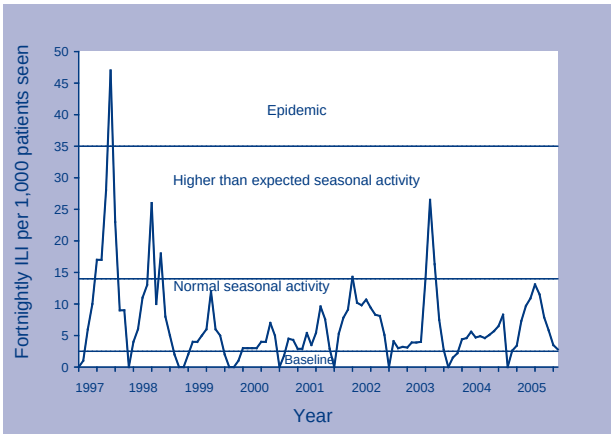


Figure 3. Fortnightly consultation rates for influenza-like illness, Victoria, 1997 to 2005



Sentinel surveillance GPs sent a total of 420 specimens for testing by PCR. Nineteen were inhibitory to the assay and were not included in the analysis. Of the 401 specimens remaining, influenza A was detected in 156 (38.9%) and influenza B in 26 (6.5%) specimens.

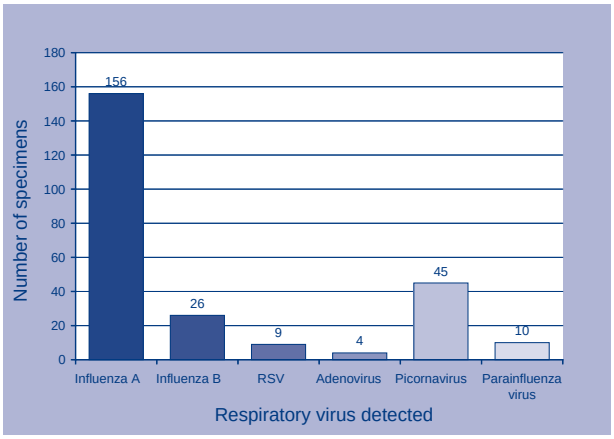
Aliquots of the 182 positive influenza samples were sent to the WHO Collaborating Centre for Reference and Research on Influenza for virus strain typing. Fifty-four per cent of these isolates were recovered: 88 per cent were influenza A and 12 per cent were influenza B. Of the influenza A samples 45 per cent were A/California/7/2004-like (H3), 44 per cent were A/New Caledonia/20/99-like (H1) and 11 per cent were A/Wellington/1/2004 (H3). Of the influenza B samples 67 per cent were B/Hong Kong/330/2001-like and 33 per cent were B/Shanghai/361/2002-like. The influenza vaccine for 2005 contained the following: A/New Caledonia/20/99(H1N1)-like virus, A/ Wellington/1/2004(H3N2)-like virus, and B/Shanghai/361/2002-like virus.[5] Although the predominant H3 and B circulating strains were not included in the vaccine, there was reasonable serological cross protection between vaccine and circulating strains.

Of the specimens received from sentinel surveillance 68 (17%) were positive for other respiratory viruses, the most common of which were picornavirus and parainfluenza virus (Figure 4).

Laboratory surveillance

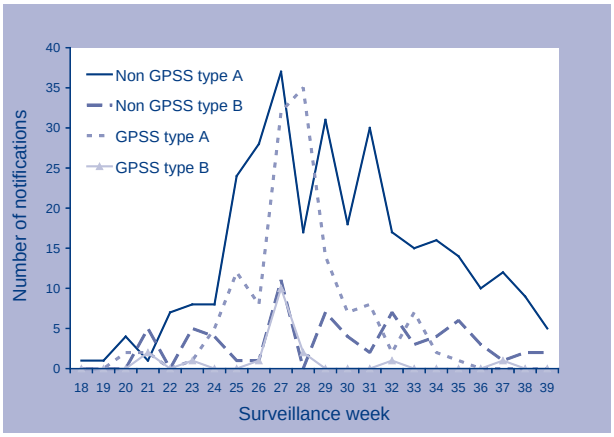
A total of 537 cases of laboratory confirmed influenza were notified to the Department of Human Services in the sentinel surveillance period between 2 May and 2 October. Of these, 156 (29%) were notified from positive specimens collected from the General Practitioner Sentinel Surveillance Program with the remainder from all other sources. There were 451 (84%) type A and 86 (16%) type B notifications. A slightly higher proportion of notifications from GP sentinel surveillance was type A (88% vs 82%). The female to male ratio was 1:1.1 with no significant difference by notification source.

Figure 4. Respiratory viruses detected from sentinel patients with influenza-like illness, Victoria, 2005



There was a sharper and later peak in influenza type A notifications from the general practitioner sentinel surveillance compared to other notifications (Figure 5). Relatively few notifications of laboratory confirmed influenza were received outside the GP sentinel surveillance period; 27 cases from 1 January to 1 May and 13 cases from 3 October to 30 November. Only one outbreak of influenza was notified in the year up to 30 November 2005. Reported in January, it occurred in an aged care facility with 19 people ill, of whom seven had laboratory confirmed influenza.

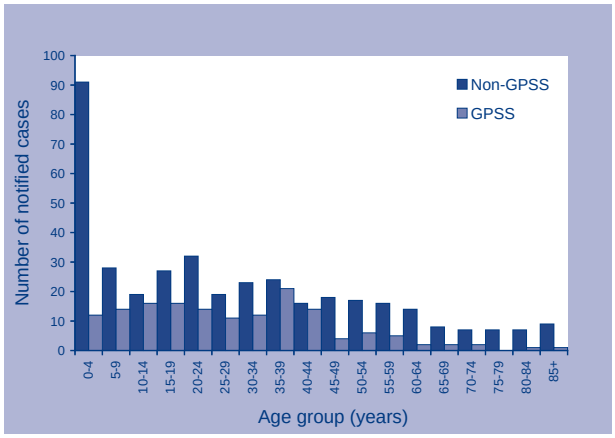
Figure 5. Laboratory confirmed influenza, Victoria, 2005, by type and notification source



GPSS General practice sentinel surveillance.

There was a marked difference in the age distribution of laboratory confirmed influenza notifications from general practitioner sentinel surveillance compared to other notification sources (Figure 6). Nearly one in four cases notified from non-sentinel practice surveillance was aged less than five years and there was a higher proportion of cases aged 65 years or older among non-sentinel surveillance notifications.

Figure 6. Laboratory confirmed influenza, Victoria, 2005, by age group and notification source



GPSS General practice sentinel surveillance.

Melbourne Medical Locum Service

During the surveillance period from week 18 to 39, MMLS recorded a total of 26,775 consultations of which 317 (1.2%) were for an ILI. The average ILI per 1,000 consultations was 11.8. Figure 2 shows a comparison of ILI rates for the influenza season between metropolitan and rural sentinel surveillance and MMLS data. MMLS surveillance continues all year and demonstrated a decline in ILI rates to below 2.0 ILI per 1,000 consultations by week 41.

Other influenza related studies

The evaluation of influenza surveillance was completed in 2005 and concluded with five recommendations summarised in the Box.

The review of relevant available emergency department and hospital admission data concluded that, while these data accurately reflected ILI activity in the community, they were not available in a timely fashion as currently collected, reviewed and made available. Each of the five data sources had different utilities. All contributed to describing inter-pandemic influenza seasonal activity but MMLS surveillance was the most efficient and could be managed with minimal extra resources, although it did not provide specimens for viral testing.[6]

Discussion

As measured by ILI rates from the GP Sentinel Surveillance Scheme, influenza activity in 2005 remained within the normal seasonal level with a well-defined peak of 13.1 ILI per 1,000 consultations during July. Although the *initial increase* in ILI activity occurred earlier for both sentinel and MMLS surveillance than for laboratory notifications, the

Box. Summary of recommendations arising from the evaluation of influenza surveillance in Victoria

1. Improve coordination between VIDRL and DHS, including weekly sharing of data between institutions and production of a single annual surveillance report.
2. Improve the quality of data for notifications of influenza held in the DHS database, including: follow-up of cases; ensuring notification of all laboratory-confirmed cases occurs; collation of strain information by DHS; adherence to serological case definitions for influenza, and; distinction in analysis and reports between the sources of laboratory-confirmed influenza notifications, namely GP sentinel surveillance and hospital laboratories.
3. All GP sentinel surveillance spatial data should be reported according to the geographic boundaries defined by DHS.
4. A review of the utility of available data on the impact of influenza on morbidity and mortality in Victoria should be conducted.
5. ILI data should be collected from Victorian emergency departments to provide an early warning system for epidemic influenza. Work in DHS on electronic syndromic surveillance may provide a simple and timely method of capturing these data.

peak in laboratory notifications occurred two weeks earlier than it did in the community surveillance systems. This may reflect a delay in notification of the increase in ILI rates observed at the start of the season. It is not clear why the onset of seasonal activity was seen earlier in locum service, compared with sentinel surveillance, but may represent earlier contact with the medical system by patients who are more acutely ill and who require after-hours care. However the early rise in ILI activity detected by community surveillance reinforces the importance of these systems in detecting increased influenza activity in the community.

The GP Sentinel Surveillance Scheme also serves an important function in notifiable disease surveillance by making a substantial contribution to the total laboratory confirmed influenza cases (nearly 30%) notified during the influenza season. However, given the differing age distributions of these patients, sentinel patients may not be representative of all patients with influenza in the community. Similarly, cases identified as part of outbreaks may skew data describing the epidemiology of community-acquired influenza.

Both influenza A sub-types, H3N2 and H1N1, circulated throughout the season. Most influenza A viruses were reported as either A/California/7/2004-like (H3) or A/New Caledonia/20/99-like (H1), both of which have been included in the 2006 vaccine. A/Wellington also circulated in smaller numbers throughout the whole season. Both A/New Caledonia and A/Wellington were covered by the 2005 vaccine. Circulating influenza B was either B/Shanghai/3611/2002-like or B/HongKong/330/2001-like. B/Shanghai was covered by the 2005 vaccine.

The vaccine for the 2006 season will contain the following:[7]

- A/New Caledonia/20/99 (H1N1)-like virus
- A/California/7/2004 (H3N2)-like virus
- B/Malaysia/2506/2004-like virus

The data received from MMLS reflected that of metropolitan surveillance. Following analysis and confirmation that MMLS is an appropriate data source for ILI surveillance, MMLS has been adopted as an integral component of influenza surveillance in Victoria.[8] MMLS data are collected all year round and will continue to supplement the sentinel surveillance data in 2006, including during the Melbourne Commonwealth Games. In light of the findings from the evaluation, coordination of surveillance activities between DHS and VIDRL has been improved.

Acknowledgements

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