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# INFLUENZA SURVEILLANCE IN VICTORIA, 2006

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## Abstract

The Victorian influenza season in 2006 remained within normal seasonal activity thresholds and was relatively mild compared with recent years. The season peaked in mid-August, with influenza-like illness (ILI) rates from general practitioner sentinel surveillance and the Melbourne Medical Locum Service (MMLS), and cases of laboratory-confirmed influenza notified to the Department of Human Services, reaching their zeniths within one week of each other. A total of 74 general practitioners (GPs) participated in the sentinel surveillance in 2006, reporting a total of 136,732 consultations during the surveillance period from May to September inclusive. Participating GPs reported

a total of 765 patients with an ILI; an average ILI rate of 5.6 cases per 1,000 consultations. The average ILI rate from the MMLS in the same period was 8.5 cases per 1,000 call-outs. Eighty-two per cent of laboratory-confirmed influenza notifications during the surveillance period were type A; the remainder were type B. Typing indicated circulation of two predominant strains during the season: A/Wisconsin/67/2005(H3N2)-like virus and B/Malaysia/2506/2004-like virus. The influenza vaccine for 2006 contained A/New Caledonia/20/99(H1N1)-like virus, A/California/7/2004(H3N2)-like virus and B/Malaysia/2506/2004-like virus. *Commun Dis Intell* 2007;31:100–106.

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## Introduction

Influenza surveillance in Victoria is comprised of three core elements. The Victorian Infectious Diseases Reference Laboratory (VIDRL) coordinates 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 Department of Human Services (DHS) coordinates the surveillance of laboratory-confirmed influenza, which is legislated under the *Health (Infectious Diseases) Regulations 2001*.

The objectives of the Victorian influenza surveillance are to:

- monitor the epidemiology of laboratory-confirmed influenza in Victoria;
- identify the onset, duration and magnitude of annual influenza seasons in Victoria; and
- 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.

Additionally, the World Health Organization (WHO) Collaborating Centre for Reference and Research on Influenza, conducts and provides data on strain typing of influenza isolates or influenza-positive specimens forwarded by VIDRL and two Melbourne hospital laboratories. This report summarises the results from Victorian influenza surveillance in 2006 and provides a comparison with previous influenza seasons.

## Methods

### General Practice Sentinel Surveillance

Geographic representativeness of the sentinel GP influenza surveillance scheme was sought by recruiting general practitioners to achieve an approximate coverage of one practice per 200,000 population in metropolitan areas and one practice per 100,000 population in rural areas, as recommended in the *Framework for an Australian Influenza Pandemic Plan*.<sup>1</sup> In 2006, 54 GPs were recruited from metropolitan Melbourne and 20 from rural and regional Victoria (Figures 1a and 1b), corresponding to rates in these areas of 1.5 and 1.4 GPs per 100,000 population, respectively.

Continuing Professional Development points from the Royal Australian College of General Practitioners or the Australian College of Rural and Remote Medicine were offered to participating GPs. GPs were required to report the total number of consultations and the age, sex and vaccination

status of all patients presenting with an ILI (defined below) for each week in the surveillance period and to take nose and throat swabs from patients with an ILI. An ILI was defined as fever (or history of feverishness), cough and fatigue/malaise. Completion of an evaluation questionnaire was also requested after weekly reporting had concluded.

The GP sentinel surveillance was conducted over a 22 week period in 2006 from 1 May to 1 October (weeks 18 to 39 inclusive). ILI activity 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 and 15); higher than expected activity (between 15 and 35); and epidemic activity (> 35).<sup>2</sup>

GPs were asked to collect swabs from patients within 3 days of onset of ILI symptoms and forward them in viral transport medium to VIDRL with data on: the patient's age; vaccination status; date of illness onset; and the GPs 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.<sup>3</sup> In 2004, oligonucleotide primers to detect all known influenza viruses replaced primers aimed specifically at currently circulating H1 and H3 sub-types.

### Melbourne Medical Locum Service

The MMLS is a 24-hour, seven days a week medical locum service for patients within an approximate 35 kilometre radius from central Melbourne. The MMLS provided data to VIDRL on the number cases with a final diagnosis reference to 'flu' or 'influenza'; the total number of call-outs each week; and ILI rates per 1,000 call-outs.

### Notified laboratory-confirmed influenza

Medical practitioners and persons in charge of pathology services are required to notify cases of laboratory-confirmed influenza to the DHS within five days of the diagnosis under the *Health (Infectious Diseases) Regulations 2001*. In 2006, notifications were received from 10 laboratories. VIDRL accounted for the majority of the notifications (59%) followed by the Royal Children's Hospital (19%) and Monash Medical Centre (11%) laboratories. Data on cases with a notification date in 2006 were extracted for analysis from the DHS Notifiable Infectious Diseases Surveillance database.

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

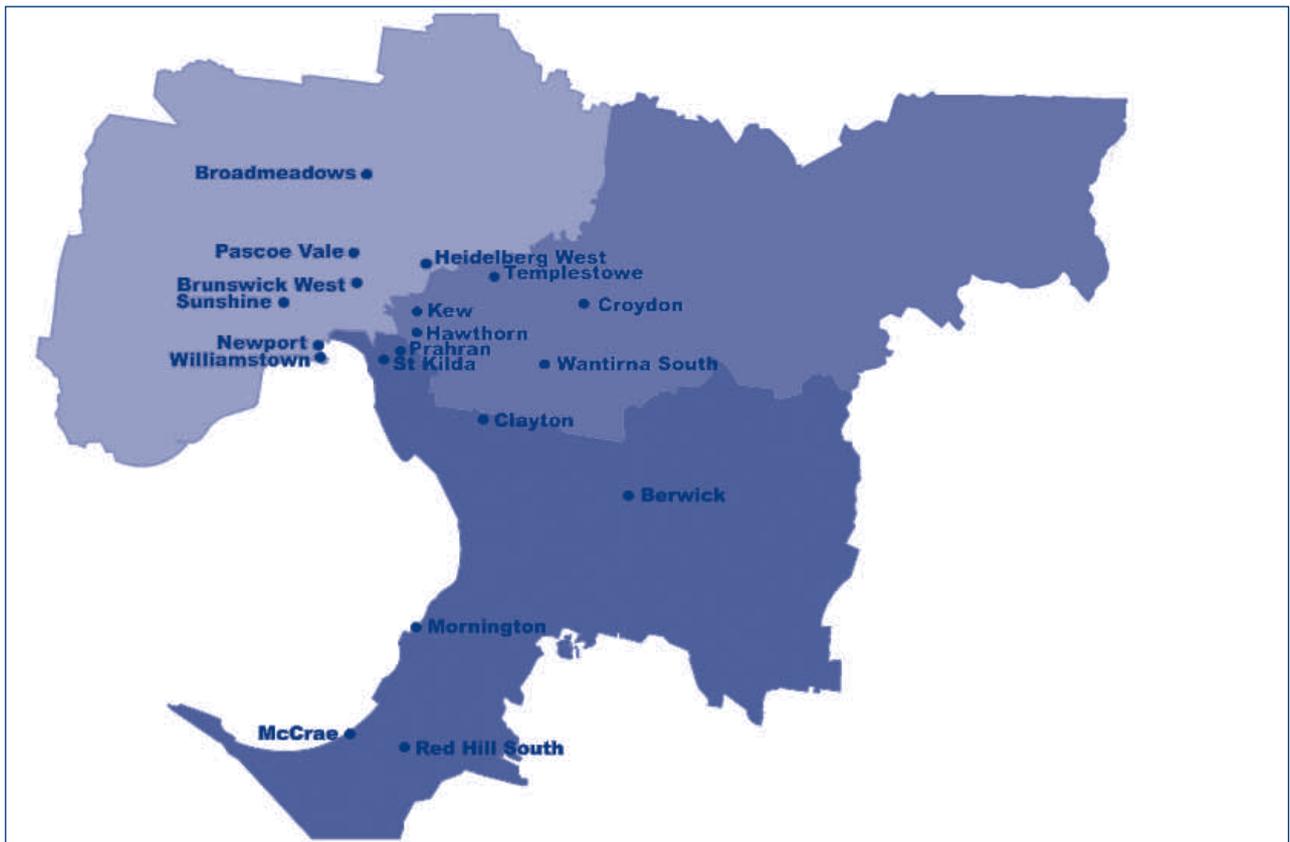
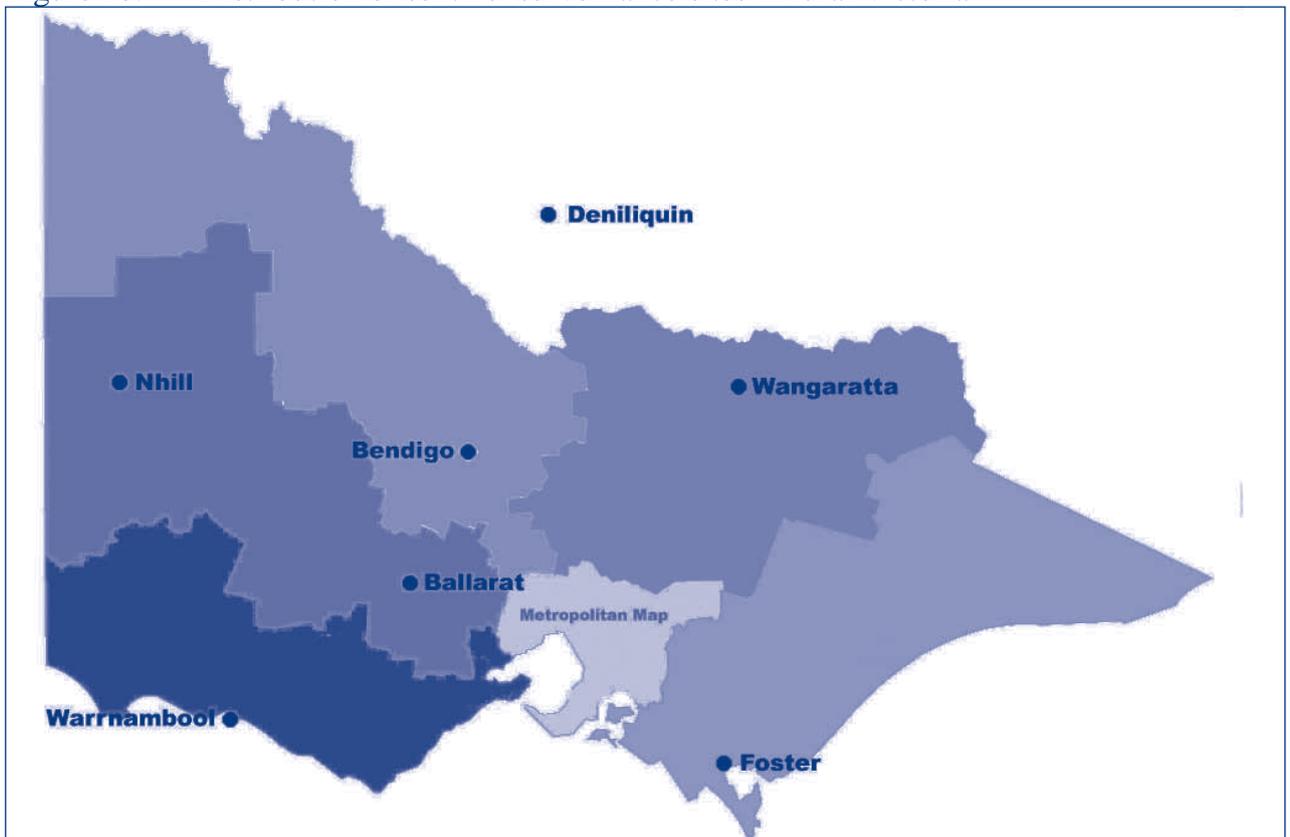


Figure 1b. Distribution of sentinel surveillance sites in rural Victoria



### Data collation and reporting

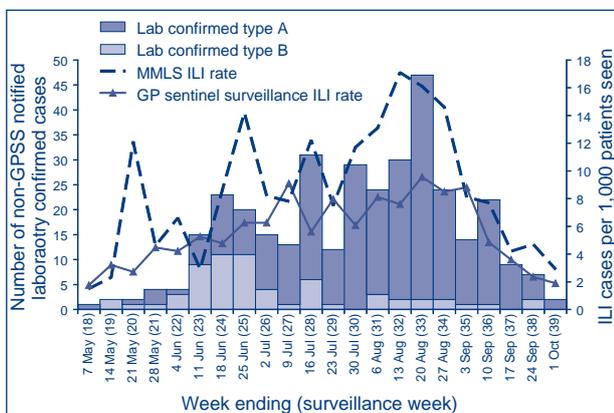
GP reports and MMLS data were collected and collated weekly. ILI surveillance data were reported to the DHS Communicable Disease Control Unit and the Australian Government Department of Health and Ageing weekly; structured summary reports were prepared and distributed fortnightly by email to GPs participating in the sentinel surveillance program, other interested health professionals and state and Australian Government departments of health. The summary reports were also posted on the VIDRL website (<http://www.vidrl.org.au>). Laboratory-confirmed influenza notifications data were updated daily and published on the DHS Communicable Disease Control Unit website (<http://www.health.vic.gov.au/ideas/surveillance/daily.htm>) in automated summary reports.

### Results

#### ILI surveillance

An average of 50 of the 74 participating GPs (68%) returned the tally sheets each week (range 45 to 58). GPs reported seeing a total of 136,732 patients in the surveillance period with 765 reported to have an ILI (0.6% or an average rate of 5.6 cases per 1,000 consultations). The ILI rate generally increased over the surveillance period, peaking at 9.6 ILI cases per 1,000 consultations in week 33 (week ending 20 August)—corresponding with the peak in notified laboratory-confirmed cases—and decreasing to baseline levels by week 38 (week ending 24 September) (Figure 2). The average age of reported ILI cases was 33 years (range 0.5 to 83 years) and the male to female ratio was 1:1. There were 55 cases aged 65 years or older; 43 (78%) were reported as vaccinated.

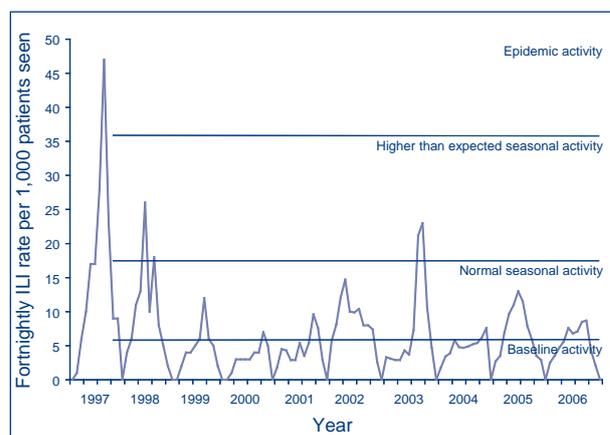
**Figure 2. Notified cases of laboratory-confirmed influenza and GP sentinel surveillance and MMLS ILI rates by week, Victoria, 1 May to 1 October 2006**



The MMLS ILI rate also showed a generalised increase over time, peaking at 17.1 ILI cases per 1,000 patients seen in week 32 (week ending 13 August) (Figure 2). The MMLS weekly ILI rates were generally higher—but tended to fluctuate more widely from week to week—compared to GP sentinel surveillance. The MMLS made 31,589 call-outs during the surveillance period. Of these, 268 were for an ILI; an average rate of 8.5 cases per 1,000 call-outs.

The 2006 influenza season (as measured by the GP sentinel surveillance ILI rate) was moderate relative to previous years (Figure 3). Rates were in the low to mid range of normal seasonal activity for most of the surveillance period and the peak rate was lower for only two other years (2000 and 2004) since 1997.

**Figure 3. Fortnightly GP sentinel surveillance ILI rates, Victoria, 1997 to 2006**



#### Laboratory surveillance

A total of 384 swabs were collected from GP sentinel surveillance patients with an ILI, of which 189 (49%) were positive for one of the respiratory viruses tested for in the multiplex PCR (Table). Almost 30% of total swabs (59% of those that were PCR positive for any virus) were positive for influenza A; 12% of swabs (25% of PCR positive swabs) were positive for picornavirus. Less than 10% were positive for other respiratory viruses, including influenza B. Most (85%) picornavirus diagnoses were made in the first half of the surveillance period whereas approximately three quarters of influenza A diagnoses were made between weeks 26 and 34 (26 June to 27 August). The other respiratory virus diagnoses were distributed throughout the surveillance period.

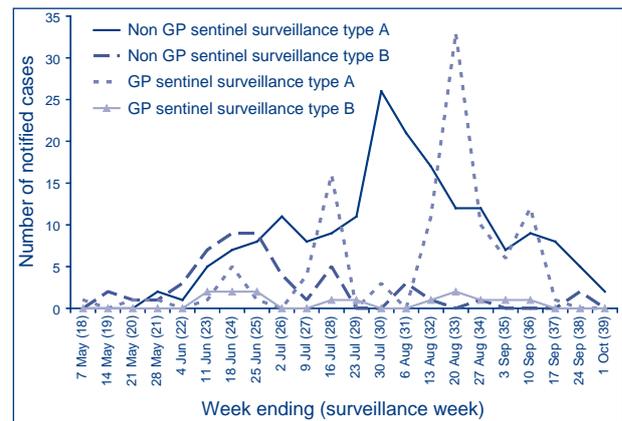
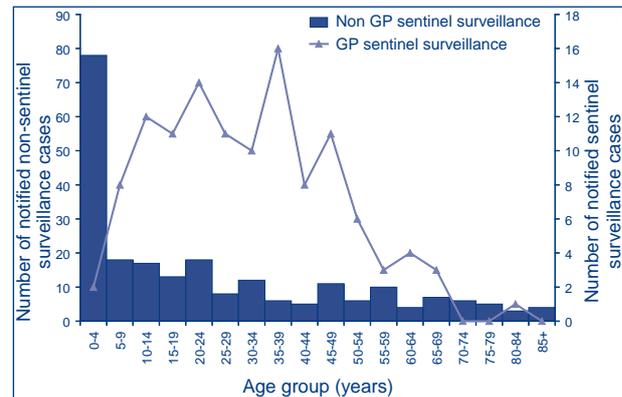
**Table. Respiratory viruses detected from GP sentinel surveillance ILI patient swabs**

Respiratory virus	n	Total swabs (%)	PCR positive swabs (%)
Influenza A	111	29	59
Influenza B	15	4	8
Picornavirus	47	12	25
Adenovirus	1	0.3	1
Parainfluenza virus	5	1	3
Respiratory syncytial virus	10	3	5
Total	189	49	100

A total of 408 cases of laboratory-confirmed influenza were notified to the Department of Human Services in 2006, of which 362 (89%) were made during the surveillance period from 1 May to 1 October. During this period, cases identified from GP sentinel surveillance comprised one-third of notifications and 11 cases (3%) were notified as a result of outbreak investigations. Laboratory-confirmed cases of influenza A showed a steady increase during the surveillance period before a sharp peak in week 33 (week ending 20 August), while influenza B notifications—which comprised only 18% of total influenza cases—peaked in weeks 24 and 25 (12 to 25 June) (Figure 2).

Stratification of laboratory-confirmed notifications by whether or not they were from sentinel surveillance sites showed little difference in trend for influenza type B notifications (Figure 4). However, for influenza type A notifications there was a bimodal distribution of notifications from GP sentinel surveillance with peaks in weeks 28 and 33 (weeks ending 16 July and 20 August respectively); notifications from other sources peaked in week 30 (week ending 30 July). The notification peaks from GP sentinel surveillance were mainly due to large numbers of notifications on single days: 16 cases on 10 July and 25 cases on 15 August. There was also a stark contrast in the age distributions for the different notification sources; 34% of cases notified from non-GP sentinel surveillance sites were aged less than 5 years and 55% were aged less than 20 years (Figure 5). The modal age group for GP sentinel surveillance laboratory-confirmed influenza cases was 35–39 years, although the distribution was much less skewed.

A total of 219 specimens were referred to the WHO Collaborating Centre for Reference and Research on Influenza in 2006; half were from VIDRL and the remainder from two metropolitan hospitals. Isolates

**Figure 4. Laboratory-confirmed influenza by type and notification source, Victoria, 1 May to 1 October 2006****Figure 5. Laboratory-confirmed influenza by age group and notification source, Victoria, 1 May to 1 October 2006**

from 135 specimens (62%) were recovered, of which 71% were influenza A and 29% were influenza B. Ninety-seven per cent of influenza A isolates were A/Wisconsin/67/2005-like (H3) and the remainder were A/New Caledonia/20/99-like (H1); all the influenza B samples were B/Malaysia/2506/2004-like. The influenza vaccine for 2006 contained A/New Caledonia/20/99(H1N1)-like virus, A/California/7/2004(H3N2)-like virus and B/Malaysia/2506/2004-like virus.<sup>4</sup>

### Outbreak investigations

In 2006, the Communicable Disease Control Unit investigated two outbreaks of type A influenza infection in aged care facilities in July and September respectively. In the first outbreak there were 24 cases (6 laboratory confirmed) in 34 residents and staff, while in the second there was a total of 8 cases (5 laboratory confirmed) in 54 residents; all cases recovered.

## Discussion

The 2006 influenza season in Victoria was relatively mild compared to previous years; ILI rates from GP sentinel surveillance remained within normal seasonal activity parameters. The seasonal peak appeared to occur in mid-August, with laboratory-confirmed notifications and ILI rates from GP sentinel surveillance peaking in week 33 and the ILI rate from the MMLS peaking in week 32 (weeks ending 20 and 13 August respectively). A rise in ILI rates as detected from community surveillance did not precede the rise in laboratory-confirmed notified cases as was observed in 2005.<sup>5</sup> There was greater variability in the MMLS ILI rate from week to week compared to the GP sentinel surveillance, although the reason for this is unclear. There was also some variability in the laboratory-confirmed influenza notifications—particularly in week 29 (week ending 23 July)—but this may be explained by the apparent batching of notifications from sentinel surveillance. When stratified, a single defined peak of notifications from non-sentinel surveillance sources occurred in week 30 (week ending 30 July)—which preceded the peaks in ILI rates for the MMLS and GP sentinel surveillance by two and three weeks respectively—whereas a bimodal peak in sentinel surveillance notifications was observed in weeks 28 and 33 (weeks ending 16 July and 20 August respectively).

The laboratory-confirmed surveillance data highlighted again in 2006 the different populations that are captured by the GP sentinel surveillance system and from other sources. Hospitals comprise a large proportion of non-sentinel surveillance notifiers and the proportion of notifications in the 0–4 year age group was also correspondingly high. This is most likely reflective of higher hospitalisation rates for influenza among this age group compared to older children<sup>6</sup> and better diagnostic follow-up for patients hospitalised with respiratory illness.

The notifications and strain typing data suggested two relatively distinct circulating influenza strains during 2006. The first half of the season was marked by circulation of influenza B, for which all typed isolates were B/Malaysia/2506/2004-like (and which was covered by the 2006 vaccine). From about week 26, influenza A/H3N2 became the dominant circulating subtype; nearly all typed influenza A viruses were A/Wisconsin/67/2005-like, which has been included in the 2007 vaccine. The recommended composition of influenza virus vaccines for use in the 2007 Southern Hemisphere influenza season is an A/New Caledonia/20/99(H1N1)-like virus, an A/Wisconsin/67/2005(H3N2)-like virus and a B/Malaysia/2506/2004-like virus.<sup>7</sup>

The GP Sentinel Surveillance Program is a cornerstone of Victoria's influenza surveillance and—as discussed above—provides much additional useful information about influenza in Victoria to that gained from passive notifiable laboratory-confirmed influenza surveillance. The system has several strengths. It has been shown to be useful for surveillance of established diseases using a small sample.<sup>8</sup> It is also a flexible system, defined as being able to adapt to changing information needs or operating conditions with little additional time, personnel or allocated funds.<sup>9</sup> The latter attribute will be demonstrated in 2007 with the addition of varicella-zoster virus (chickenpox and herpes zoster) to be added to the conditions under GP sentinel surveillance in Victoria.

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