
NATIONAL INFLUENZA SURVEILLANCE 1995

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Abstract

In 1996 data from a number of sources were combined to detect trends in influenza activity in the Australian community. Epidemics of influenza A (H₁N₁) and influenza B were recorded by the laboratory reporting scheme. Influenza activity was reflected in the sentinel general practitioner recording schemes. However schools absenteeism, deaths surveillance and hospital admissions data had only limited coverage and did not reflect any national trend in influenza activity.

Introduction

Influenza is a major public health problem. It has the potential to cause significant morbidity and mortality particularly in those at high risk of complications such as the elderly and those with cardiovascular disease. An effective national surveillance system is an essential component of a program for the control of this disease. The major objectives of such a scheme include:

- early detection of influenza epidemics thus enabling the implementation of public health measures such as the immunisation of at risk groups, and planning for the possible impact on clinical services;
- characterisation of the nature of the epidemic by the collection of morbidity and mortality data and estimation of the impact of the outbreak and control measures such as vaccination campaigns; and
- isolation and antigenic characterisation of influenza viruses for planning the formulation of the following season's vaccine.

Influenza activity has been recorded in Australia by the CDI Laboratory Virology and Serology Reporting Scheme since 1978. Whilst laboratory diagnosis is the most specific marker of influenza activity, the sensitivity of such a scheme is low as laboratory confirmation is only sought in a small proportion of cases. In 1994 national surveillance was expanded to include data from several other sources which provide less specific surveillance information but can be used as surrogate markers of influenza activity.

Throughout the winter of 1995 data were published as *National Influenza Surveillance 1995* in *Communicable Diseases Intelligence*. Reports began on 15 May 1995 and finished on 16 October 1995.

This is the annual report of *National Influenza Surveillance 1995*.

Surveillance methods

Five types of surveillance provided data for *National Influenza Surveillance 1995*. These included laboratory surveillance, sentinel general practitioner surveillance, absenteeism surveillance, laboratory surveillance, total deaths surveillance and hospital admissions for influenza and pneumonia. National coverage was not possible for all of the different types of surveillance.

LABORATORY SURVEILLANCE

Laboratory diagnoses of influenza and in particular influenza virus isolation constitute the gold standard in influenza diagnosis and surveillance specificity¹. In 1995 the CDI Virology and Serology Reporting Scheme's influenza reports were included in the *National Influenza Surveillance 1995* reports as the most specific measure of influenza activity. Twenty-one sentinel laboratories from throughout Australia contributed reports to the CDI Virology and Serology Reporting Scheme in 1995. In addition the World Health Organization Collaborating Centre for Influenza Reference and Research contributed reports on the subtypes of influenza viruses isolated during the season in Australia and elsewhere in the region. This provided information on the degree to which circulating viruses were related to current vaccine strains and strains circulating elsewhere in the world.

SENTINEL GENERAL PRACTITIONER SURVEILLANCE

Four sentinel general practitioner schemes reporting influenza-like illness were included in the *National Influenza Surveillance 1995*: the Australian Sentinel Practice Research Network (ASPREN), the Australian Capital Territory Sentinel General Practice Scheme, the New South Wales Sentinel General Practice Scheme and the Victorian Sentinel General Practice Scheme. Case definitions varied between the schemes.

ABSENTEEISM SURVEILLANCE

Absenteeism surveillance provides a non-specific measure of the effects of influenza epidemics. *National Influenza Surveillance 1995* included Australia Post sick leave absenteeism surveillance which has the potential to measure the impact of influenza activity on the adult population on a national scale. Total absenteeism in a selection of schools in the Australian Capital Territory and in New South Wales was also included. These latter sources of data have the potential to measure the impact of influenza on children of school age.

TOTAL DEATHS SURVEILLANCE

During influenza epidemics increases are observed in the number of deaths attributed to influenza, the number attributed to pneumonia and the total number of

deaths^{2,3}. Surveillance data for total deaths can therefore be used to monitor outbreaks associated with strains of known high mortality such as influenza A H₃N₂. During 1995 these data were collected for Victoria and South Australia.

HOSPITAL ADMISSIONS FOR INFLUENZA AND PNEUMONIA

During influenza epidemics hospital admissions for influenza and pneumonia are known to rise and hence can be used as indicators of influenza activity in the community.

In 1995 the Victorian Department of Health and Community Services monitored hospital admissions for influenza and/or pneumonia as part of its influenza surveillance system.

Results

LABORATORY SURVEILLANCE

CDI Virology and Serology Reporting Scheme

Epidemics of both influenza A H₁N₁ and influenza B were recorded in 1995. Influenza A reports peaked in late June whilst those for influenza B reached a lower peak in August (Figure 1).

Overall it was an average season for influenza A (Figure 2). Reports peaked earlier than has been the case in recent years (Figure 3). Western Australia and the Northern Territory experienced a peak in April, earlier than other States and Territories (Figure 4) whilst re-

Figure 1. Influenza A and B laboratory reports, 1995, by week

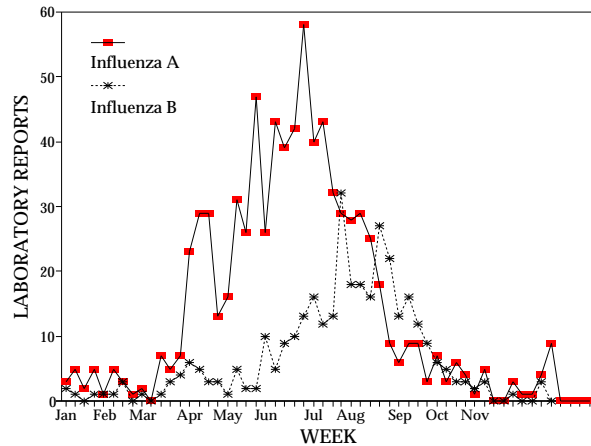


Figure 2. Influenza A and B laboratory reports, 1978 to 1995, by year of specimen collection

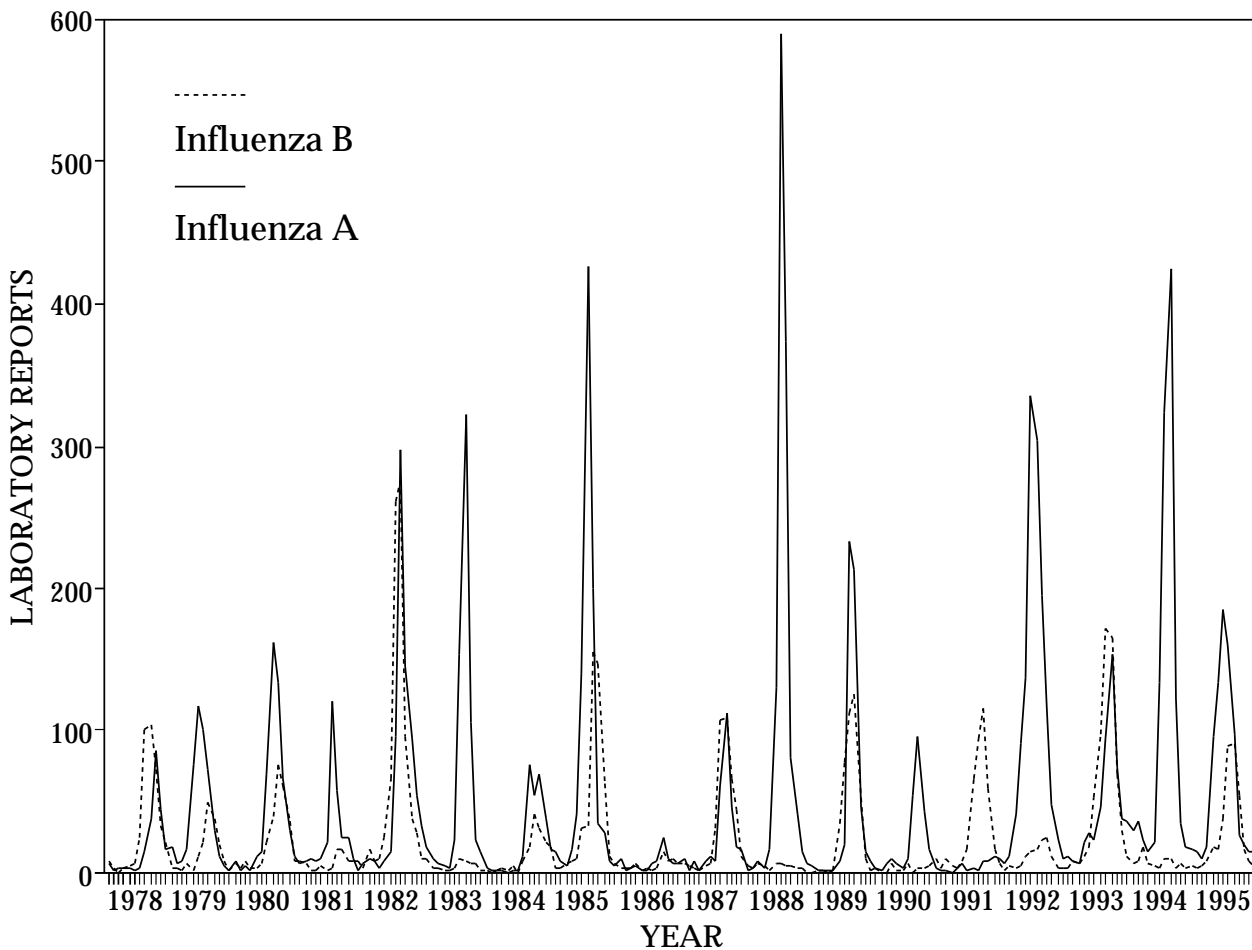


Figure 3. Influenza A laboratory reports, 1990 to 1994 average and 1995, by month of specimen collection

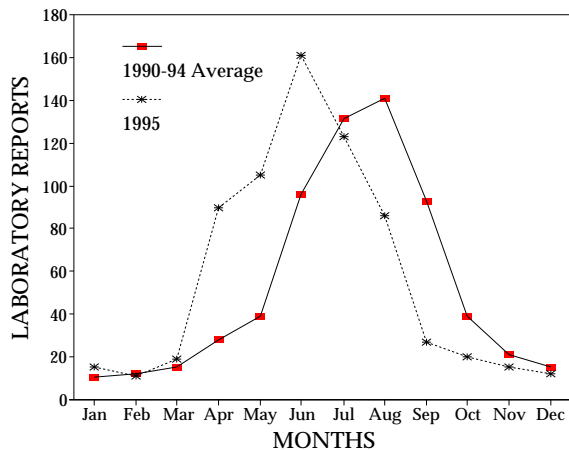


Figure 4. Influenza A laboratory reports, by month of specimen collection and State or Territory

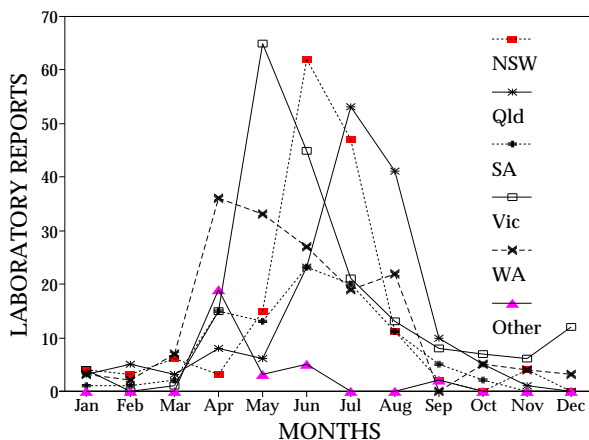
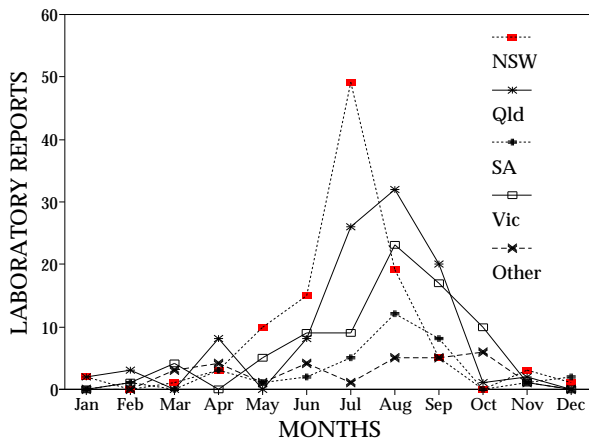


Figure 5. Influenza B laboratory reports, by month of specimen collection and State or Territory



ports from Victoria peaked in May, New South Wales in June and those from Queensland in July. A total of 796 reports of influenza A was received for the year of which 92 (12%) were identified as being H₁N₁ strains. Several of these were sub-typed as A/Texas/36/91-like. Only nine reports of H₃N₂ strains were received, the strain of the remainder being unknown. The male/female ratio was 1.3/1.0 and 10% of reports were for adults over the age of 65 years.

Compared to previous epidemic years the number of influenza B laboratory reports received was moderate. Reports peaked in early August at a time when influenza A reports were declining. An earlier peak was seen in New South Wales than in other States and Territories (Figure 5). For 1995 a total of 354 reports of influenza B was received. Equal numbers of males and females were affected; the male/female ratio was 1.0/1.0 and 8% of reports were for adults over the age of 65 years.

WHO Collaborating Centre for Influenza Reference and Research

Influenza A (H₁N₁)

Some antigenic heterogeneity was observed among isolates with the majority being closely related to the A/Texas/36/91 reference strain and a smaller number of the older A/Taiwan/1/86-like strains. Isolates did, however, display host-adaptive antigenic changes which often differentiate influenza viruses grown in cell culture from those grown in embryonated eggs. This has been a characteristic of the A (H₁N₁) A/Texas-like viruses isolated world-wide in recent years.

Influenza A (H₃N₂)

The small number of Australian isolates were antigenically indistinguishable from the A/Guangdong/25/93-A/Johannesburg/33/94 reference strains.

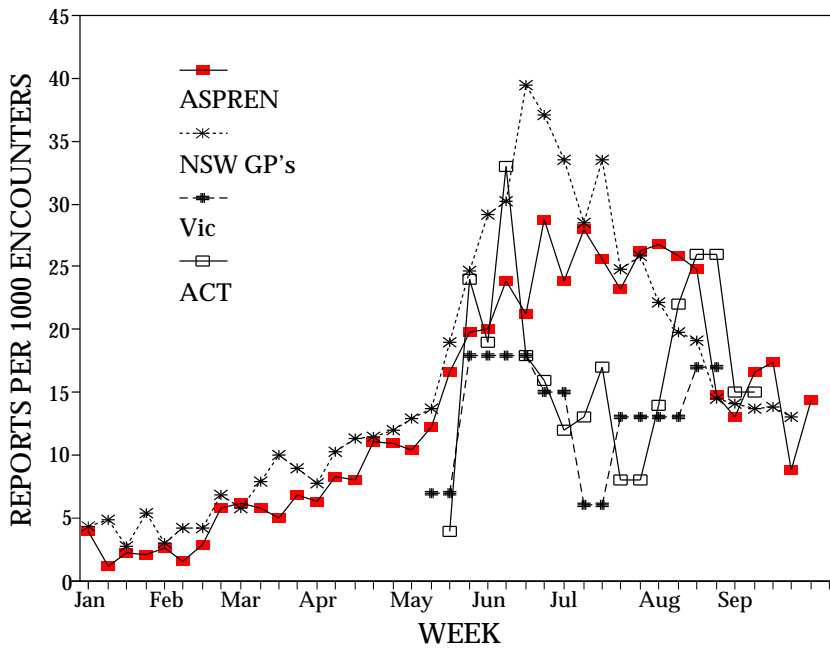
Influenza B

The majority of influenza B isolates displayed significant antigenic drift from the B/Panama/45/90 reference strain and were characterised as B/Beijing/184/93-like viruses.

SENTINEL GENERAL PRACTITIONER SURVEILLANCE

Consultation rates for influenza-like illness reported by general practitioners to the ASPREN scheme rose from June through to early August (Figure 6). For the New South Wales scheme a peak was observed in mid June, indicating a more acute epidemic course than seen nationally in the ASPREN scheme. The rates of influenza activity recorded by the Australian Capital Territory Sentinel General Practitioner Scheme fluctuated with peaks being observed in early June and again in late August. Consultation rates for Victoria remained consistently lower than the other schemes although some fluctuation was observed.

Figure 6. Influenza cases per 1,000 encounters: ASPREN, New South Wales, Victoria and the Australian Capital Territory, by week



ABSENTEEISM SURVEILLANCE

National absenteeism rates reported by Australia Post remained between 2% and 4% throughout the winter months (Figure 7). Rates fell in late June. The New South Wales Schools absenteeism showed a peak rate of 11% in late June. The Australian Capital Territory schools absenteeism surveillance showed a similar pattern to that observed in New South Wales, peaking at the end of June. Schools absenteeism data was not available for the entire period due to school holidays.

DEATHS SURVEILLANCE

Victorian Total Deaths Surveillance fluctuated in 1995 but did not reveal any seasonal peak which could be associated with influenza activity (Figure 8). Whilst the death rates reported by South Australian Deaths Surveillance were higher than those in Victoria overall they followed a similar seasonal trend.

Figure 7. Australia Post and schools absenteeism reports by week and scheme

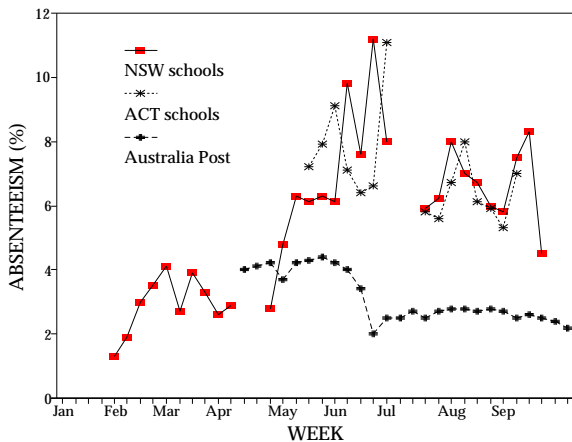


Figure 8. Total deaths per 1,000 population for South Australia and Victoria, by week

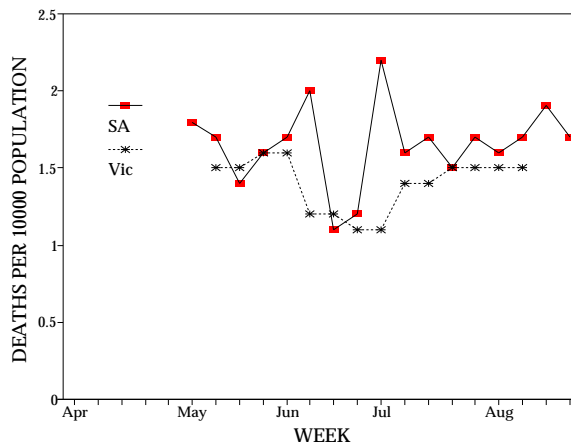
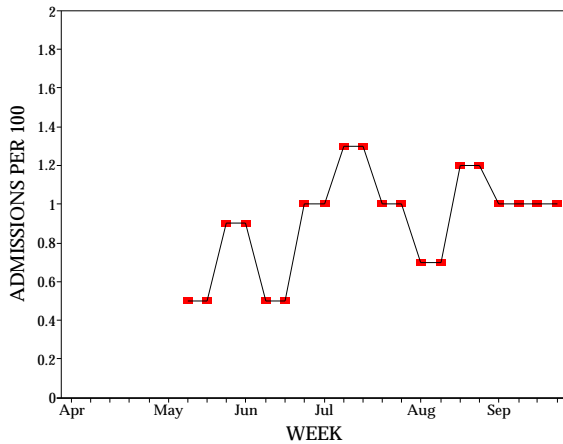


Figure 9. Victorian influenza and pneumonia hospital admissions per 100 admissions,



HOSPITAL ADMISSIONS FOR INFLUENZA AND PNEUMONIA

Victorian Hospital Admissions Surveillance

The rate of hospital admission for influenza and pneumonia recorded by this scheme demonstrated no apparent trend which could be attributed to influenza activity (Figure 9).

Discussion

In 1995 in Australia moderate epidemics of both influenza A and B were observed. The occurrence of epidemics of the two virus types in a single year is not unusual, these having been most recently observed 1989 and 1993.

Although the laboratory system is a sentinel one, seasonal trends in influenza activity are reflected in the data. As in previous years laboratory reports provided the most specific information on influenza activity in Australia in 1995 and therefore this method remains the standard for influenza surveillance. There were two distinct outbreaks, influenza A in June and influenza B in August. The last epidemic year for influenza A H₁N₁ was in 1988 in Australia. In the 1995-1996 northern winter epidemics of this strain were recorded in Canada, Japan and most regions of the United States of America⁵. The majority of these isolates were antigenically similar to the A/Texas/36/91-like strains reported in Australia. This concurs with the view that outbreaks in the Southern hemisphere may predict the type of virus which will occur in the northern hemisphere the following winter⁶.

Epidemics of influenza B tend to occur in alternate years in Australia⁷. As expected there was an outbreak of this virus in 1995. By contrast only sporadic cases of influenza B were reported in North America, Europe and Asia in the 1995-1996 northern winter⁵.

The sentinel general practitioner schemes provided timely information on reports of influenza-like illness in Australia. A similar seasonal pattern was observed in the ASPREN and the New South Wales schemes but differed from that in Victoria and the ACT. The small number of practitioners involved in the ACT scheme may result in a reporting bias. It would be useful to combine the ACT figures with those for New South Wales. Overall influenza activity was highest in the ASPREN and New South Wales schemes at the end of June, similar to the peak in laboratory reports of influenza A but somewhat earlier than in 1994 when reports peaked in late August⁴.

National absenteeism rates reported by Australia Post remained between 2% and 4% throughout the winter months, similar to the national Telecom figures in 1994⁴. However it was not possible to correlate the rates with influenza activity. Schools absenteeism data are difficult to interpret due to breaks in data collection during school holidays. Also these data were only available from New South Wales and the Australian Capital Territory. Schools and industrial absenteeism are known to be insensitive and late indicators of influenza activity⁶. Due to limited coverage the schools absenteeism data component of *National Influenza Surveillance* should be reviewed.

Deaths surveillance data was only available for two States, Victoria and South Australia, and is therefore not representative of the country as a whole. The lack of correlation between influenza activity and deaths surveillance may be due to the fact that few reports of influenza A H₃N₂, which is known to be associated with high mortality, were received in 1995. Whilst this surveillance method has been validated elsewhere^{2,3}, due to limited coverage its contribution to *National Influenza Surveillance* is difficult to assess.

Hospital admissions data for influenza and pneumonia were only available from three hospitals in Victoria. This limited source of data is costly to collect and it is unlikely that more complete national coverage can be obtained in the near future. It is therefore recommended that the inclusion of these data in *National Influenza Surveillance* be reviewed.

Conclusion

National Influenza Surveillance will continue in the winter of 1996. Whilst laboratory data continues to form the cornerstone of the scheme, data on influenza-like illness reported by sentinel general practitioners provides a non-specific indicator of influenza activity in the Australian community. In order to optimise the use of resources, contributors to this scheme should review data sources in the light of their value in *National Influenza Surveillance*. This should be done in conjunction with the Communicable Diseases Network of Australia New Zealand.

Acknowledgements

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References

1. Dab W, Quenel P, Cohen JM, Hannoun C. A new influenza surveillance system in France: the Ile de France "GROG". 2. Validity of the indicators (1984-1989). *Eur J Epidemiol* 1991;7:579-587.
2. Scragg R. Effect of influenza epidemics on Australian mortality. *Med J Aust* 1985;142:98-102.
3. Curwen M, Dunnell K, Ashley J. Hidden influenza deaths. *BMJ* 1990;300:896.
4. Hargreaves J, Longbottom H, Curran M. National influenza surveillance 1994 - annual report. *Comm Dis Intell* 1995;19:211-217.
5. Recommended composition of influenza virus vaccines for use in the 1996-1997 season. *Wkly Epidemiol Rec* 1996;71:57-61.
6. Betts R F. Influenza virus. In: Mandell G L, Bennett J E, Dolin R editors. *Principles and practice of infectious diseases*. New York: Churchill Livingstone 1995:1546-1567.
7. Curran M. Annual Report of the CDI Virology and Serology Reporting Scheme, 1994. *Comm Dis Intell* 1995;23:590-615.