

NATIONAL INFLUENZA SURVEILLANCE 1994 - ANNUAL REPORT

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Introduction

Influenza has the potential to cause significant morbidity and mortality especially in persons at high risk of complications. A national surveillance system is an important component of a program for the control of this disease and has as its main objectives:

- early detection of influenza epidemics, enabling efforts for public health actions such as vaccination of at risk persons not previously vaccinated to be appropriately targeted, and planning for possible impacts on the provision of clinical care,
- the collection and analysis of epidemiological information on influenza morbidity and mortality in order to characterise the nature of the epidemic, and to estimate the impact of the disease outbreaks and of control efforts such as vaccination campaigns,
- collection of influenza isolates and analysis of antigenic characteristics of the viruses to provide information on which antigenic variants should be included in the following season's vaccines¹.

Influenza activity has been recorded in Australia by the CDI Virology and Serology Laboratory Reporting Scheme since 1978. This Scheme has reported influenza activity each winter in Australia, except in 1986, and has formed the basis of past national influenza surveillance efforts. In 1994, national surveillance was expanded to include information from several other schemes collecting a range of data which can be used to measure influenza activity. Laboratory diagnoses of influenza provide the most specific marker of influenza activity, however, the sensitivity of this type of surveil-

lance is low because only a small proportion of cases is laboratory confirmed. Other schemes were therefore used to provide less specific surveillance information which can be used as surrogate markers of influenza activity.

The results of each of the schemes were published together in *Communicable Diseases Intelligence as National Influenza Surveillance 1994*. The reports began in the issue of CDI of 30 May 1994 and finished with the issue of 31 October 1994.

This annual report of *National Influenza Surveillance 1994* aims to determine whether the surveillance met the objectives of an influenza surveillance system and to evaluate the surveillance methods used.

Surveillance methods

Five types of surveillance schemes were used to provide data for *National influenza surveillance 1994*. These were general practitioner surveillance, absenteeism surveillance, laboratory surveillance, total deaths surveillance, and hospital admissions for influenza and pneumonia. National coverage was not possible for each of the types of surveillance schemes.

SENTINEL GENERAL PRACTITIONER SURVEILLANCE

Four sentinel general practitioner schemes reporting influenza-like illness were included in the *National Influenza Surveillance 1994*: the Australian Sentinel Practice Research Network (ASPREN), the Australian Capital Territory Sentinel General Practice Scheme, the New South Wales Sentinel General Practitioner Scheme and the Victorian Sentinel General Practitioner

Table. Geographical locations of ASPREN recorders, March 1994

State or Territory	Recorders in major urban areas	Recorders in rural areas	Total
Australian Capital Territory	2	0	2
New South Wales	17	4	21
Northern Territory	0	3	3
Queensland	7	6	13
South Australia	34	9	43
Tasmania	3	1	4
Victoria	6	5	11
Western Australia	2	3	5
Total	71	31	102

Scheme. Analysis of data from these four schemes provides a national picture of influenza-like illness.

Australian Sentinel Practice Research Network

ASPREN is conducted by the Research and Health Promotion Unit of The Royal Australian College of General Practitioners in Adelaide. The Network has about 100 general practitioner recorders in locations throughout Australia (Table 1). Each week (beginning on Mondays) they monitored about 10,000 consultations and reported the number of cases of influenza-like illness, the age group and sex of the patients and the total number of consultations.

The number of influenza consultations and the number per 1000 consultations were reported in *CDI*, as were the major trends by State and Territory, when the data were available.

The ASPREN influenza case definition was

- (a) viral culture or serological evidence of influenza virus infection, or
- (b) influenza epidemic, plus four of the criteria in (c),
or
- (c) six of the following:
 - (i) sudden onset (within 12 hours)
 - (ii) cough
 - (iii) rigors or chills
 - (iv) fever
 - (v) prostration and weakness
 - (vi) myalgia, widespread aches and pains
 - (vii) no significant respiratory physical signs other than redness of nasal mucous membrane and throat
 - (viii) influenza in close contacts.

Australian Capital Territory Sentinel General Practitioner Scheme

The Australian Capital Territory (ACT) Sentinel General Practitioner Scheme is conducted by the ACT Department of Health and Community Care. Seven general practitioners from the ACT reported the number of consultations for influenza and the total consultations for each week (beginning on Sundays). The rate of influenza reporting per 1000 consultations each week was included each fortnight. The case definition was as for ASPREN.

New South Wales Sentinel General Practitioner Scheme

The New South Wales Department of Health conducts sentinel general practitioner surveillance for influenza-like illness each year. In 1994, surveillance involved about 100 general practitioners monitoring about 15,000 weekly consultations in eight Public Health areas - Illawarra, Central and Southern Sydney, Western Sydney and Wentworth, Hunter, Eastern Sydney, North Sydney, Central Coast and Northern Districts.

The weekly rate of influenza reporting per 1000 consultations was included in the *National Influenza Surveillance 1994* report each fortnight. The case definition was all of the following:

- (a) cough
- (b) myalgia
- (c) no abnormal respiratory physical signs other than inflammation of nasal mucous membranes and throat
- (d) two of the following:
 - (i) sudden onset (less than 12 hours)
 - (ii) rigors, chills or fever
 - (iii) prostration or weakness
 - (iv) influenza in close contacts.

Victorian Sentinel General Practitioner Scheme

The Victorian Influenza Surveillance System is managed by the Department of Health and Community Services, Victoria. The sentinel general practitioner surveillance involved 30 general practitioners in the metropolitan and rural areas of Victoria. Fortnightly reports were made of the total number of consultations, the number of patients with influenza, the age and sex of the influenza patients and the postcode of the practice; the total number of influenza consultations and the influenza consultation rate were reported in *CDI*. Twelve of the metropolitan practitioners took throat washings from a maximum of four patients each week for laboratory analysis to provide an estimate of the accuracy of the clinical case definition used.

The case definition is at least four of eight criteria listed in (c) of the ASPREN case definition. In addition, practitioners are asked not to record cases of acute tonsillitis, otitis media, chest infections (that is those with pulmonary crepitations or rhonchi), acute sinusitis or coryza (simple head cold).

ABSENTEEISM SURVEILLANCE

Absenteeism surveillance provides a non-specific measure of the effects of influenza epidemics. The *National Influenza Surveillance 1994* included Telecom Australia sick leave absenteeism surveillance, which had the potential to measure national influenza activity affecting working age adults. Total absenteeism in a selection of schools in the Australian Capital Territory and in New South Wales² was also included, and had the potential to measure activity in children, which is more common with strains which have circulated in previous years.

Telecom Australia Absenteeism Surveillance

Telecom Australia has about 65,000 employees in locations throughout Australia. Each Wednesday, the number of employees absent on sick leave was recorded by the Office of the Chief Medical Officer in Melbourne, and published as part of the *National Influenza Surveillance 1994* report. Telecom processed sick leave forms fortnightly. Availability of final data for a period was dependent on receipt of finalised sick leave

information; interim data were published with a delay of only 12 days, and finalised data with a delay of about two months.

New South Wales Schools Absenteeism Surveillance

The New South Wales Department of Health conducted schools absenteeism surveillance. Each week, about 17 schools, with about 11,000 students, reported their total student absenteeism for the week. The daily average percentage of students absent each week was included in the *National Influenza Surveillance 1994* report.

Australian Capital Territory Schools Absenteeism Surveillance

Schools absenteeism surveillance is conducted by the ACT Department of Health and Community Care. Six schools from throughout the ACT reported the total number of students absent and the total enrolled on each Tuesday. The percentage of students absent each Tuesday was included in the *National Influenza Surveillance 1994* report.

LABORATORY SURVEILLANCE

Laboratory diagnoses of influenza, and in particular influenza virus isolates, constitute the gold standard in influenza diagnosis and the gold standard in surveillance specificity³. In 1994, the *CDI* Virology and Serology Reporting Scheme's influenza reports were incorporated into the *National Influenza Surveillance 1994* reports as the most specific measure of influenza activity. The World Health Organization (WHO) Collaborating Centre for Influenza Reference and Research contributed reports on the results of subtyping of influenza viruses isolated during the season in Australia and elsewhere in the region, providing information on their antigenic characteristics and their relatedness to vaccine strains and strains detected elsewhere in the world.

CDI Virology and Serology Reporting Scheme

There were 18 sentinel laboratories from around Australia that contributed reports to the *CDI* Virology and Serology Reporting Scheme. Each influenza report included the laboratory identification, the date of specimen collection, the type of influenza virus (and subtype if known), the source specimen and information on the methods of isolation, direct identification and/or serology used to make the diagnosis. The age and sex of the patient, postcode and coded clinical information are also usually included. Influenza diagnoses were reported by type and diagnostic method, by week of specimen collection. Some age and sex, State, and clinical information was also included.

WHO Collaborating Centre for Influenza Reference and Research typing results

In 1994, the WHO Collaborating Centre for Influenza Reference and Research located at CSL Limited, Melbourne received virus isolates from throughout Australia and New Zealand, and from South Africa. Detailed antigenic analysis of all isolates was carried out using panels of polyclonal and monoclonal antisera

and a panel of internationally agreed antigens. Updates on information collated about the strains were published in *CDI* at the beginning and the end of the season.

TOTAL DEATHS SURVEILLANCE

During influenza epidemics, there are increases in the number of deaths attributed to influenza, the number attributed to pneumonia and the total number of deaths^{4,5}. Monitoring of total deaths can therefore provide influenza surveillance information which is sensitive to outbreaks caused by strains, such as influenza A H₃N₂, which are associated with high levels of mortality. These data were only collected for Victoria in 1994.

Victorian Total Deaths Surveillance

In 1994, data on fortnightly total numbers of deaths were collected by the Victorian Department of Health and Community Services, and they were reported as a rate per 10,000 population for each fortnight.

HOSPITAL ADMISSIONS FOR INFLUENZA AND PNEUMONIA

Hospital admissions for influenza and pneumonia rise during influenza epidemics, and can therefore be used in influenza surveillance.

Victorian hospital admissions

The Victorian Department of Health and Community Services monitored hospital admissions for influenza and/or pneumonia as part of its influenza surveillance system. In 1994, three hospitals documented all cases admitted with a provisional diagnosis of influenza and/or pneumonia each fortnight. The number of admissions and the rate per 100 admissions were reported in the fortnightly *National Influenza Surveillance 1994* reports.

Results

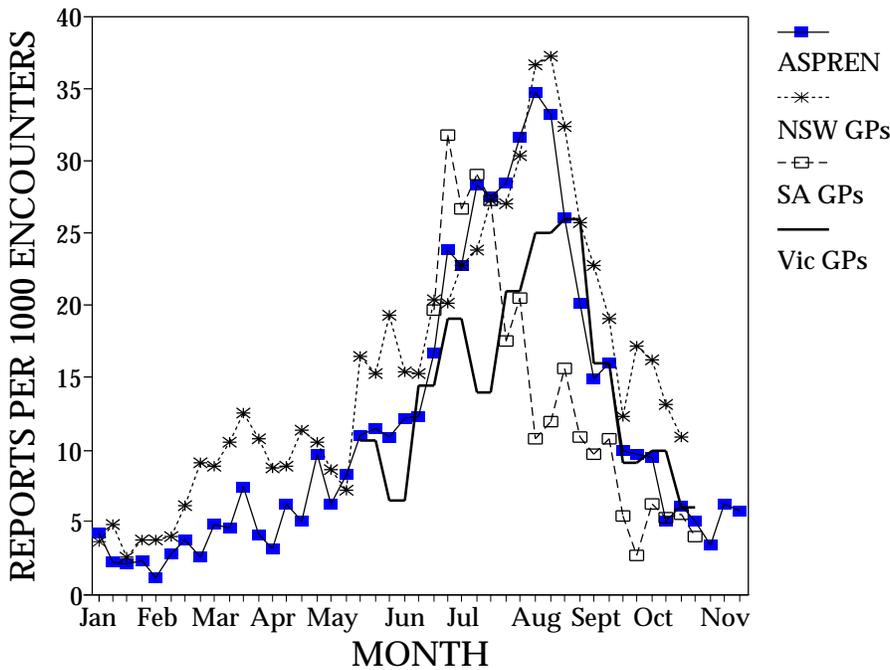
SENTINEL GENERAL PRACTITIONER SURVEILLANCE

The reports of consultations for influenza-like illness by sentinel general practitioners showed a peak in late August in the ASPREN scheme and in the New South Wales scheme and a peak in early September in the Victorian scheme. This surveillance provided a useful marker of influenza activity, demonstrated by the coinciding of the peaks measured by the schemes with the peaks in laboratory influenza isolates. It provided more timely information than the laboratory reporting scheme.

Australian Sentinel General Practice Research Network

The peak influenza activity in 1994, as measured by this scheme, was in late August (Figure 1), and the seasonal pattern was very similar to those recorded by the New South Wales and Victorian sentinel schemes. ASPREN data for South Australia showed a peak in late June coinciding with an outbreak of influenza A in Mount

Figure 1. Influenza cases per 1000 encounters: ASPREN, ASPREN for South Australia only, New South Wales and Victoria, by week



ported by other schemes, perhaps due to the smaller number of practitioners contributing. The reporting delay was only about nine days, so this scheme provided very up to date information.

New South Wales Sentinel General Practitioner Scheme

The New South Wales scheme measured a peak in influenza activity at the same time as ASPREN did for Australia (late August), although there were higher reporting rates in autumn from the New South Wales scheme. The reporting delay was from 14 days, similar to the delay for ASPREN.

Victorian Sentinel General Practitioner Scheme

The Victorian sentinel general practitioners reported a peak in the influenza reports in early September, slightly later than in the ASPREN and New South Wales schemes. The reporting delay was usually 14 days, as for the New South

Wales scheme. Reports were based on fortnights, rather than on weeks.

ABSENTEEISM SURVEILLANCE

Telecom Australia Absenteeism Surveillance

The interim data did not seem to identify any peak in influenza activity in 1994 (Figure 2). There was a slightly higher rate of sick leave absenteeism in the finalised data over the winter period in general, with a small peak at the beginning of August. Reporting delays for interim data were small.

Gambier⁶. Age and sex information was not usually reported; most ASPREN influenza reports have been for persons in the 15 to 44 years age group. The reporting delay (between the last day of the reporting period to the date of publication in *CDI*) was usually 15 days, so this scheme provided very timely information.

Australian Capital Territory Sentinel General Practitioner Scheme

The peak influenza activity measured by this scheme was in late July (data not shown). The rates reported by this scheme fluctuated more widely than those re-

Figure 2. Proportion of Telecom Australia staff on sick leave, by week and data type

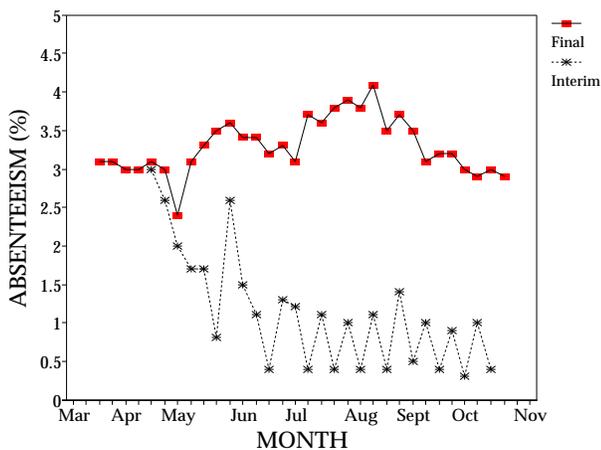
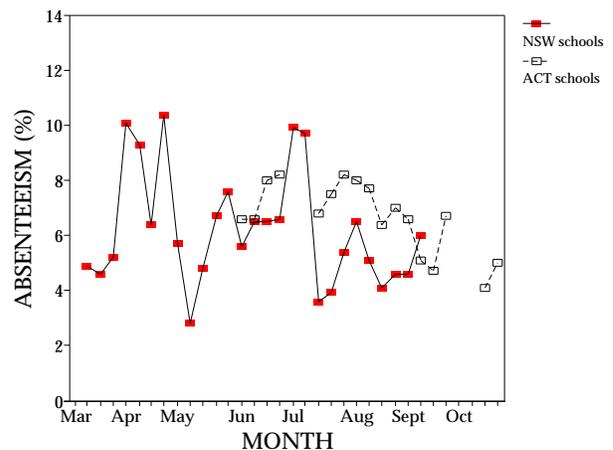


Figure 3. New South Wales and Australian Capital Territory school absenteeism surveillance, by week and scheme



New South Wales Schools Absenteeism Surveillance

The New South Wales schools absenteeism showed no apparent influenza-associated peak in absenteeism in 1994 (Figure 3). There was a reporting delay of between 10 and 22 days.

Australian Capital Territory Schools Absenteeism Surveillance

As for the New South Wales schools, this surveillance did not reveal any influenza-associated increases in absenteeism (Figure 3). There were breaks in the data at times of school holidays, but the reporting delay was only six days.

LABORATORY SURVEILLANCE

CDI Virology and Serology Reporting Scheme

The CDI scheme recorded an influenza season in which influenza A (H₃N₂) dominated. Compared with previous years, it was a moderate season. There were fewer influenza A and A H₃N₂ reports than in 1992, but more than in all the other years in which influenza A H₃N₂ predominated. Markedly increased numbers of reports were received in June, July, August and September, later than in 1992 but about the same as in other years.

There was a peak in influenza A reports diagnosed by methods other than single high titre (which is not as specific) in July and August 1994 (Figure 4). There were 929 reports to 31 October, 617 other than single high titre, and 67 isolates were identified as H₃N₂ subtype, some as A/Guangdong/25/93-like. Peaks were recorded in July in South Australia and in August in New South Wales, Victoria, Western Australia and Queensland. Most 1994 reports were for persons aged less than 25 years (Figure 6).

Figure 4. CDI influenza A laboratory reports, by method of diagnosis and week of specimen collection

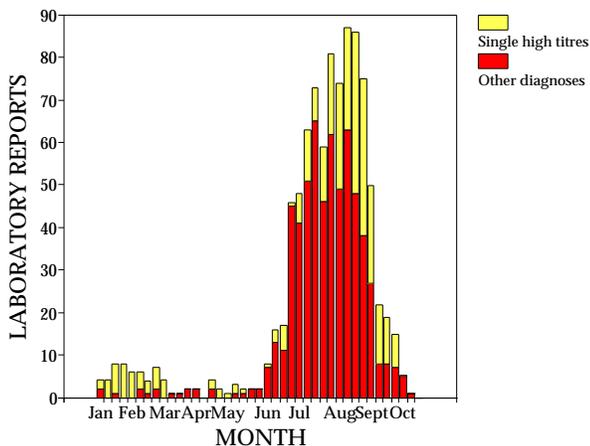
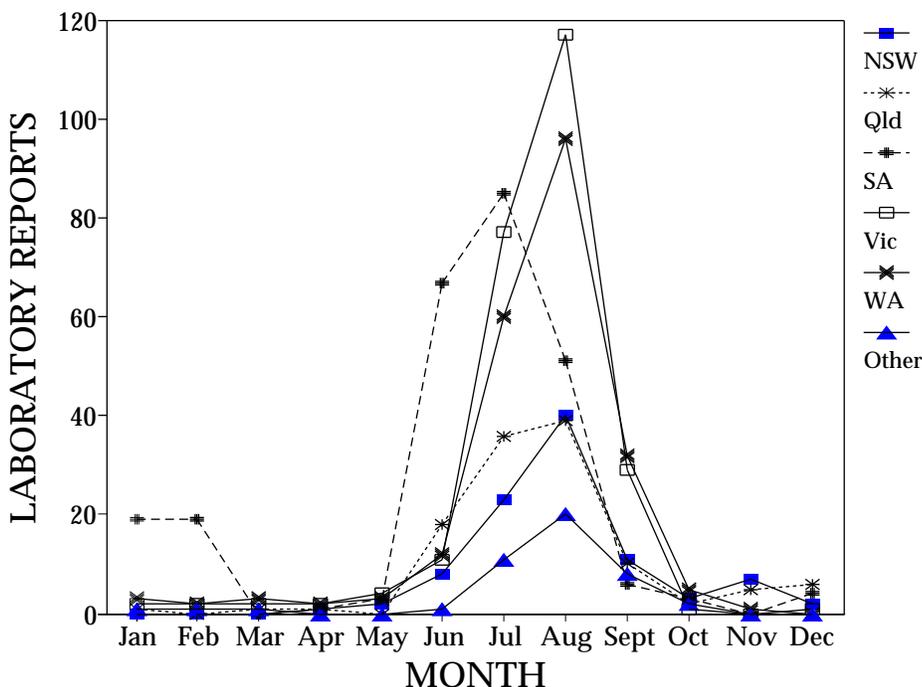


Figure 5. CDI influenza A laboratory reports, by month of specimen collection and State or Territory



There were 45 reports of influenza B in the season, 22 with diagnoses other than single high titres, and no seasonal peak (Figure 7). This was the smallest number of influenza B reported received by the Scheme since 1990.

The reporting delay was up to one to two months, depending on factors such as the method of diagnosis.

WHO Collaborating Centre for Influenza Reference and Research

The majority of influenza isolates received in the 1994 season by the Centre from Australia and New Zealand were influenza A H₃N₂ subtype. A total of 389 isolates were analysed. All showed some antigenic drift away from the 1994 vaccine strain A/Beijing/32/92 and reduced reactivity with A/Beijing antiserum. The vast majority (351) were demonstrated to be most

Figure 6. CDI influenza A laboratory reports, by age group and sex

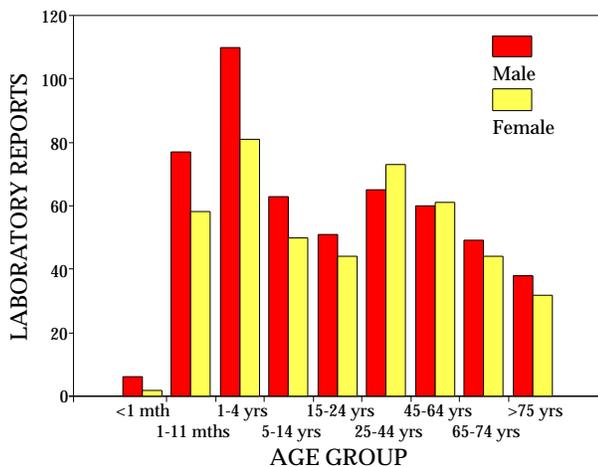
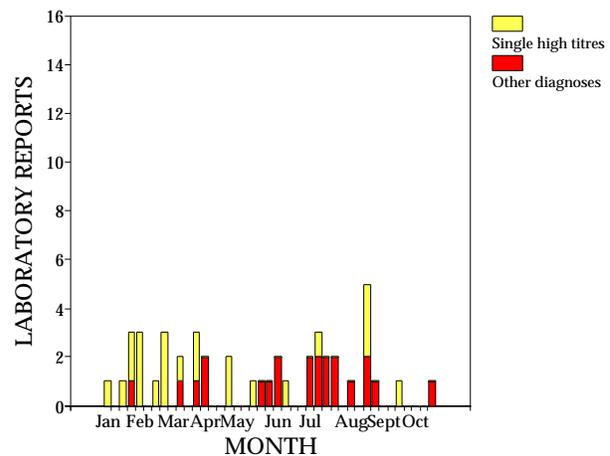


Figure 7. CDI influenza B laboratory reports, by method of diagnosis and week of specimen collection



closely related to the reference strain A/Guangdong/25/93. Small numbers of isolates (eight) were A/Shangdong/9/93-like and some strains were intermediate between these two reference strains.

The Collaborating Centre received only one influenza A H₁N₁ isolate, from New Zealand. It was characterised as A/Texas/36/91-like.

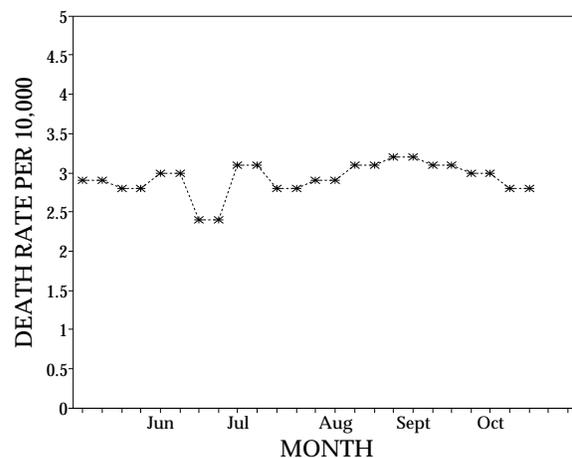
Local influenza B isolates were most closely related to B/Sichuan/8/92 but continued to react strongly with B/Panama antiserum.

TOTAL DEATHS SURVEILLANCE

Victorian Total Deaths Surveillance

Victorian total deaths surveillance data did not reveal a seasonal peak or a peak which seemed to be associated with influenza (Figure 8). The reporting delay was 14 days.

Figure 8. Victorian total deaths per 10,000 population, by fortnight

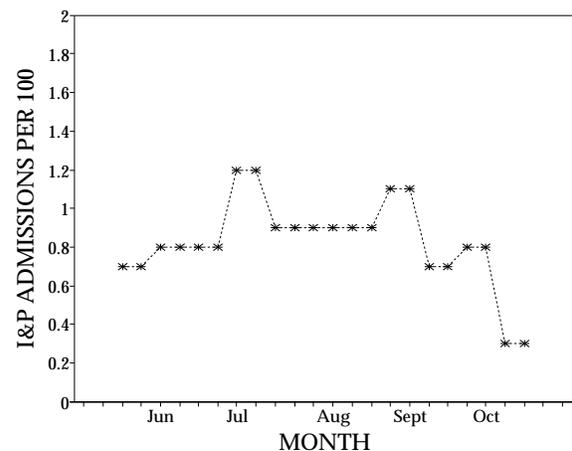


HOSPITAL ADMISSIONS FOR INFLUENZA AND PNEUMONIA

Victorian Hospital Admissions Surveillance

There was no apparent influenza-associated peak in hospital admissions for influenza and pneumonia measured in this scheme in 1994 (Figure 9). The reporting delay was 14 days.

Figure 9. Victorian hospital influenza and pneumonia hospital admissions per 100 admissions, by fortnight



SUMMARY OF THE 1994 RESULTS

Influenza activity was documented at levels above background by the sentinel general practitioner schemes from mid-June to mid-September with a peak in July-August and reporting delays of about two weeks.

Absenteeism surveillance had a small reporting delay but did not document increased absenteeism which appeared to be associated with influenza activity.

Laboratory reports monitored a moderate season, compared with previous years, with reports peaking in July-August. Most diagnoses were of influenza A, subtype H₃N₂, some characterised as

A/Guangdong/25/93-like, and thus drifted slightly from the 1994 vaccine strain.

Victorian total deaths surveillance and influenza and pneumonia admission surveillance revealed no increases that could be attributed to influenza.

Discussion

National influenza surveillance 1994 provided a timely national perspective on influenza activity in Australia in 1994. Retrospective comparison of data from the sentinel general practitioner schemes with data from the specific laboratory schemes show corresponding trends and thus provides some validation of the non-specific Schemes. Some of the surveillance systems are still in the developmental stage with respect to methods or national coverage. However, with time they will provide important baseline information to inform public health action in an epidemic year.

The sentinel general practitioner schemes provided timely information and there was good coverage for New South Wales, Victoria, the ACT and South Australia. The data from the ACT (not shown) demonstrated that if there is a small number of general practitioners contributing to a system there is a potential for the rates to be biased by a localised outbreak of influenza-like illness or individual diagnostic techniques. The data from the sentinel general practitioner schemes could be enhanced in 1995 by the use of uniform case definitions by all participating schemes, increased participation of general practitioners from all jurisdictions, and laboratory validation of a proportion of reported cases.

The utility of data from Telecom Australia absenteeism surveillance was limited by the fortnightly reporting cycles and the delay in receipt of final sick leave reports. While these data and data for school absenteeism showed no apparent trend for 1994, they did provide baseline information on absenteeism that may be useful in an epidemic year.

The laboratory reports continued to provide the most specific information on influenza for the year and to inform the development of the vaccine for the following season. However, these data are limited because of the small number of reports and delays in reporting. In addition there is a testing bias in a sentinel laboratory system, with the young and the elderly probably more likely to be tested for the virus. The *CDI Virology and Serology Laboratory Reporting Scheme* now has data on laboratory confirmed influenza activity since 1978. These data provide a unique baseline by which to measure seasonal influenza activity.

The Victorian total death data were timely. While no seasonal peak was observed this is not unexpected as there was not a severe epidemic in 1994, and possibly because of the relatively small population base involved. This surveillance method has been validated elsewhere^{4,5} and the system will continue and be evalu-

ated over time. The utility of the information may be enhanced if this information were collected for the whole year, allowing for better seasonal comparisons. Data could also be provided from other jurisdictions to improve national coverage and increase the denominator population.

National influenza surveillance will commence next fortnight and incorporate a number of the revisions discussed in this report.

References

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CDI editorial comment

Reports from the northern hemisphere in 1994-1995 showed influenza A H₃N₂, influenza A H₁N₁ and influenza B viruses continued to circulate in many countries in Asia, the Americas and Europe¹. There were few reports of influenza in October-December, but in January and February 1995 influenza activity increased.

Influenza was confirmed for the first time in the 1994-1995 season in an outbreak of influenza B in northern Portugal in October 1994. Elsewhere in Europe, a few cases of influenza A and influenza B were reported during October, November and December 1994. Outbreaks of influenza A H₃N₂ were reported in the United States and in several regions of China during December 1994 and January 1995. By mid-February 1995, 33 countries had reported influenza A and/or influenza B, including eight countries in Asia, four in the Americas and 20 in Europe.

Reference

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