Annual report of the National Influenza Surveillance Scheme, 2004

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Abstract

The National Influenza Surveillance Scheme includes data on influenza-like illness from sentinel general practitioner practices, laboratory reports of influenza from National Notifiable Diseases Surveillance Scheme and absenteeism data from a national employer. In 2004, 2,116 cases of laboratory-confirmed influenza-like illness were reported, which was 41 per cent lower than the previous year. Peak activity was recorded in September, a month later than in 2003. Influenza A was again predominant while influenza B had an increased activity compared to the previous season. Four hundred and fifty-four isolates were antigenically analysed: 342 were A (H3N2 strain), 4 were A(H1N1 strain) strains and 108 were influenza B viruses. Further antigenic drift was seen in the A(H3N2) subtype with approximately one third of all isolates antigenically distinguishable from the A/Fujian/411/2002 reference strain. Vaccination coverage indicated that 79 per cent of Australians aged over 65 years received the 2004 influenza vaccine. *Commun Dis Intell* 2005;29:124–135.

Keywords: disease surveillance, influenza, vaccine

Introduction

Influenza is a major threat to public health worldwide because of its ability to spread rapidly through populations, showing a greater severity in the very young, the frail elderly and people with chronic diseases.

Influenza is an acute self-limiting viral disease of the upper respiratory tract. The health and economic impact of influenza largely arise from related complications such as lower respiratory tract infections and exacerbation of cardiopulmonary and other chronic diseases. These complications result in excess hospitalisation and mortality.

Influenza infections are seasonal in temperate climates (peaking between June and September in the Southern Hemisphere and between December and April in the Northern Hemisphere), but may occur throughout the year in tropical regions. The seasonal activity of influenza virus varies from year to year with some years marked by larger epidemics with higher morbidity and mortality. In Australia during 2003, influenza and pneumonia were the underlying causes of 3,566 deaths.[1]

There are three types of influenza—A, B and C—which are classified according to their antigenically distinct internal proteins. The ancestral hosts for influenza A viruses are aquatic birds, however, certain subtypes have become established in various mammals, including humans and pigs. Both Influenza B and C are restricted to humans, although influenza C has been isolated from pigs.[2] Influenza C causes a less severe illness than either influenza A or B, more akin to the common cold.[3]

Influenza viruses are successful human pathogens because of their ability to vary their two external proteins, haemagglutinin (H) and neuraminidase (N). Mutations cause a gradual change in these proteins called ‘antigenic drift’, which results in annual epidemics of influenza. The greater the change in these proteins, the less likely it is that the virus will be recognised by immune cells primed by exposure to earlier infections or vaccines, and the greater the epidemic potential. At irregular intervals, there are more dramatic changes in the viral proteins, called ‘antigenic shift’, which are a result of either direct introduction of avian influenza viruses into the human population or a reassortment between human and avian viruses which is believed to occur

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in an intermediate host such as pigs. These 'shifts' result in the emergence of a new influenza virus. In the absence of immunity to these new viruses, there is a rapid spread of influenza with dramatically increased rates of morbidity and mortality.

Periodically, novel influenza viruses emerge and spread rapidly through susceptible populations, resulting in worldwide epidemics or pandemics.[4] Three pandemics occurred in the 20th century. The Spanish Flu (A/H1N1) pandemic of 1918–1919, is estimated to have caused at least 20 million deaths worldwide, with unusually high mortality among young adults.[5] Mortality associated with the 1957 'Asian Flu' (A/H2N2) and the 1968 'Hong Kong Flu' (A/H3N2) pandemics was less severe, with the highest mortality in the elderly and persons with chronic diseases.[6]

As it is impossible to predict when the next pandemic will occur or how severe the illness will be, an effective national surveillance system is essential for the control of seasonal epidemics and preparedness for potential pandemics. The outbreaks of influenza A(H5N1) virus in Asia in 2004/05 and the associated human cases have raised serious concerns that this virus subtype may acquire the ability for person-to-person transmission and result in pandemic influenza (http://www.who.int/csr/disease/influenza/WHO_CDS_2005_29/en/). Virological and epidemiological monitoring are important components of influenza surveillance. The main objectives of virological and epidemiological surveillance of influenza are:

- early detection of epidemics to enable the implementation of public health measures such as the vaccination of high risk groups, outbreak control campaigns and provisions of clinical services;
- characterisation of the nature of the epidemic;
- isolation and antigenic characterisation of circulating influenza viruses to assist in the formulation of the following season's vaccine and to provide new vaccine strains; and
- evaluation of the impact of the epidemic and associated public health measures.

In 2004, the Communicable Diseases Australia website (http://www.health.gov.au/internet/wcms/publishing.nsf/Content/cda-surveil-ozflu-flucurr.htm) published influenza surveillance data fortnightly during the influenza season. This annual influenza report is a summary of the surveillance information gathered by various systems in 2004.

The international influenza activity in 2004 and the relationship to Australian influenza activity are also included in this report.

Surveillance methods

Surveillance of influenza in Australia is based on six sets of data:

- notifications of laboratory-confirmed influenza required by legislation in most states and territories, and nationally notifiable to the National Notifiable Diseases Surveillance System (NNDSS);
- laboratory diagnosis including virus isolation and serology by laboratories participating in the Laboratory Virology and Serology Reporting Scheme (LabVISE);
- subtype and strain data of circulating influenza viruses provided by the World Health Organization (WHO) Collaborating Centre for Reference and Research on Influenza;
- consultation rates for influenza-like illness diagnosed by sentinel general practitioners;
- absenteeism data of workers from a national employer; and
- hospitalisation and mortality data.

Australia also hosts one of the four WHO Collaborating Centres for Reference and Research on Influenza.

National Notifiable Diseases Surveillance System

In all jurisdictions with the exception of the Australian Capital Territory and South Australia, laboratory-confirmed influenza is a notifiable disease under state and territory legislature. In the Australian Capital Territory and South Australia, laboratory reports are also collected and sent to NNDSS although influenza is not a notifiable condition. In this report, data are analysed by the date of onset in order to present disease activity during the reporting period, but when this was not available either the specimen collection date or the notification date, whichever was the earlier, was used.

Laboratory surveillance

LabVISE is a national scheme of sentinel laboratories that reports influenza diagnosis all year round. In 2004, 17 laboratories from all jurisdictions except the Northern Territory contributed to the scheme. Data were reported monthly and were analysed by the specimen collection date.

WHO Collaborating Centre for Reference and Research on Influenza

The WHO Collaborating Centres for Reference and Research on Influenza located in Australia, Japan, the United Kingdom and United States of America are responsible for analysing influenza viruses collected through an international surveillance network involving over 100 national laboratories. The Melbourne Centre analyses viruses received from Australia and from laboratories throughout Oceania, the Asian region and beyond. All virus isolates are analysed antigenically and a geographically and temporally representative sample, together with any strains demonstrating uncharacteristic reactions during antigenic characterisation, are further analysed by genetic sequencing of the viral haemagglutinin antigen and, for a proportion of these, the neuraminidase antigen. Together with serological and epidemiological data, this forms the basis from which WHO makes recommendations in February (Northern Hemisphere) and September (Southern Hemisphere) for the formulation of vaccines to be used in the following winter.

WHO vaccine formulation recommendations are made in the context of strains that are antigenically 'like' laboratory reference strains that are named according to a standard nomenclature for influenza viruses. For human isolates this nomenclature is based on type, the place of isolation, sequential number and year of isolation; for influenza A the subtype of the HA and NA may be included in brackets after the designation. For avian/animal isolates the species yielding the isolate is also included. An example of a human isolate is A/Sydney/5/97(H3N2), an influenza A(H3N2) virus that was the 5th sequential influenza A isolated in Sydney for the year in 1997. The WHO recommendations (e.g. Southern Hemisphere recommendation for 2005—http://www.who.int/wer/2004/wer7941/en/) are then translated into actual virus strains acceptable to regulatory authorities and vaccine manufacturers by national and regional committees (e.g. the Australian Influenza Vaccine Committee—http://www.tga.gov.au/committee/aivc2005.htm)

Sentinel general practitioner surveillance

Sentinel general practitioner surveillance schemes for influenza monitor the consultation rates for influenza-like illness (ILI). In Australia, there are five such schemes: the Australian Sentinel Practice Research Network (ASPREN) which collects data at a national level, the New South Wales Influenza Surveillance Scheme, the Victorian Influenza Surveillance Scheme, Western Australian sentinel general practices, and the Northern Territory Tropical Influenza Surveillance Scheme. In 2004, Queensland also joined the sentinel general practitioner surveillance schemes. ASPREN and the Northern Territory Tropical Influenza Surveillance Scheme report ILI rates throughout the year, while the other sentinel surveillance schemes report from May to October each year.

In 2004, all sentinel surveillance schemes adopted the same case definition for ILI: presentation with fever, cough and fatigue. Victoria and Western Australia currently use this case definition, but it was used for the first time in 2004 by ASPREN, the Northern Territory and New South Wales. ASPREN used both old (definition 2) and new (definition 1) case definitions in their reporting in 2004.

Sentinel general practices contributing to the ASPREN scheme are mostly located in capital cities and larger regional centres on the east coast of Australia (Map). In 2004, an average of 47 (range 32–62) general practices reported ILI cases on an average of 4,962 (range 2,138–6,587) consultations per week.

The Northern Territory Tropical Influenza Surveillance reported cases of ILI as the rate per 1,000 consultations per week. Throughout the year, eight to fourteen centres reported to the surveillance system with an average of 866 (range 338–1,290) consultations per week.

In 2004, the New South Wales Influenza Surveillance program collected reports from New South Wales practitioners who are part of ASPREN and from five of the 17 Public Health Units (Southern New South Wales, New England, Wentworth, Central Sydney and South Eastern Sydney). Fifteen (range 2–21) general practitioners reported ILI cases weekly from May to October on an average of 1,854 (range 208–2,659) consultations per week.

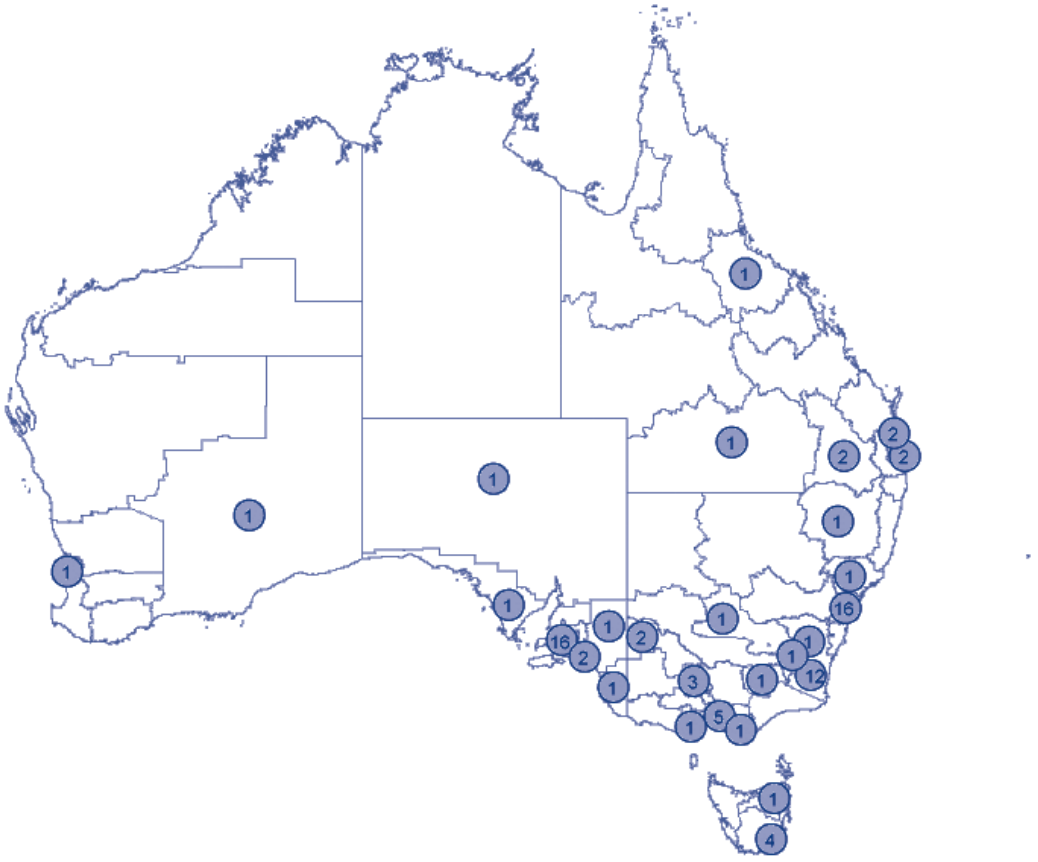
The Victorian Infectious Diseases Reference Laboratory, the WHO Collaborating Centre for Reference and Research on Influenza and the Victorian Department of Human Services contributed to the Victorian Influenza Surveillance Scheme. In 2004 the Victorian Influenza Surveillance Scheme also enlisted the Melbourne Locum Service. Overall, 76 general practitioners from metropolitan (15 sites) and rural (23 sites) regions were recruited to report ILI consultations between April and October. These practices reported on 6,995 (range 4,675–8,128) consultations per week. ILI was calculated as the rate per 1,000 consultations per week.

In Western Australia, 18 general practices, 14 in the metropolitan area (Perth) and four in rural regions (one each in Kalgoorlie, Busselton, Tom Price and Geraldton) participated in ILI surveillance from May to November. Data were reported, for the first time, as the rate of ILI per 1,000 consultations per week in 2004. Data collected prior to 2004 were reported as the number of cases per practice per week.

Table 1. Case definitions of influenza-like illness used in Australian sentinel practice schemes, 2004

Program	Case definition
Victorian Influenza Surveillance Scheme, Western Australian sentinel general practices, New South Wales State program, Northern Territory and ASPREN (definition 1)	Fever, cough, fatigue
ASPREN (definition 2)	(a) Viral culture or serological evidence of influenza virus infection; or (b) influenza epidemic, plus four of the criteria in (c) (c) Six of the following: sudden onset (within 12 hours); cough; rigors/chills; fever; prostration and weakness; myalgia; no significant respiratory symptoms other than redness of nasal mucous membranes and throat; influenza in close contacts.

Map. Geographic distribution of ASPREN sentinel general practice sites, Australia, 2004



In Queensland, 13 sentinel practices reported to the surveillance system during the influenza season. Three of these practices were in metropolitan area, while the rest were in rural and remote regions. The sentinel practices reported to the surveillance system with an average of 980 (range 129–1,521) consultations per week. ILI was reported as the rate per 1,000 consultations per week.

Absenteeism surveillance

Australia Post, a major nationwide employer provided sick leave absenteeism data collected weekly between March and December 2004. Absenteeism, defined as an absence due to illness for at least three consecutive days, was presented as a rate per 100 employees per week, on an average of 32,973 employees per week in 2004.

Hospitalisation data

The Australian Institute of Health and Welfare provided data on hospital separations in public and private hospitals. The number of separations with a primary diagnosis of influenza due to identified influenza viruses (ICD-10AM = J10) and influenza where the virus was not identified (ICD-10AM = J11) were reported. Data for the 2003/04 financial year were not available at the time of writing this report.

Results

The influenza surveillance data presented here should be interpreted with caution. Laboratory-confirmed influenza represents a small proportion of all influenza cases in the year and consequently the estimation of the circulating strains is based on a small sample. As 2004 was the first time that all the sentinel schemes used the same case definition, comparisons of ILI between schemes was possible. However, it is difficult for some of the sentinel schemes to compare 2004 rates of ILI with previous years because of the adoption of a new case definition.

National Notifiable Diseases Surveillance System

In 2004, 2,116 laboratory confirmed cases of influenza were reported to NNDSS, which represents a 41 per cent decrease from the number of notifications in 2003. All jurisdictions reported laboratory-confirmed influenza to NNDSS, although Tasmania and the Australian Capital Territory reported very few cases. Tasmania's low reporting may have been due to their limited access to laboratory testing of influenza. In the Australian Capital Territory and South Australia, where influenza was not classified as a notifiable disease, the reporting of laboratory-confirmed influenza has never been complete.

Notifications of laboratory-confirmed influenza started to increase in late August; peaked in late September and started to decrease in late October (Figure 1). Compared to 2003, the influenza season started a month late; the magnitude of notifications was much smaller and spread out; the peak number of notifications was much lower; and the rise of the number of notifications was not as sharp as that observed in 2003.

A comparison of notification rates in each jurisdiction (with the exception of the Australian Capital Territory and Tasmania) is shown in Figure 2. The highest notification rate occurred in September in Queensland (9 cases per 100,000 population), the Northern Territory (6 cases per 100,000 population), and New South Wales (4 cases per 100,000 population).

Figure 1. Notifications of laboratory-confirmed influenza to the National Notifiable Diseases Surveillance System, Australia, 2003 and 2004, by week of onset

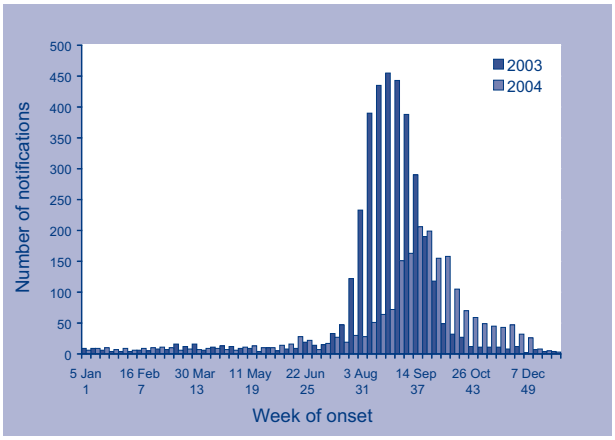
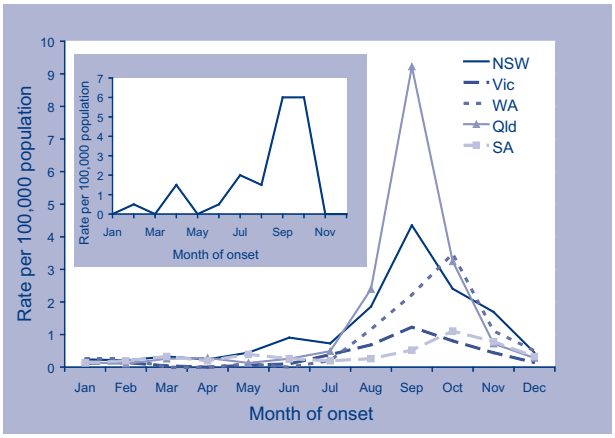


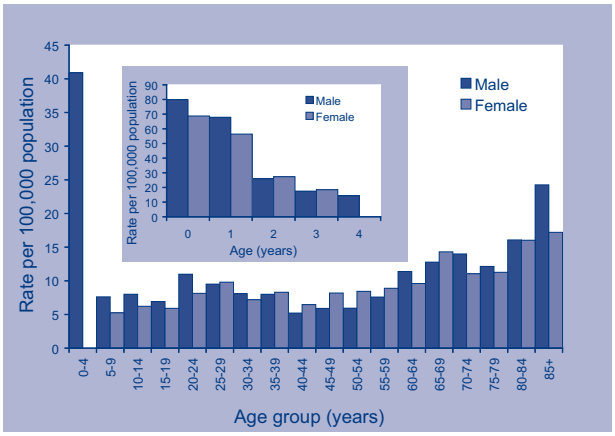
Figure 2. Notification rates of laboratory-confirmed influenza, Australia, 2004, by jurisdiction and month of onset



National age-specific notification rates are shown in Figure 3. The overall male to female ratio was 1:1. The 0–4 years age group had highest notification rate (39 cases per 100,000 population) – representing 23 per cent of all notifications.

Infants under the age of one composed 39 per cent of the notifications of the 0–4 years age group and had the highest notification rate at 75 cases per 100,000 population (Figure 3 insert). The 85 years and over age group had the second highest notification rate (19 cases per 100,000 population).

Figure 3. Notification rates of laboratory-confirmed influenza, Australia, 2004, by age and sex



Laboratory surveillance

A total of 706 laboratory diagnoses of influenza were reported to LabVISE participating laboratories, 69 per cent of which were influenza A (Figure 4). The overall influenza A to B ratio in 2004 was 2:1. The peak of influenza reports to LabVISE occurred in September, which was a week later than the peak influenza activity observed in the NNDSS surveillance data. This was because LabVISE data were analysed by the date of specimen collection while NNDSS data were analysed by date of onset.

WHO Collaborating Centre for Reference and Research on Influenza

The WHO Collaborating Centre for Reference and Research on Influenza received 454 isolates or clinical specimens from Australia that yielded viable influenza viruses (the lowest level for a decade) and they were all analysed antigenically. Of these viruses 342 (75.3%) were A(H3N2) strains, 108 (23.8%) influenza B and only four were A(H1N1) viruses. Sequence analysis of the variable (HA1) region of the haemagglutinin was undertaken for 51 strains (37 H3, 14 B) and of the neuraminidase for 31 strains (25 A and 6 B). Approximately one third of the Australian A(H3) viruses were genetically and antigenically distinguishable from the reference strain A/Fujian/411/2003 and 2004 vaccine strain A/Wyoming/3/2003 (Table 2, Figure 5), and were similar to a recent isolate A/Wellington/1/2004. Influenza A(H3N2) isolates from throughout the Asia-Pacific region displayed similar antigenic drift and the percentage of A/Wellington/1/2004-like strains increased as the year progressed.

Genetic analysis of the Australian A(H3) isolates demonstrated that, unlike the previous season when the neuraminidase antigen of most of the viruses was more closely related to that of strains circulating in the 2003 season than to that of the reference virus A/Fujian/411/2002 (Figure 6), the majority fell within the A/Fujian/411/2004 lineage with only a few strains (e.g. A/Victoria/520/2004 and A/Brisbane/59/2004) with a neuraminidase in the 2003 lineage. This is

Figure 4. Laboratory reports of influenza diagnoses reported to LabVISE, Australia, 2004, by type and month of specimen collection

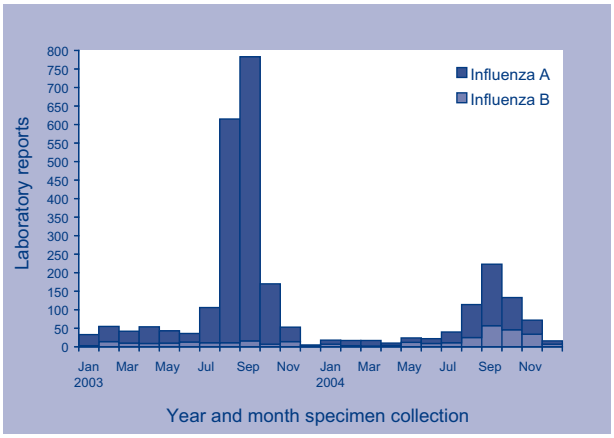


Table 2. Antigenic comparisons of influenza A(H3) viruses by the haemagglutination-inhibition test

Virus antigen	Ferret antiserum		
	Reciprocal haemagglutination-inhibition titre		
	A/Panama	A/Wyoming	A/Wellington
A/Panama/2007/99	640	40	160
A/Wyoming/3/2003*	230	2,560	640
A/Wellington/1/2004	160	320	1,280

* A/Wyoming/3/2003 was the A/Fujian/411/2002-like vaccine strain used in the 2004 vaccine.

suggestive of both a fresh introduction of A(H3) viruses from the Northern Hemisphere and some limited persistence of viruses from the previous season. Of the four A(H1) isolates all were A(H1N1) and these remained antigenically close to the reference and vaccine strain A/New Caledonia/20/99. Of the 108 influenza B viruses analysed the majority (83.3%) were antigenically and genetically closely related to the reference virus B/Shanghai/361/2002 (B/Sichuan/379/99 lineage) with 18 B/Hong Kong/330/2001-like strains (Figure 7).

Consistent with the antigenic drift in the A(H3) isolates demonstrated by ferret antisera (Table 2), serological studies conducted with pre– and post-vaccination human sera from recipients of vaccine containing the A/Fujian/411/2002-like strain showed a reduction in antibody titres to the recent A/Wellington/1/2004-like strains. While the Australian 2004 vaccine contained a B/Hong Kong/330/2001-like strain the majority of the influenza B isolates were B/Sichuan/379/99 lineage strains and the vaccine induced significantly reduced antibody levels to these viruses. Unpredictability

Figure 5. Evolutionary relationships between influenza A(H3) haemagglutinins (HA1 region)

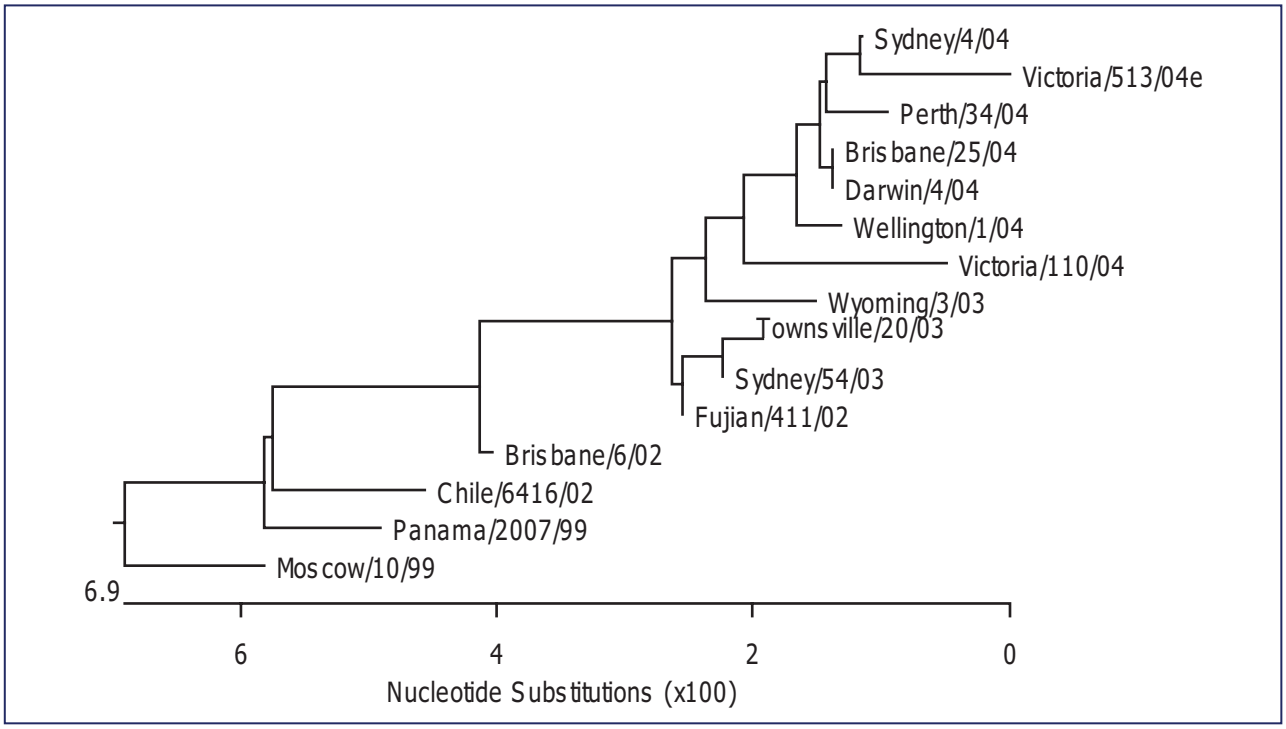


Figure 6. Evolutionary relationships between influenza N2 neuraminidases

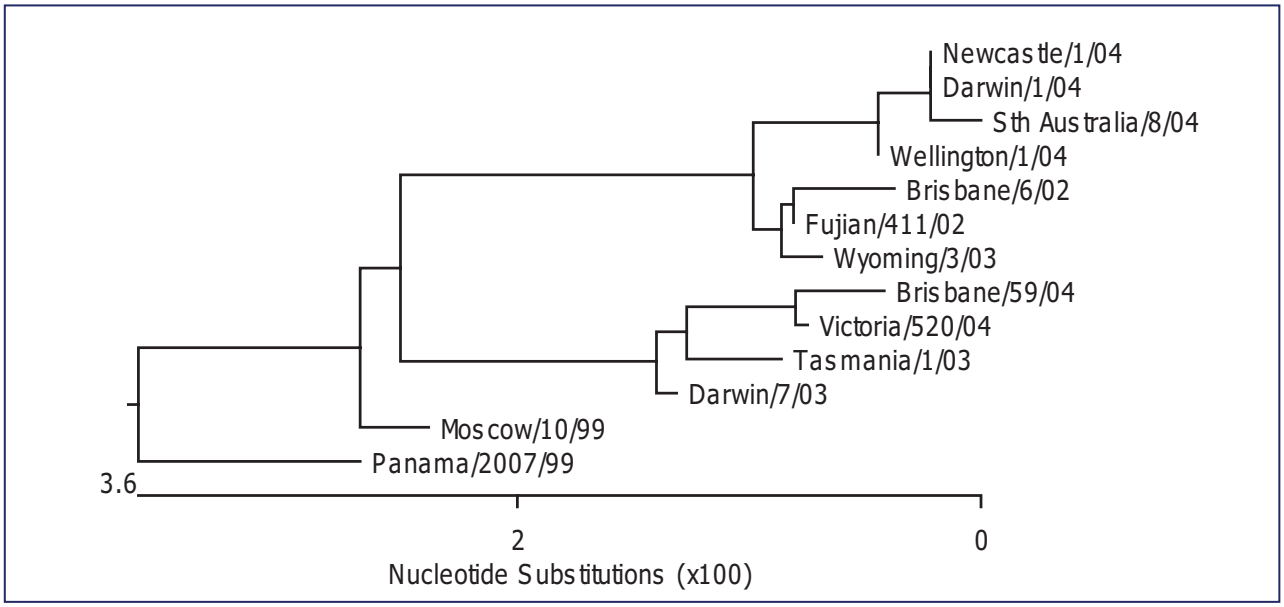
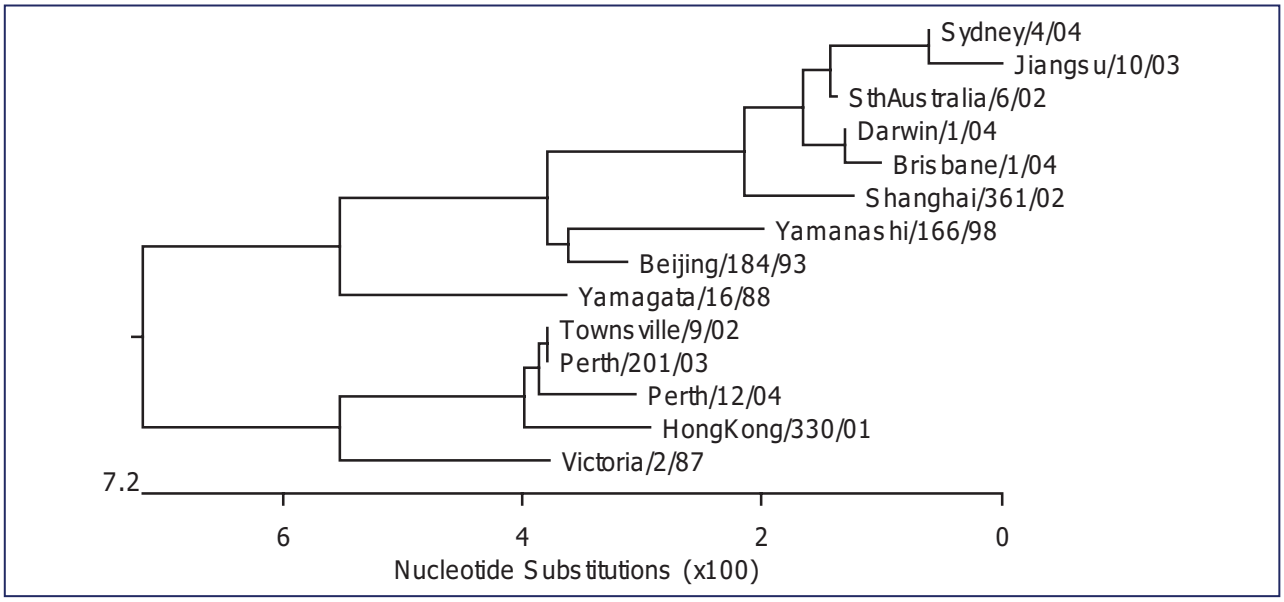


Figure 7. Evolutionary relationships between influenza B haemagglutinins (HA1 region)



regarding the predominance of the two type B lineages from year to year has been problematic for vaccine formulation in recent seasons.

Sentinel general practice surveillance

ASPREN data for 2004 is presented for both the old (case definition 2: cough, rigour or chills, fever, prostration and weakness, myalgia, redness of mucous membrane, with a sudden onset) and the new (case definition 1: fever, cough and fatigue) case definitions in comparison with 2003 data (Figure 8). According to case definition 1, ILI peaked twice in 2004: first in early July (20.3 ILI per 1,000 consultations), and again in mid-September (18.3 ILI per 1,000 consultations). The ILI rate of case definition 2 showed the same peaks also in early July (12.9 ILI per 1,000 consultations) and in mid-September (10.3 ILI per 1,000 consultations). As expected, the broader definition (case definition 1) identified more cases. The multiple peaks of ILI rates in the two definitions may reflect that rates of ILI peaked at different times in different jurisdictions.

The Northern Territory Tropical Influenza Surveillance Scheme data showed two peak ILI rates (Figure 9); one in week 12 (late March) (31 ILI per 1,000 consultations); and one in week 28 (mid-July) (27 ILI per 1,000 consultations). This is an established pattern of influenza in Australia's tropical north. In 2003, the highest ILI rate using the old case definition (ASPREN definition 2 in Table 1) was reported in week 36 (early September) with a rate of 39 ILI per 1,000 consultations.

Figure 8. ASPREN consultation rates for influenza-like illness, Australia, 2003 and 2004, by week of report

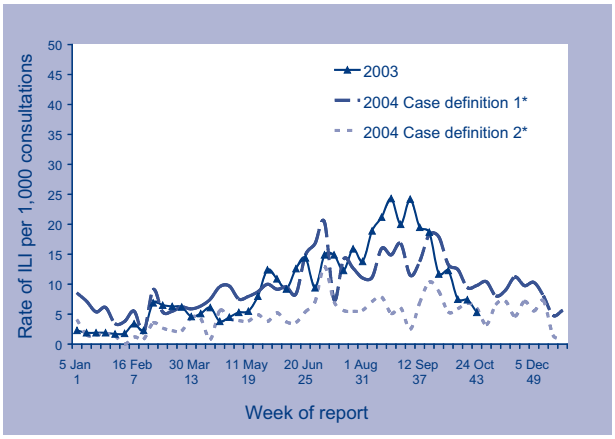
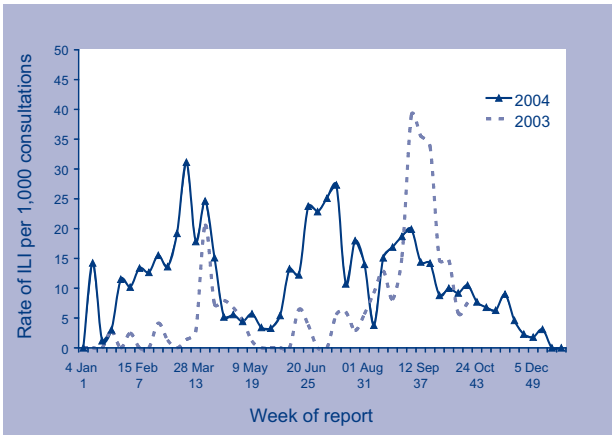
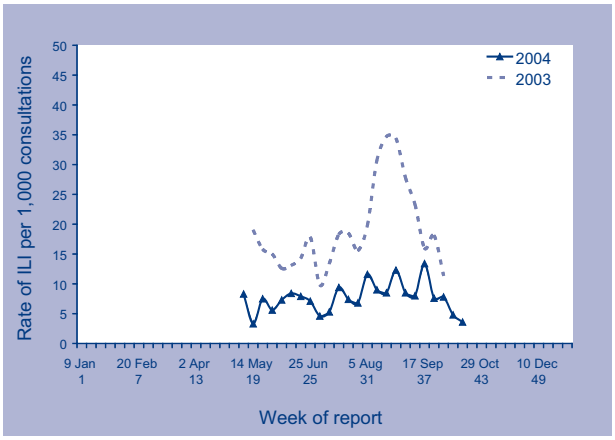


Figure 9. Consultation rates for influenza-like illness, Northern Territory, 2003 and 2004, by week of report



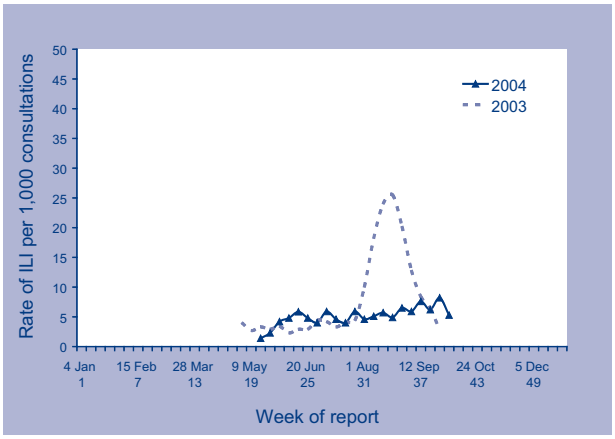
In New South Wales, ILI surveillance was conducted from May to October 2004. There was no obvious peak observed in 2004. The highest ILI rate (13 ILI per 1000 consultations) was reported in week 37 (mid-September) (Figure 10). In 2003, the peak rate using the old case definition (ASPREN definition 2 in Table 1) was reported in week 33 (late August) (35 ILI per 1,000 consultations).

Figure 10. Consultation rates for influenza-like illness, New South Wales, 2003 and 2004, by week of report



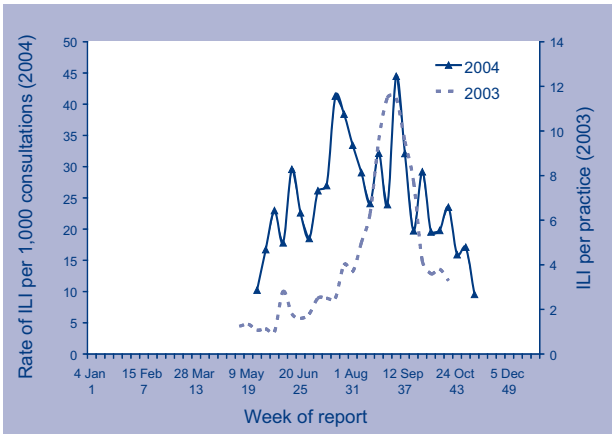
In Victoria, ILI surveillance was conducted from May to October 2004. Similar to the pattern observed in the New South Wales data, there was no obvious peak in 2004. The highest ILI rate (8 ILI per 1,000 consultations) was reported in week 39 (late September) (Figure 11). In 2003, the peak ILI rate (26 ILI per 1,000 consultations) occurred in week 34 (late August).

Figure 11. Consultation rates for influenza-like illness, Victoria, 2003 and 2004, by week of report



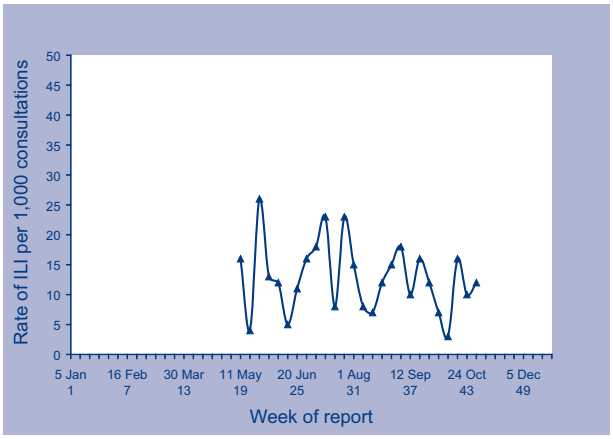
In Western Australia, the ILI rate peaked in week 36 of early September (44.5 ILI per 1,000 consultations). In 2003, the ILI was reported as the rate per practice and peaked in week 35 (Figure 12).

Figure 12. Consultation rates for influenza-like illness, Western Australia, 2003 and 2004, by week of report



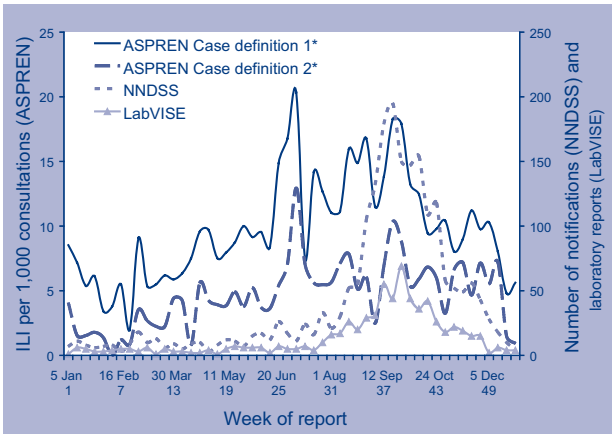
In Queensland, ILI surveillance was conducted from May to October 2004. There was no apparent trend during this influenza season. The highest rate (26 ILI per 1,000 consultations) was reported in week 21 (mid-May) (Figure 13).

Figure 13. Consultation rates for influenza-like illness, Queensland, 2004, by week of report



A comparison of the ASPREN, NNDSS and LabVISE reports is shown in Figure 14. The first peak of ILI in week 27 (early July) reflected by ASPREN was not seen in NNDSS or LabVISE however, the peak activity of ILI indicated by reports to ASPREN in the period between weeks 35 and 38 (29 August to 25 September) was reflected in laboratory reports of influenza to LabVISE and confirmed influenza notifications received by NNDSS.

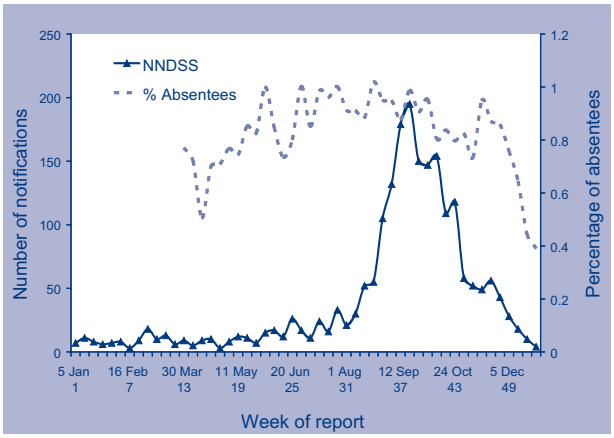
Figure 14. Laboratory reports to LabVISE, notifications to NNDSS and consultation rates in ASPREN of influenza, Australia, 2004, by week of report



Absenteeism surveillance

Absenteeism surveillance is a non-specific index of influenza activity. In 2004, there was no apparent trend observed in the absenteeism surveillance which could be attributed to increased influenza activity. The percentage of absentees started to increase in mid-May (0.9%), then remained steady until late November (Figure 15).

Figure 15. Rates of absenteeism and consultation rates of influenza-like illness, Australia, 2004, by week of report



World trends in influenza, 2004

In 2004, Influenza A (H3N2) viruses predominated in most parts of the world and were responsible for the majority of outbreaks. Influenza A (H1) and B viruses circulated at low levels. In the Southern Hemisphere, influenza activity was relatively mild. Outbreaks caused by influenza A (H3N2) were reported in South America and New Zealand. While the majority of influenza (H3N2) isolates were similar to A/Fujian/411/2002, an increasing proportion of isolates was distinguishable from the A/Wyoming/3/2003 vaccine virus and more closely related to A/Wellington/1/2004.[7] In some countries, influenza A (H1N1) and A (H1N2) viruses were isolated; the majority of these isolates were antigenically closely related to A/New Caledonia/20/99. In many countries, influenza B viruses were also isolated; the majority of recent isolates were closely related to B/Shanghai/361/2002 (B/Yamagata/16/88 lineage), while the reminder were more closely related to B/Hong Kong/330/2001 (B/Victoria/2/87 lineage).

In association with the widespread avian influenza among poultry in Asia and the localised outbreaks among poultry in Canada in 2004, human cases of influenza A (H5N1) and A (H7N3) were also reported. Between 1 January 2004 and 15 February 2005, 55 patients with influenza A (H5N1) were reported from Viet Nam, Thailand and Cambodia, 42 of whom died.[8] These cases were associated with outbreaks of highly pathogenic avian influenza (H5N1) in poultry. A recent study has shown evidence of a highly probable case of human-to-human transmission of a family cluster in Thailand.[9] In March 2004, two human cases of influenza A (H7N3) were associated with outbreaks of avian influenza A (H7N3) in poultry in British Columbia, Canada. There has been no evidence of human-to-human transmission of the H7N3 strain.[10]

The temporal pattern of influenza in New Zealand was similar to Australia with a late onset of the influenza season as compared to 2003. The New Zealand consultation rates for ILI started to increase in mid-August, and peaked in week 38 in late September.[11] New Zealand's influenza isolates in 2004 were predominately A strain (93%) with occasional B viruses (7%). The overwhelming majority of influenza A viruses were A(H3N2) strains and the WHO Collaborating Centre, Melbourne, reported that 61 per cent of the viruses characterised were A/Wellington/1/2004-like. Overall, influenza activity in New Zealand 2004 occurred at a moderate level compared to 2002 and 2003 seasons.

Discussion

The 2004 influenza activity in Australia was low compared with 2003, and the onset of the influenza season was about a month later than in 2003. Although influenza A remained the predominant virus type, there was increased activity of influenza B compared with 2003. The increase of influenza B activity was predicted as outbreaks tend to occur in alternate years.[12] Both influenza A and B peaked in the same month (September). While influenza activity was moderate in 2004, there were a number of outbreaks worth noting. There were two outbreaks of influenza in army camps, one in Victoria (A/Fuijian (H3N2)-like) and

another in Queensland.[13] In September, 13 outbreaks of ILI were reported from residential institutions in New South Wales,[13] including 12 aged care facilities and one correctional centre. The outbreaks had high attack rates (up to 76% of residents and 42% of staff) and case fatality rates of 14 per cent.

The majority of influenza A isolates were characterised as influenza A(H3N2) subtype and approximately one third of these demonstrated detectable antigenic drift from the A/Fujian/411/2002-like strain used in the 2004 vaccine. Two separate lineages of influenza B continue to circulate worldwide and the predominant lineage varies from region to region and from season to season. In 2004, the Australian influenza B isolates were predominantly A/Shanghai/361/2002-like whereas the 2004 vaccine contained a B/Hong Kong/330/2001-like strain which induced relatively low levels of cross-reactive antibody. Few influenza A(H1) strains were observed and these showed no evidence of antigenic drift from the A/New Caledonia/20/99 strain incorporated in vaccines since 2000.

There was a higher rate of ILI using the national case definition (fever, cough and fatigue), compared with the old ASPREN case definition (definition 2 in Table 1). A Dutch study[14] has shown that the use of a less specific spectrum of symptoms such as fever, cough, acute onset and malaise had a higher predictive value than that of all the symptoms combined. An Australian study[15] also found that the combination of cough, fever and fatigue was both sensitive (43.5–75.1%) and specific (46.6–80.3%) with positive predictive values ranging from 23 to 60 per cent. These results are reassuring that our national case definition is simple and sensitive, and also predictive of laboratory-confirmed influenza.

Influenza-like illness peaked in the early spring in late September. As in previous years, the earliest reports of ILI were from the Northern Territory, signalling the beginning of the influenza season. Early reports of ILI were also received from Queensland. Laboratory reports of influenza showed slightly different time distribution compared with ILI data from ASPREN. The first peak of laboratory reports in week 33 (mid-August), was six weeks later than first peak seen in ASPREN data. This delay between general practitioner's reports and laboratory reports may reflect a delay in laboratory testing and reporting. Alternatively, the first peak of ILI described by ASPREN in week 27 (early July) may have been caused by viruses related to other respiratory illnesses, and therefore a parallel peak was not seen in NNDSS or LabVISE.

National absenteeism rates reported by Australian Post added little information to the other surveillance systems and remained relatively insensitive to the low levels of influenza activity in 2004. These data may prove more useful in a year of high levels of influenza activity.

Influenza vaccination of the elderly is an important public health action to reduce ILI-related deaths and morbidity. The National Health and Medical Research Council recommends annual influenza vaccination for all Australians aged 65 years or over. In 2004, the vaccination coverage of Australians aged over 65 years was 79 per cent which was higher than in 2003 (77%).[16] Compared to 2003, notification rates of influenza declined slightly (16 cases per 100,000 population in 2003; 14 cases per 100,000 population in 2004) in the over 65 years age group. There was a larger decrease (257 cases per 100,000 population in 2003; 75 cases per 100,000 population in 2004) in the rate among the under one year age group while rates in other age groups remained unchanged. Influenza vaccination can mitigate the impact of morbidity and mortality from annual influenza epidemics on the most susceptible populations.[17]

Preparation for an influenza pandemic is a high priority in Australia. As the threat of a potential pandemic is growing due to the rapid spread of avian influenza in Asia, a range of activities have been coordinated by the Australian Government to prepare for the challenge. The action plan for pandemic influenza is under revision in light of the current international situation. It focuses on the responsibilities of the Australian Government and the jurisdictions in the phases of an influenza pandemic. A range of surveillance activities at the national level, such as hospital surveillance, border surveillance and general practitioner surveillance has been planned. Other activities to enhance the pandemic influenza preparedness, such as rumour surveillance of influenza including avian influenza; stockpiling of antiviral drugs and personal protective equipment; and tracking of vaccine development are coordinated at the national level.

The recommended Australian influenza vaccine for 2005 is composed of an A/New Caledonia/20/99(H1N1)-like strain, an A/Wellington/1/2004 (H3N2)-like strain in place of A/Fujian/411/2002(H3N2)-like virus and a B/Shanghai/361/2002-like strain in place of B/Hong Kong/331/2001-like strains. The World Health Organization identified that there was a antigenic drift in the A(H3N2) viruses and predominance of influenza B viruses of the B/Shanghai/361/2002 lineage in the Northern Hemisphere in 2004. This antigenic drift has resulted in some concerns that vaccines containing an A/Fujian/411/2002(H3N2)-like virus, currently in use in the Northern Hemisphere, may provide sub-optimal protection.

Vaccination remains the most effective strategy of reducing the impact of influenza. Awareness among health care providers of current influenza activity is necessary for reducing the impact of influenza. As the threat of a potential pandemic influenza grows, the National Incident Room will continue its role of providing early warning of diseases including avian influenza and pandemic influenza. This information will add further value to the regular surveillance activity of the National Influenza Surveillance Scheme in the winter of 2005.

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