COMMUNICABLE DISEASES INTELLIGENCE

ISSN 0725 - 3141 VOLUME 20 NUMBER 6 18 March 1996

CONTENTS

ARTICLES **Page**

Editor : Helen Longbottom

COMMONWEALTH
DEPARTMENT OF
HEALTH AND FAMILY SERVICES

Editorial Advisory Board : Charles Watson (Chair), Margaret Burgess, Scott Cameron, Gavin Frost, Jeffrey Hanna, John Kaldor, Margery Kennet, Christine Robert

Editorial and Production Staff : Margaret Curran,Graeme Oliver, Scott Crerar, Ana Herceg, David Evans, Htoo Myint, Matthew Gooden, Emma Wood, Michelle Wood, Heather Mortlock, Julie Borella

Contributions covering any aspect of communicable diseases are invited. Instructions to authors can be found in CDI 1995; 20: 13.

CDI is produced fortnightly by the AIDS/Communicable Diseases Branch, Department of Health and Family Services, GPO Box 9848 Canberra ACT 2601, Fax: (06) 289 7791 Telephone : (06) 289 1555

CDI is available on the CDI Bulletin Board System on (06) 281 6695, and via Internet on 'ftp://ftp.health.gov.au' in directory /pub/CDI and on 'http://www.health.gov.au' in '/hsh/pubs/cdi/cdihtml.htm.'

AN OUTBREAK OF ROSS RIVER VIRUS DISEASE IN THE SOUTH-WEST OF WESTERN AUSTRALIA

Michael Lindsay[1], *Nidia Oliveira*[1], *Eva Jasinska*[1], *Cheryl Johansen*[2], *Susan A Harrington*[3], *AE (Tony) Wright*[3] *and David Smith*[4]

Abstract

An outbreak of Ross River virus disease is occurring in the south-west of Western Australia. Over 500 serologically confirmed cases were reported from November 1995 to February 1996. The main regions affected by the mosquito-borne disease are communities on the Swan Coastal Plain south of Perth. Cases have also been reported from towns further south or inland and from Perth itself. We present a preliminary overview of the number of human cases, mosquito and virus activity and environmental conditions prior to and during the outbreak.

Introduction

The south-west of Western Australia has been the site of a number of outbreaks of Ross River virus (RRV) disease, most notably in 1988/89 and 1991/92[1,2]. A new outbreak occurred in the summer of 1995/96. While there are similarities between the outbreaks, there are some differences in the timing and location of virus activity in the current outbreak.

Methods

The University of Western Australia Department of Microbiology holds a database of cases of Ross River virus infection. The database has two sources of information. The first is notifications of Ross River virus infection reported to the Health Department of Western Australia by doctors under the State public health legislation. Where available these include case follow-up questionnaires carried out by Environmental Health Officers from relevant local authorities.

The database also includes reports of RRV infection from the Western Australian Centre for Pathology and Medical Research and a number of private pathology laboratories. These reports are cross-checked against the Health Department notifications. A small number of cases diagnosed by State and private laboratories, but not notified, are included in the database.

Monitoring of adult mosquito populations and RRV activity is carried out routinely by the University of Western Australia Department of Microbiology at up to 40 sites between Rockingham and Dunsborough (50-260 km south of Perth) each fortnight through spring and summer. In addition, saltmarsh mosquito breeding sites are regularly monitored by local authorities and Health Department personnel.

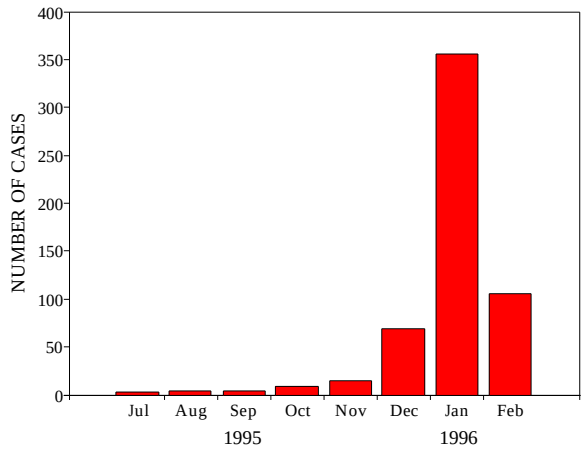
Results

The outbreak commenced in late 1995 and peaked in January 1996 (Figure 1). A total of 545 cases was reported between November 1995 and February 1996. Almost 65% of the cases reported to the end of February had dates of onset in January 1996.

The worst affected areas, in terms of total numbers of cases and case attack rates, were coastal towns and communities south of Perth. These include the area around the Leschenault Inlet (including the City of Bunbury) and the Shires of Capel and Busselton (Table 1). These regions are popular tourist destinations during the summer holidays.

A number of cases also occurred in Perth. Many of these were from semi-rural, outer-lying suburbs, but some were from suburbs closer to the city centre. Follow-up

Figure 1. Serologically confirmed cases of Ross River virus disease in the south-west of WA, by month of onset, July 1995 to February 1996



1. Department of Microbiology, The University of Western Australia, QE II Medical Centre, Nedlands, WA, 6907.
2. Department of Microbiology, The University of Queensland, Brisbane, Qld.
3. Medical Entomology Section, Environmental Health Branch, The Health Department of Western Australia, WA.
4. Division of Microbiology and Infectious Diseases, Western Australian Centre for Pathology and Medical Research WA.

Table 1. Cases of Ross River virus disease by month of onset and geographical region in the south-west of WA, July 1995 to February 1996[1]

Region	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Total
Metropolitan area	1	1			6	23	99	17	147
Peel		1	3	1	1	8	34	9	57
Leschenault	2			1	3	9	114	30	159
Capel / Busselton				2	1	26	73	20	122
Inland / south coast		2		1	2	3	30	27	65
North / east of Perth			1	4	2		5	3	15
Total	3	4	4	9	15	69	355	106	565

1. Cases are recorded by most likely region of exposure where available (from case follow-up) or by region of residence otherwise. Data are incomplete.

information available to date shows that a considerable proportion of metropolitan cases were exposed in the south-west, particularly in the Leschenault, Capel and Busselton regions. However, there were also many cases from Perth that appear to have been locally acquired.

A substantial number of cases were reported from the Peel region, surrounding the Peel Inlet and Harvey Estuary.

Widespread breeding of *Aedes camptorhynchus* (larvae) was observed in the Capel-Busselton region in late October 1995. This prompted a media release by the Health Department, warning of an increased risk of transmission of RRV in the south-west. Unfortunately, almost no larval mosquito control was carried out in the worst-affected regions.

The adult mosquito monitoring program subsequently showed that extremely large populations of *Ae. camptorhynchus* survived through November and December (Figure 2). During the corresponding 1994 / 95 season, when almost no human cases were reported, far fewer mosquitoes were trapped (Figure 3). The number of mosquitoes collected per trap per night in the Capel-Busselton region during November and December 1995 (up to 10,000 mosquitoes per trap at some sites) is unprecedented in the five years of surveillance in the region. Similar results were obtained in the Leschenault region. These observations, along with the expected seasonal exodus of city dwellers to these areas during the Christmas holidays, prompted a second warning by the Heath Department in December 1995.

Fourteen isolates of RRV were obtained from *Ae. camptorhynchus* mosquitoes collected at a major wetland west of Busselton on 7 December 1995 (Figure 2). Large populations of potential vertebrate hosts (western grey kangaroos; *Macropus fuliginosus*) were also observed in close proximity to this site throughout spring and summer. Case follow-up indicates that a large percentage of Busselton cases were exposed in this locality. The last time that RRV was isolated from this site was during the 1991 / 92 outbreak in the region.

Table 2. Isolations of Ross River virus from mosquitoes collected in the Peel region, September 1995 to January 1996

Date	Species	Isolates of RRV
14.09.95	*Ae. camptorhynchus*	1
24.10.95	*Ae. camptorhynchus*	2
7.12.95	*Ae. camptorhynchus*	1
27.12.95	*Ae. camptorhynchus*	5
15.01.96	*Ae. camptorhynchus*	2
15.01.96	*Ae. vigilax*	3

Mosquito populations in the Capel-Busselton region and most areas of the Leschenault region decreased by mid January 1996. However, further human cases with dates of onset in February have been reported.

Several isolates of RRV were also obtained from mosquitoes collected in the Peel region, including some from *Aedes vigilax* (Table 2).

Analyses of environmental conditions prior to and during the outbreak are not yet complete. However, record high October daily rainfall was reported at numerous centres in the south-west. Above average rains occurred in November in Perth and in December in Mandurah, Bunbury and Capel-Busselton. These were accompanied by above average October and November temperatures at many south-west centres. A series of extremely high tides was also recorded along the Peel-Leschenault region coast around 20 December. This resulted from unusually early cyclonic activity along the north and west coasts of WA during December.

A small number of cases of Barmah Forest virus infection were diagnosed during the current outbreak. Numerous cases of a RRV-like illness were also reported, as was seen during the 1988 / 89 and 1991 / 92 outbreaks. Sera from these patients have been tested for IgM antibody to RRV and Barmah Forest virus but were negative for both.

Figure 2. Mean number of adult mosquitoes (total population and dominant species) and isolations of Ross River virus from mosquitoes at Capel-Busselton region wetland sites, January 1995 to January 1996

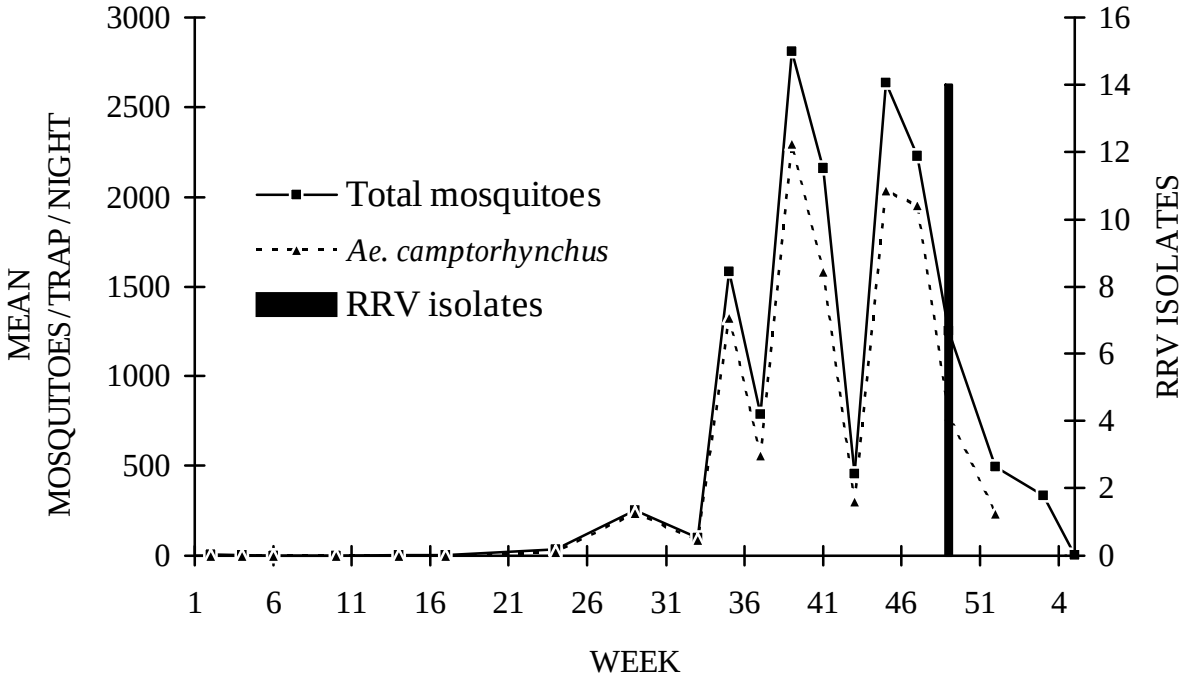
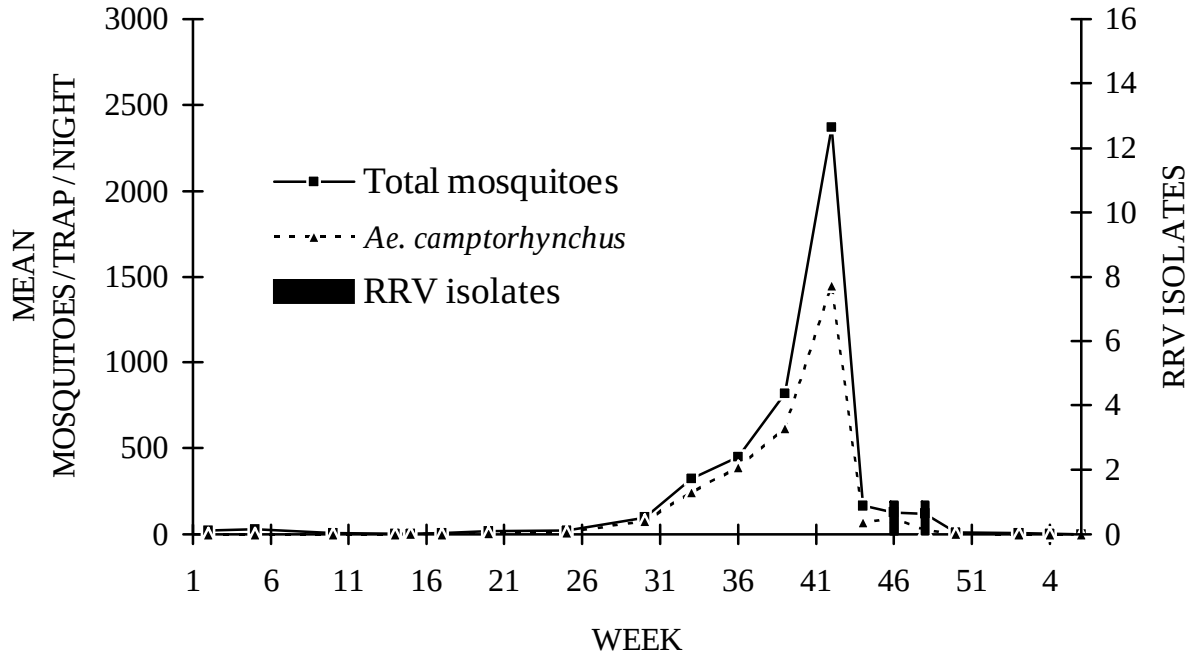


Figure 3. Mean number of adult mosquitoes (total population and dominant species) and isolations of Ross River virus from mosquitoes at Capel-Busselton region wetland sites, January 1994 to April 1995



Discussion

Monitoring of the incidence of human disease provided no indication of abnormally high levels of RRV activity in Western Australia until mid December 1995 when the number of reported cases began to rise sharply. In contrast, monitoring of mosquito breeding sites, adult mosquito populations and environmental conditions in late October and November 1995 showed there was potential for high levels of virus transmission.

This outbreak appears to have had a very rapid onset. However, further notifications and analysis of follow-up of cases for January and February may alter the epidemic curve. Previous south-west outbreaks also peaked in January or February but were considerably less acute. In addition, the number of notified cases is almost certainly an under-estimate of the true number of cases.

It appears that many holiday-makers from elsewhere in the south-west, as well as locals, were exposed to infected mosquitoes during the Christmas-New Year period. There are also many cases from Perth that appear to have been locally acquired. This was also the case during the two previously reported outbreaks.

The Peel region reported far fewer cases by late February than during the 1988/89 and 1991/92 outbreaks. During 1988 and 1991 virus activity in the Peel outbreaks commenced earlier than in the Leschenault and Capel-Busselton region. This is apparently not the case during the current outbreak. The reasons for these differences are not yet clear but it is of note that extensive control of saltmarsh mosquito breeding has been carried out in the Peel region this season.

Large saltmarshes and brackish wetlands in the Peel, Leschenault, Capel and Busselton regions provide an ideal breeding habitat for *Ae. camptorhynchus* mosquitoes[3,4]. This species is the major vector of RRV in the south-west of Western Australia. Surveillance during previous outbreaks has clearly shown that the risk of RRV transmission in coastal regions of the south-west increases markedly if large populations of adult *Ae. camptorhynchus* persist into late spring and summer[1,2].

The recent isolations of RRV from *Ae. vigilax* are of particular concern. This species is regarded as the major vector of RRV in coastal areas of northern and eastern Australia[5,6] but until now has had little or no role in transmission of RRV in the south-west[1,2]. *Ae. vigilax* has become the dominant species in the Peel region between December and March since the opening of the Dawesville Channel. It is a vicious biter, even during the day if weather conditions are suitable, and is known to disperse considerable distances from breeding sites. Thus, the potential for interaction between infected mosquitoes and humans in the Peel region may be greater and occur over a wider area than originally thought.

It is likely that a combination of environmental factors enabled widespread breeding and survival of vector mosquito species. Late spring and summer rains, a short-term rise in sea level (accompanied by higher tides) and mild spring and summer temperature conditions were predisposing factors during previous outbreaks in the south-west[1,2,6].

Preliminary analysis of the location of virus activity (measured as either human cases or isolations from mosquitoes) indicates that activity is far less likely in regions where virus activity was detected in the previous season. Thus, length of time since the previous outbreak may be a predisposing factor for higher levels of virus activity in the south-west. The reason for this is not yet known but may be due to higher levels of immunity in recently infected populations of enzootic or amplifying vertebrate hosts. This may help to explain the comparatively reduced numbers of cases in the Peel region this season following elevated levels of virus activity last year that coincided with the opening of the Dawesville Channel.

Some of the cases of RRV-like illness may represent individuals that had not seroconverted at the time of the first blood sample. However, many have since provided further samples, all of which have tested negative. Sera from these patients are currently being tested against a wide range of other Australian arboviruses and more samples will be sought to ensure that the phenomenon is not due to an extremely delayed immunological response to RRV.

References

1. Lindsay MD, Condon R, Mackenzie JS, *et al.* A major outbreak of Ross River virus infection in the south-west of Western Australia and the Perth Metropolitan area. *Comm Dis Intell* 1992; 16: 290-294.

2. Lindsay MD, Latchford JA, Wright AE Mackenzie JS. Studies on the ecology of Ross River virus in the south-west of Western Australia. *Arbovirus Research Aust* 1989; 5: 28-32.

3. Wright AE. *Report on the mosquito eradication campaign: survey of mosquitoes in the Bunbury region, WA.* Perth: Health Department of Western Australia, 1986.

4. Wright AE. *Report on the mosquito eradication campaign: survey of mosquitoes in the Mandurah region, WA.* Perth: Health Department of Western Australia, 1988.

5. Mackenzie JS, Lindsay MD, Coelen R.J, *et al.* Arboviruses causing human disease in the Australasian zoogeographic region. *Arch Virol* 1994; 136: 447-467.

6. Russell RC. Ross River virus: disease trends and vector ecology in Australia. *Bull Soc Vector Ecology* 1994; 19: 73-81.

NATIONAL INFLUENZA SURVEILLANCE 1995

Margaret Curran for the National Influenza Surveillance Scheme; AIDS/Communicable Diseases Branch, Department of Health and Family Services, GPO Box 9848, Canberra, ACT 2601

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 (H_1N_1) 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 particulary 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 Ocotber 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 specificity[1]. 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 H_3N_2. 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 H_1N_1 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

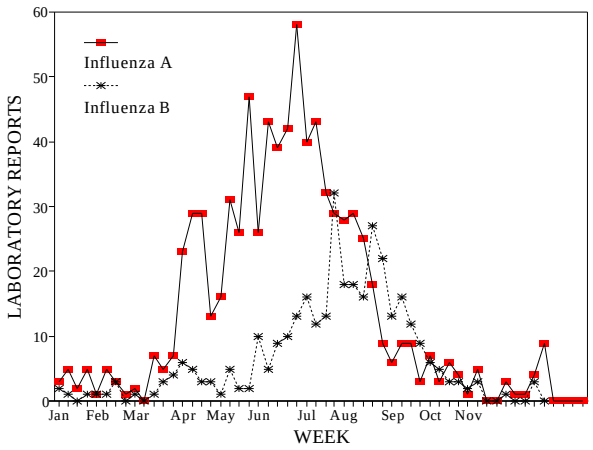


Figure 2. Influenza A and B laboratory reports, 1978 to 1995, by year of specimen collection

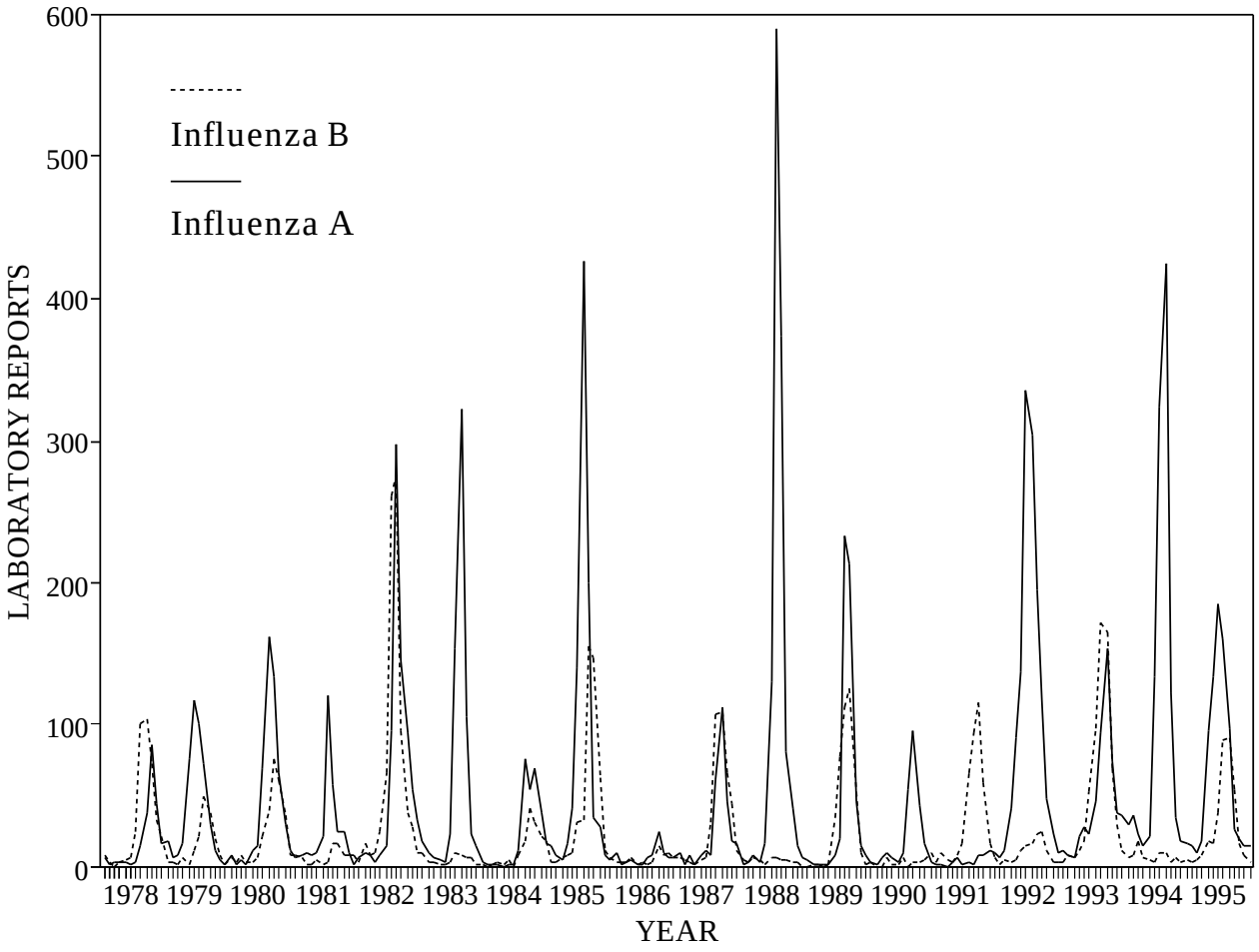


Figure 3. Influenza A laboratory reports, 1990 to 1994 average and 1995, by month of specimen collection

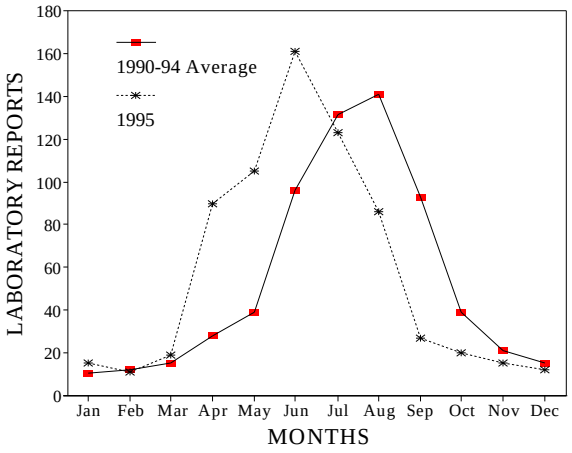


Figure 4. Influenza A laboratory reports, by month of specimen collection and State or Territory

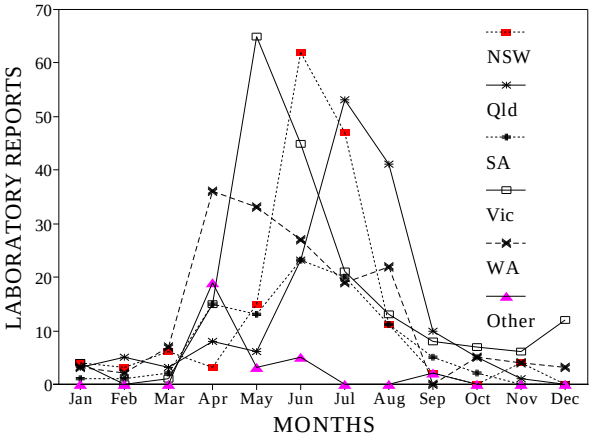
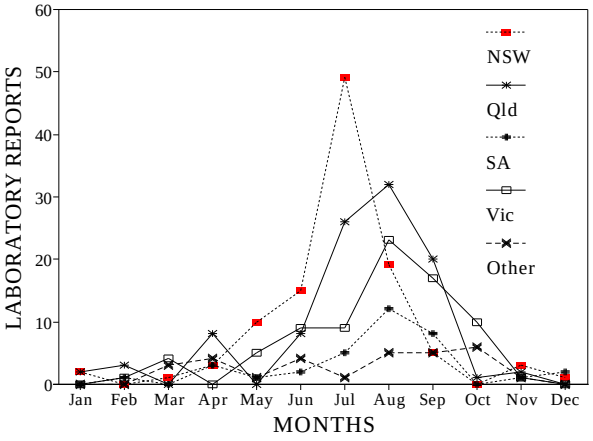


Figure 5. Influenza B laboratory reports, by month of specimen collection and State or Territory



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 H_1N_1 strains. Several of these were sub-typed as A / Texas / 36 / 91-like. Only nine reports of H_3N_2 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 (H_1N_1)

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 (H_1N_1) A / Texas-like viruses isolated world-wide in recent years.

Influenza A (H_3N_2)

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

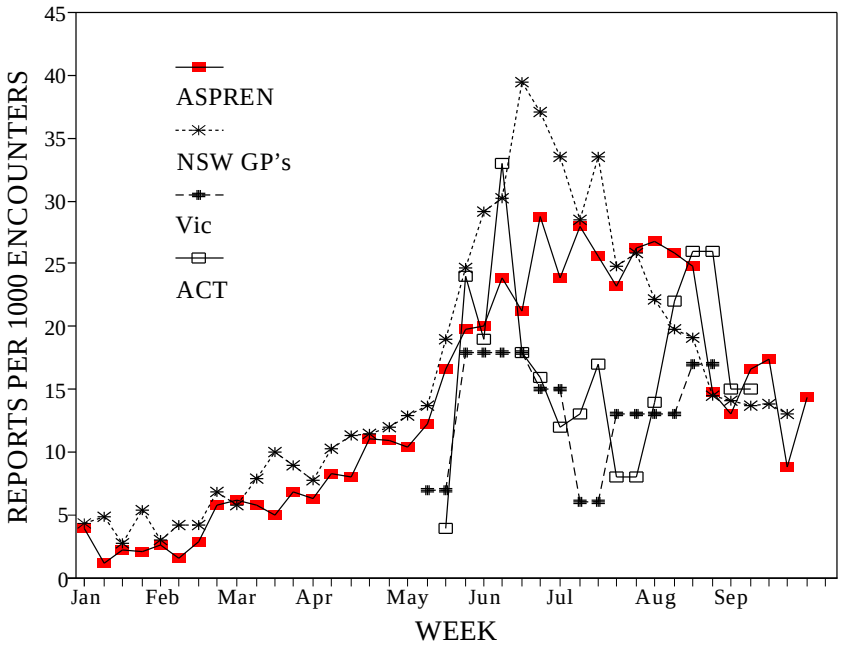
Influenza B

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

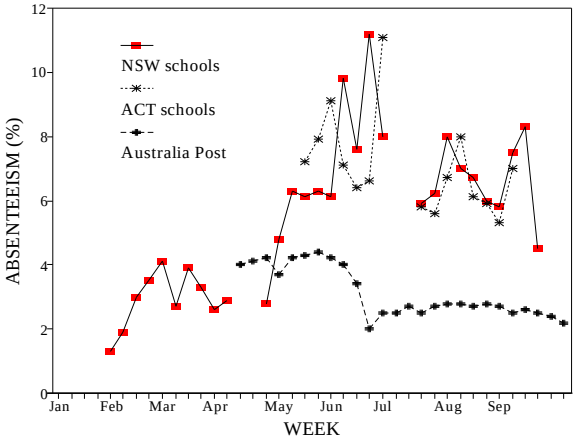


Figure 8. Total deaths per 1,000 population for South Australia and Victoria, by week

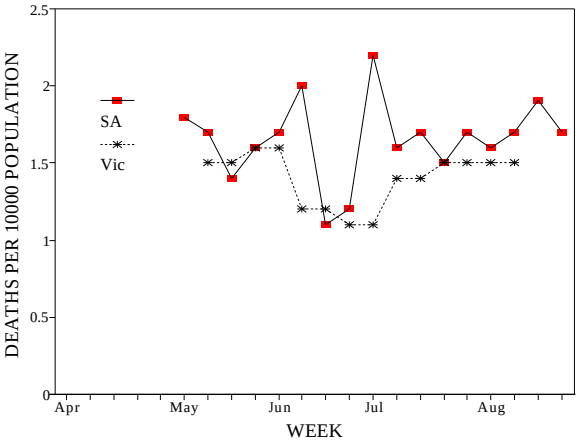
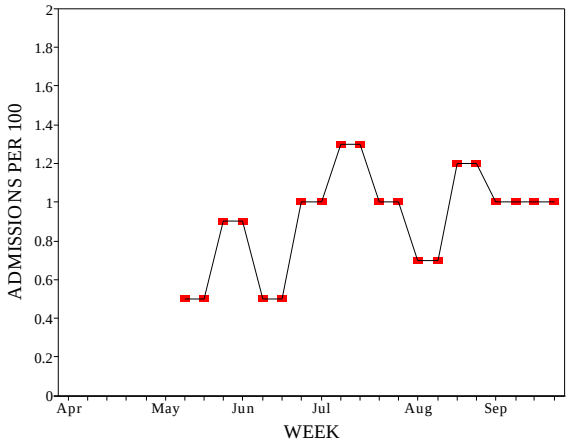


Figure 9. Victorian influenza and pneumonia hospital admissions per 100 admissions,



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 occurence 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 H_1N_1 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 America[5]. 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 winter[6].

Epidemics of influenza B tend to occur in alternate years in Australia[7]. 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 winter[5].

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 August[4].

National absenteeism rates reported by Australia Post remained between 2% and 4% throughout the winter months, similar to the national Telecom figures in 1994[4]. 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 activity[6]. 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 H_3N_2, 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

I would like to thank Jenny Hargreaves for her contribution to the running of this scheme. I would also like to thank all contributors for the time they have invested in the collection of these data. They include: the Australian Capital Territory Department of Health; Australian Sentinel Practice Research Network; *Communicable Diseases Intelligence* Virology and Serology Reporting Scheme Contributing Laboratories; New South Wales Department of Health; Australia Post; Victorian Department of Health and Community Services; World Health Organization Collaborating Centre for Influenza Reference and Research, Melbourne.

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.

INFLUENZA VACCINE FORMULA FOR THE NORTHERN WINTER 1996-1997

Adapted from Weekly Epidemiological Record 1996;71:57-62

The new composition of the influenza vaccines for the 1996-1997 northern season has been announced by international experts meeting at World Health Organization headquarters. Scientists are constantly challenged to identify newly emerging strains of influenza viruses, so that effective vaccines can be formulated in time. Compared with last year's recommendations, one of the three influenza vaccine components has been changed.

Influenza activity, October 1995-February 1996

Epidemics of influenza were reported between October 1995 and February 1996 in many countries in Europe, North America, and Asia. After a few reports in October 1995, influenza activity increased in November and reached a peak in December or January. By February, influenza had declined in most countries. Influenza A viruses have been widespread and caused moderate to severe epidemics affecting mainly children and young adults. European countries and China reported predominantly influenza A(H_3N_2) while influenza A(H_1N_1) caused epidemics in Canada, Japan and most regions of the United States of America.

Influenza A(H_3N_2)

The first outbreaks of influenza A(H_3N_2) were reported in boarding schools in England in September and October. The disease spread in the United Kingdom and appeared in other European countries during November and December, causing epidemics across most of the continent (Belarus, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Latvia, Netherlands, Norway, Slovakia, Spain, Sweden and United Kingdom), as well as in Madagascar and the United States. Outbreaks of influenza A(H_3N_2) started in Beijing towards the end of December and spread to six provinces in China during January. Isolates of influenza A(H_3N_2) virus were also reported in Canada, Europe (Belgium, Iceland, Ireland, Italy, Poland, Portugal, Russian Federation and Switzerland), Asia (Hong Kong, Japan and Singapore) and Oceania (Australia, Guam and New Zealand).

Influenza A(H_1N_1)

Influenza A(H_1N_1) caused a widespread epidemic in Japan and was, overall, the predominant virus in North America (Canada and the United States) and parts of Europe (Belgium, southern France and Switzerland). These viruses were also detected elsewhere in Asia (China, Hong Kong, Israel and Thailand) and Europe (Finland, Germany, Italy, Latvia, Netherlands, Poland, Romania, Russian Federation, Spain, Sweden and United Kingdom).

Influenza B

Sporadic cases of influenza B have been reported in North America (Canada and United States), in Asia (China, Hong Kong, Israel, Japan and Singapore) and

Table 1. Haemagglutination-inhibition test results of influenza A(H_3N_2) viruses

	Post-infection ferret sera			
Antigens	A / Johannesburg / 33 / 94	A / Thessalonika / 1 / 95	A / Alaska / 10 / 95	A / Wuhan / 359 / 95
A / Johannesburg / 33 / 94	**1280**	1280	160	80
A / Thessalonika / 1 / 95	640	**1280**	160	160
A / Alaska / 10 / 95	320	640	**1280**	640
A / Wuhan / 359 / 95	80	160	160	**640**
Recent isolates				
A / Johannesburg / 36 / 95	1280	1280	320	80
A / England / 409 / 95	1280	1280	320	80
A / Netherlands / 223 / 95	1280	1280	320	80
A / Idaho / 4 / 95	320	ND	320	40
A / Shenzhen / 262 / 95	160	ND	1280	640
A / New York / 95 / 96	160	ND	320	1280
A / Shanghai / 15 / 95	160	ND	640	320
A / Hong Kong / 55 / 95	160	320	ND	640
A / Singapore / 62 / 95	320	320	ND	320
A / Shanghai / 9 / 95	80	160	160	320
A / Nanchang / 7118 / 95	80	160	160	640
A / Guam / 291 / 95	160	ND	320	1280

ND = Not Done

in Europe (Belarus, Bulgaria, Finland, France, Germany, Greece, Hungary, Netherlands, Poland, Romania, Russian Federation, Sweden, Switzerland and United Kingdom). A few isolates in Oceania (Australia and New Zealand) have also been reported.

Antigenic characteristics of recent isolates

Influenza A(H_3N_2) virus

In haemagglutination-inhibition (HI) tests with post-infection ferret sera, the majority of the influenza A(H_3N_2) isolates were antigenically similar to A/Johannesburg/33/94, the vaccine strain recommended in 1995. The antigenic characteristics of a number of these isolates, including A/England/409/95 and A/Netherlands/223/95, are illustrated in the Table. In recent months, however, an increasing number of isolates were antigenically distinguishable from A/Johannesburg/33/94; in particular, viruses represented by A/Wuhan/359/95 were isolated in increasing numbers in China, Guam, Hong Kong, Singapore and the United States.

Influenza A(H_1N_1) virus

The majority of A(H_1N_1) isolates from the Americas, Asia, Europe and Oceania were closely related to A/Singapore/6/86 and A/Texas/36/91.

Influenza B virus

The influenza B viruses received for analysis, including the most recent isolates from Asia, Europe and North America, were antigenically similar to B/Beijing/184/93 and B/Harbin/7/94.

Studies with inactivated influenza virus vaccines

Antibodies to haemagglutinin were measured in the sera of vaccinees who had received trivalent inactivated vaccines containing the antigens of A/Johannesburg/33/94(H_3N_2)-like, A/Singapore/6/86(H_1N_1)-like and B/Beijing/184/93-like viruses administered in doses of 15 micrograms of each haemagglutinin.

Post-immunisation HI antibodies at titres of ≥40 against the H_3N_2 vaccine virus were detected in 54%-96% (mean 80%) of adults and 38%-96% (mean 73%) of the elderly. Similarly, post-immunisation HI antibody titres of ≥40 to representative recent isolates such as A/England/409/95, which is antigenically similar to the vaccine virus (Table), were found in 83%-100% (mean 91%) of adults and 79%-100% (mean 90%) of the elderly. The geometric mean post-vaccination titres were not significantly different from those for the vaccine virus. In contrast, post-immunisation HI antibody titres at ≥40 were observed at lower frequency to strains which showed antigenic differences from A/Johannesburg/33/94 such as A/Wuhan/359/95, A/Nanchang/7118/95, A/Shanghai/9/95, A/Shanghai/15/95 and A/Shenzhen/262/95. For example, for A/Shanghai/15/95 and A/Shenzhen/262/95, 17%-96% (mean 65%) of adults and 50%-88% (mean 64%) of elderly vaccinees had antibody at titres ≥40, and in more than 70% of tests, the geometric mean post-vaccination titres was approximately 50% lower than for the vaccine virus.

Post-immunisation HI antibodies at titres of ≥40 to the influenza A(H_1N_1) vaccine virus were detected in the sera of 56% of children, 88%-100% (mean 94%) of adults and 63%-100% (mean 81%) of elderly vaccinees. For representative recent isolates of A(H_1N_1) virus, 50%-94% (mean 70%) of children, 79%-100% (mean 92%) of adults and 67%-100% (mean 83%) of elderly vaccinees had HI titres ≥40. Geometric mean titres to the recent isolates were generally similar to those for the vaccine viruses.

For the influenza B vaccine virus, post-immunisation HI antibodies at titres of ≥40 were detected in the sera of 94% of children, 75%-100% (mean 96%) of adults and 79%-100% (mean 94%) of the elderly. Similar frequencies of antibodies to representative recent influenza B virus isolates were detected in 100% of children, 75%-100% (mean 94%) of adults and 63%-100% (mean 91%) of elderly vaccinees. Geometric mean titres to the recent isolates were generally similar to those for the vaccine virus.

Composition of northern hemisphere influenza virus vaccines

During the 1995-1996 season, influenza A(H_3N_2), A(H_1N_1) and influenza B viruses continued to circulate. In many countries, influenza A(H_3N_2) viruses were isolated from outbreaks and sporadic cases. Increasing numbers of recent isolates were antigenically heterogeneous and distinguishable from the current vaccine strain A/Johannesburg/33/94 and were similar to the recent reference strain A/Wuhan/359/95. Vaccines containing A/Johannesburg/33/94-like viruses induced serum HI antibodies at lower frequency and titre to recent variants than to the vaccine strain. Influenza A(H_1N_1) viruses circulated widely and were the predominant type in several countries. The majority of isolates were antigenically similar to the most commonly used vaccine strain, A/Texas/36/91. Sporadic isolates of influenza B virus from Asia, Europe and North America were antigenically closely related to the current vaccine viruses.

The Trivalent vaccine recommended for the 1996-1997 northern winter season is shown in the box.

Northern winter influenza vaccine formulation

- an A/Wuhan/359/95(H_3N_2)-like strain,
- an A/Singapore/6/86(H_1N_1)-like strain*, and
- a B/Beijing/184/93-like strain **.

* The most widely used vaccine strain is A/Texas/36/91.
** The most widely used vaccine strain is B/Harbin/7/94.

CORRESPONDENCE

Composition of influenza vaccine for the southern hemisphere winter, 1996

John Cable, Chairman, Australian Influenza Vaccine Committee, Therapeutic Goods Administration Laboratories, PO Box 100, Woden, ACT 2606

The latest edition of the Schedule of Pharmaceutical Benefits (effective from 1 February 1996), includes two distinct entries under the title 'Influenza Vaccine' which differ in terms of the specific strains included in the formulation.

FLUVAX and XFLU (both manufactured by CSL Limited) include A / Texas / 36 / 91, A / Johannesburg / 33 / 94 and B / Beijing / 184 / 93-'like' strains, while VAXIGRIP, manufactured by Pasteur Merieux Serums & Vaccins and distributed in Australia by Rhone -Poulenc Rorer contains A / Texas / 36 / 91, A / Guangdong / 25 / 93 and B / Harbin / 07 / 94-'like' strains.

Pharmacists, general practitioners and State Health authorities have expressed concern at the availability of the two formulations, and have sought advice from the WHO Collaborating Centre for Influenza Reference & Research and the Commonwealth Department of Health and Family Services to clarify which formulation would provide the best protection against strains of influenza virus likely to circulate in the Australian community this coming winter.

The composition of vaccine to be issued in Australia each winter is decided by the Australian Influenza Vaccine Committee (AIVC). This committee met in September 1995 and reviewed the serological and epidemiological data concerning the distribution and prevalence of influenza strains circulating in both northern and southern hemispheres during the preceding months. It also reviewed WHO recommendations for the composition of vaccines to be used in the northern hemisphere in the current winter. The AIVC recommendation on the Australian formulation for 1996, based on this information, is shown in the box.

Southern winter influenza vaccine formulation

- an A / Texas / 36 / 91 (H_1N_1)-like strain,
- an A / Johannesburg / 33 / 94 (H_3N_2)-like strain, and
- a B / Beijing / 184 / 93-like strain.

These are reference or 'type' strains. During its deliberations, the AIVC endorsed the use of the H_3N_2 strain A / Guangdong / 25 / 93 as an alternative to A / Johannesburg / 33 / 94 in the production of the vaccine as the two strains are antigenically equivalent (ie they share the same antigenic structure).

The AIVC also endorsed the use of B / Harbin / 07 / 94 (the B strain used in northern hemisphere vaccines this winter) and B / Wellington / 09 / 95 as acceptable alternatives to the B / Beijing / 184 / 93 strains. Again, these strains are antigenically equivalent to B / Beijing / 184 / 93 and are therefore regarded as B / Beijing / 184 / 93-'like' strains.

Thus the three available influenza vaccines FLUVAX, XFLU & VAXIGRIP represent equivalent formulations and all three would be expected to provide good protection against influenza strains predicted to circulate in Australia this coming winter.

National Health and Medical Research Council recommendations on influenza immunisation[1]

Influenza vaccine should be given routinely on an annual basis to:

- Individuals over 65 years of age: the risk to the elderly is greatest if they also have chronic cardiac or lung disease, and is increased for residents of nursing homes and other chronic care facilities;
- Aboriginal and Torres Strait Islander adults over 50 years of age, because of the greatly increased risk of premature death from respiratory disease.

Annual vaccination should be considered for individuals who are in the following groups:

- Adults with chronic debilitating diseases (especially those with chronic cardiac, pulmonary, renal and metabolic disorders);
- Children with cyanotic congenital heart disease;
- Adults and children receiving immunosuppressive therapy;
- Staff who care for immunocompromised patients (patients with immune deficiency or malignancy, bone marrow transplant recipients and liver transport recipients are at high risk from influenza infection, but have an attenuated immune response to influenza vaccine);
- Residents of nursing homes and other chronic care facilities;
- Staff of nursing homes and other chronic care facilities (in an attempt to protect the patients).

Based on: National Health and Medical Research Council. *The Australian immunisation procedures handbook, fifth edition.* Canberra: Australian Government Publishing Service, 1995.

OVERSEAS BRIEFS

In the past fortnight the following information has been provided by the World Health Organization (WHO).

Meningitis

Chad

Outbreaks of meningitis have been declared in three different Prefectures. As of 11 March information had been received on 244 cases and 19 deaths in the health districts of Kumra, Dobba and Abeche in the Prefectures of Moyen-Chari, Logone Oriental and Ouaddai. A technical committee has been established to coordinate control activities.

Nigeria

As of 5 March 17,668 cases including 2,500 deaths had been reported from 15 states. Most cases were reported in Bauchi, Kaduna, Kano, Katsina, Kebbi and Sokoto states. The Federal Government has made arrangements to immunise people in all urban areas of the affected states. *Neisseria meningitidis* serogroup A has been confirmed in specimens received recently at the WHO Collaborating Centre for Reference and Research on Meningitis, National Institute of Public Health, Oslo, Norway. Travellers to hyper-endemic areas who may be in close contact with the local population should consider vaccination.

Cholera

Senegal

The outbreak which began in August 1995 has continued over the past few months in the following areas: Louga, Mbacke and Touba Departments (Diourbel Region), Fatick Department (Sine-Saloum Region), St Louis Department (Fleuve Region) and Thies Department (Thies Region). A total of 3,031 cases with 188 deaths was reported in the first two months of the year.

Other

Other countries reporting cholera in the past week are Cameroon, Mali and Uganda.

COMMUNICABLE DISEASES SURVEILLANCE

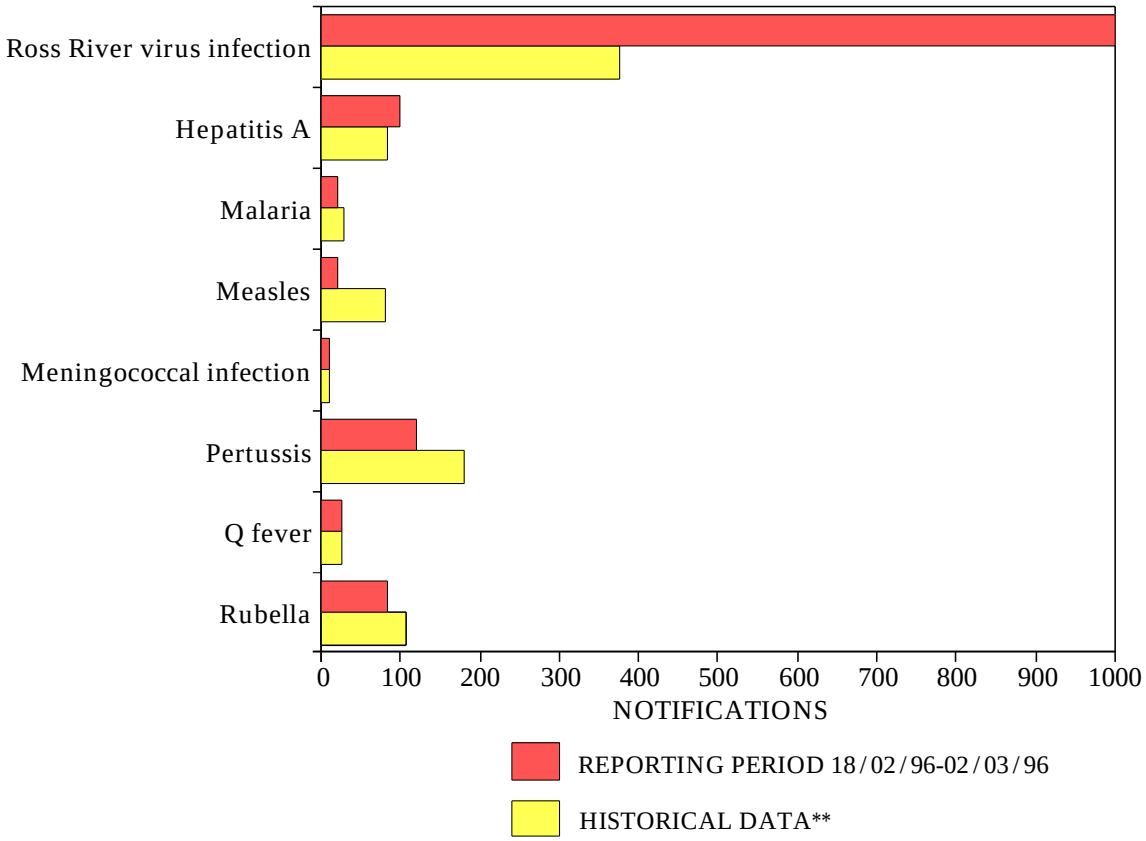
National Notifiable Diseases Surveillance System, 18 February to 2 March 1996

There were 3,172 notifications received for this two week period (Tables 1, 2 and 3, and Figure 1).

- There were 1,000 notifications of **Ross River virus infection**, nearly twice the number of cases reported for the previous fortnight. The male:female ratio was 1.0:1.1. As for the previous two reporting periods, all age groups were affected. Nearly 60% of cases were aged between 30 and 54 years, with peak numbers of cases for both sexes in the age range 35-45 years. Cases have recently been reported from the Northern and North Western statistical divisions of New South Wales. Increasing numbers of cases were reported from Queensland (the highest rates being in the central coastal statistical divisions, Darling Downs and South West) and Western Australia (the highest rates being in the south-west).
- Fifty-four cases of **Barmah Forest virus infection** were reported from 10 statistical divisions in Queensland. Thirty-six of the cases were in the age range 30-54 years.
- Five cases of **dengue** were reported from New South Wales, the Northern Territory and Queensland. Three were females and two males. Their ages ranged from 15 to 44 years.
- Notifications of **campylobacteriosis** continue at a high level, with 473 cases reported in the current fortnight. The male:female ratio was 1.1:1.0. All age groups were affected, with 22% of cases being aged less than five years.
- There were 306 notifications of **chlamydial infection** received, 44% being reported from Queensland. The male:female ratio was 1.0:2.0; 82% of the cases were aged between 15 and 29 years.
- A case of **cholera** was reported from South Australia.
- There were 142 notifications of **gonococcal infection** received; 97 cases were male and 45 female; 72% were aged between 15 and 29 years.
- Three cases of ***Haemophilus influenzae* type b infection** were reported during the period, a male aged three years, and a male and a female both aged five years. The reports were received from the Australian Capital Territory, the Northern Territory and Victoria.
- There were 100 cases of **hepatitis A** reported, 67% of them males. The cases were from all five-year age groups; 51% were in males aged from 15 to 39 years. Three quarters of the cases were reported from the metropolitan statististical divisions of Sydney (45 cases), Melbourne (17 cases) and Brisbane (12 cases).
- Nine cases of **hepatitis B (incident)** were reported; five were males and three females, the sex of the remaining case was not reported. All age groups from 15-20 to 40-44 years were represented.
- Two cases of **hydatid disease** were notified, a male from the New South Wales statistical division of Murrumbidgee and a female from the Queensland statistical division of Moreton.
- Nine cases of **legionellosis** were reported. Six were in males and three in females. They were from age groups ranging from 30-34 to 70-74 years. The cases were reported from six separate statistical divisions in six States and Territories.
- Two cases of **leprosy** were notified from the Northern Territory. Both cases were in males.
- Twelve cases of **leptospirosis** were reported. Their ages ranged from 21 to 58 years. All but three were males. The cases were reported from six separate rural statistical divisions in three States.
- Three cases of **listeriosis** were reported; two were male and one female. All were over 65 years of age. The cases were reported from the statististical divisions of Brisbane, Canberra and Murray (Victoria).
- Twenty-two notifications of **malaria** were received; 13 were male and eight female, the sex of the remaining case was not reported. The ages of cases ranged from 13 to 55 years. The cases were reported from nine separate statistical divisions in four States and Territories.
- Twenty-one cases of **measles** were reported; 12 were male and 7 female, the sex of the remaining case was not reported. Their ages ranged from less than one year to 31 years; eight cases were under five years of age.
- There were 10 cases of **meningococcal infection** reported from nine separate Statistical Divisions in four States and Territories. There were nine males and one female. Their ages ranged from less than one year to 54 years.

- There were 120 notifications of **pertussis**, the same number as reported in the previous fortnight; 50 were male and 70 female. All age groups were represented. Eight cases were aged less than one year, and a further 10 cases were less than five years of age. Fifteen apparent clusters of two or three cases were reported from three States.
- Twenty-six notifications of **Q fever** were received from 10 rural and three metropolitan statistical divisions in four States. All but three cases were male. Their reported ages ranged from 15 to 59 years.
- There were 83 cases of **rubella** reported; 55 were male and 27 female. Recorded ages of cases were from all five-year age groups up to 55-59 years; 49% of cases (41) were reported in males 15-24 years of age, and 14% (12 cases) in women aged 15 to 44 years.
- There were 277 cases of **salmonellosis** reported; 126 were male and 148 female; the sex of the remaining three cases was not reported; 47% of the cases were aged less than five years.
- Fifty-seven cases of **syphilis** were reported; 30 were male and 27 female. All age groups from 10-14 to 60-64 years were represented.
- There were 28 cases of **tuberculosis** reported; 14 were male and 14 female. All age groups but two between 10-14 and 80-84 years were represented.
- Seventeen cases of **yersiniosis** were reported; eight were male, and nine female. Five cases were reported in children under five years of age, the remainder of the cases were aged between 15 and 69 years.

Figure 1. Selected National Notifiable Diseases Surveillance System reports, and historical data[1]



1. The historical data are the averages of the number of notifications in 9 previous 2-week reporting periods: the corresponding periods of the last 3 years and the periods immediately preceding and following those.

Table 1. Notifications of diseases preventable by vaccines recommended by the NHMRC for routine childhood immunisation, received by State and Territory health authorities in the period 18 February to 2 March 1996

DISEASES	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	TOTALS FOR AUSTRALIA[1] This period 1996	This period 1995	Year to date 1996	Year to date 1995
Diphtheria	1	0	1	0	0	0	1	0	3	0	0	0
Haemophilus influenzae b infection	0	0	0	0	0	0	0	0	0	2	15	14
Measles	0	5	1	4	1	0	8	2	21	56	100	452
Mumps	0	2	0	NN	0	1	1	0	4	6	23	23
Pertussis	1	29	0	33	33	0	19	5	120	174	548	1011
Poliomyelitis	0	0	0	0	0	0	0	0	0	0	0	0
Rubella	3	11	2	31	1	3	28	4	83	95	665	599
Tetanus	0	0	0	0	0	0	0	0	0	0	1	1

1. Totals comprise data from all States and Territories. Cumulative figures are subject to retrospective revision, so there may be discrepancies between the number of new notifications and the increment in the cumulative figure from the previous period.

NN Not Notifiable.

Table 2. Notifications of other diseases[1] received by State and Territory health authorities in the period 18 February to 2 March 1996

DISEASES	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	TOTALS FOR AUSTRALIA[2] This period 1996	This period 1995	Year to date 1996	Year to date 1995
Arbovirus infection												
Ross River virus infection	0	108	11	654	0	-	13	214	1000	64	1852	413
Dengue	0	1	1	3	0	-	0	0	5	1	12	3
Barmah Forest virus infection	0	0	-	54	0	0	-	-	54	11	126	73
NEC[3,4]	0	9	3	0	0	0	2	6	20	4	59	21
Campylobacteriosis[5]	15	-	14	111	102	29	122	80	473	415	2116	1909
Chlamydial infection (NEC)[6]	7	NN	61	135	0	10	63	30	306	204	1243	1120
Donovanosis	0	NN	0	0	NN	0	0	0	0	2	9	16
Gonococcal infection[7]	0	18	54	45	0	0	15	10	142	93	589	535
Hepatitis A	3	51	1	23	1	1	20	0	100	48	497	361
Hepatitis B	0	2	0	0	0	0	6	1	9	19	48	65
Hepatitis C incident	0	1	1	-	0	-	-	-	2	2	7	7
Hepatitis C unspecified	9	-	9	76		9	136	32	271	304	1550	1459
Hepatitis (NEC)	0	1	0	0	0	0	0	NN	1	1	5	7
Legionellosis	1	2	0	0	1	1	2	2	9	4	32	38
Leptospirosis	0	2	0	9	0	0	1	0	12	4	45	31
Listeriosis	1	0	0	1	0	0	1	0	3	2	12	17
Malaria	2	12	2	0	1	0	3	2	22	6	124	102
Meningococcal infection	0	5	1	3	1	0	0	0	10	9	49	60
Ornithosis	0	NN	0	2	0	0	2	0	4	2	23	30
Q fever	0	12	0	9	0	0	4	1	26	13	82	85
Salmonellosis (NEC)	7	46	27	135	15	7	15	25	277	388	1333	1513
Shigellosis[5]	0	-	5	18	3	0	4	5	35	31	130	172
Syphilis	3	29	16	6	0	0	0	3	57	45	218	340
Tuberculosis	0	15	1	4	0	2	4	2	28	38	152	196
Typhoid[8]	0	0	0	0	0	0	0	0	0	9	22	21
Yersiniosis (NEC)[5]	0	-	0	15	2	0	0	0	17	14	61	95

1. For HIV and AIDS, see *CDI* 1996;5:125-126. For rarely notified diseases, see Table 3 .
2. Totals comprise data from all States and Territories. Cumulative figures are subject to retrospective revision so there may be discrepancies between the number of new notifications and the increment in the cumulative figure from the previous period.
3. Tas: includes Ross River virus and dengue.
4. WA, NT and Vic: includes Barmah Forest virus.
5. NSW: only as 'foodborne disease' or 'gastroenteritis in an institution'.
6. WA: genital only.
7. NT, Qld, SA and Vic: includes gonococcal neonatal ophthalmia.
8. NSW, Vic: includes paratyphoid.

NN Not Notifiable.

NEC Not Elsewhere Classified.

- Elsewhere Classified.

Table 3. Notifications of rare[1] diseases received by State and Territory health authorities in the period 18 February to 2 March 1996

DISEASES	Total this period	Reporting States or Territories	Year to date 1996
Botulism	0		0
Brucellosis	2	Qld	5
Chancroid	0		0
Cholera	1	SA	2
Hydatid infection	2	NSW 1, Qld 1	7
Leprosy	2	NT	2
Lymphogranuloma venereum	0		0
Plague	0		0
Rabies	0		0
Yellow fever	0		0
Other viral haemorrhagic fevers	0		0

1. Fewer than 60 cases of each of these diseases were notified each year during the period 1988 to 1994.

Table 4. Australian Sentinel Practice Research Network, weeks 7 and 8, 1996

Condition	Week 7, to 18 February 1996		Week 8, to 25 February 1996	
	Reports	Rate per 1000 encounters	Reports	Rate per 1000 encounters
Influenza	47	4.6	53	5.9
Rubella	5	0.5	1	0.1
Measles	1	0.1	0	0.0
Chickenpox	24	2.3	14	1.6
Pertussis	2	0.2	11	1.2
Gastroenteritis	232	22.5	126	13.9

Australian Sentinel Practice Research Network

Data for weeks 7 and 8 ending 18 and 25 February respectively are included in this issue of *CDI* (Table 4). The rate of reporting of influenza-like illness has risen in recent weeks. For the week ending 25 February 66% of reports of influenza-like illness were for adults in the 15 to 44 year age group.

Virology and Serology Reporting Scheme

There were 2,259 reports received in the *CDI* Virology and Serology Reporting Scheme this period (Tables 5, 6 and 7).

- Eight reports of **measles** were received this period. Included were 5 females and 3 males. Seven patients were between the ages of 25 and 44 years.
- Three reports of **mumps** were received this period. Diagnosis was by virus isolation (one) and single high titre (2).
- **Rubella** was reported for 30 patients this period. Diagnosis was by IgM detection (15), single high titre (11) and virus isolation (4). Included were 13 females and 17 males.
- **Hepatitis A** was reported for 58 patients this period including 45 males and 13 females. Sixty-three percent (37) of the males were between the ages of 15 and 44 years.
- Seven hundred and ninety cases of **Ross River virus** were reported this period diagnosed by IgM detection (675), single high titre (82), fourfold change in titre (31) and antigen detection (2). Seventy-one percent of cases came from Queensland and 17% from Western Australia. The number of reports received for February 1996 was the highest recorded for any month since the scheme began (Figure 2).
- Thirty-seven reports of **Barmah Forest virus** were received this period. Diagnosis was by IgM detection (23), fourfold change in titre (2) and single high titre (11). Reports have continued to increase in recent weeks (Figure 3).
- Five reports of **dengue virus** were received this period. Included were **type 3** (2), **type 4** (one) and **untyped** (2). The two reports of **dengue virus type 3** included a 36 year old male who had recently

visited Papua New Guinea and a 22 year old female who had recently visited Indonesia.

- Two reports of **flavivirus unspecified** were received from Victoria this period. Diagnosis was by IgM detection and fourfold change in titre.
- Twelve reports of **adenovirus type 3** were received this period. Diagnosis was by virus isolation (11) and antigen detection (one). A decline in reports continues since a peak in November. Other reports of **adenovirus** included **type 2** (4), **type 7** (2), **type 8** (one) and **type 11** (one).
- **Adenovirus not typed** was reported for 30 patients this fortnight. Diagnosis was by virus isolation (15), antigen detection (13) and single high titre (2). Reports have continued to decline over recent months.
- **Herpes simplex virus type 1** was reported for 357 patients this period. Diagnosis was by virus isolation (354) and antigen detection (3).
- Three hundred and sixty-two reports of **herpes simplex virus type 2** were received this period. Diagnosis was by virus isolation (361) and antigen detection (one).
- Ten reports of **herpes simplex virus untyped** were received this period. Diagnosis was by virus isolation (8) and IgM detection (2).
- **Cytomegalovirus** reports were received this period for 83 patients. Diagnosis was by virus isolation (45), antigen detection (2) and IgM detection (36). Included were 9 HIV / AIDS patients and 4 transplant recipients.
- **Varicella-zoster virus** was reported for 92 patients this period. Diagnosis was by virus isolation (40), IgM detection (23), antigen detection (28) and nucleic acid detection (one). Included was a 23 year old pregnant female (7 weeks gestation).
- One hundred and seven reports of **Epstein-Barr virus** were received this reporting period. Diagnosis was by IgM detection (104), fourfold change in titre (2) and total antibody (one).
- **Herpes virus group not typed** was reported for 20 patients this period. Diagnosis was by virus isolation (19) and IgM detection (one).
- **Poxvirus group not typed** was reported for one patient this period. Diagnosis was by antigen detection.
- Ten reports of **parvovirus** were received this period. The reports came from Victoria (6), Queensland (2) and Western Australia (2). Included were 7 females of childbearing age.
- **Echovirus type 1** was reported for 3 patients this period. All the reports came from South Australia and were diagnosed by virus isolation.
- Five reports of **rhinovirus** were received this period. All reports came from Victoria and were diagnosed by virus isolation.
- **Enterovirus not typed** was reported for 29 cases this period. Diagnosis was by virus isolation (27) and nucleic acid detection(2).
- **Influenza A** was reported for 14 patients this period. Six patients were female and 8 male. Reports have continued to decline since a peak in June (Figure 4).
- One report of **influenza B** was received this period. Diagnosis was by single high titre.
- **Parainfluenza virus type 1** was reported for 6 patients this period. The reports came from Victoria (one) and Western Australia (5).
- Four reports of **parainfluenza virus type 2** were received this period. Diagnosis was by virus isolation (2) and antigen detection (2).

Figure 2. Ross River virus laboratory reports, 1992 to 1996, by month of specimen collection

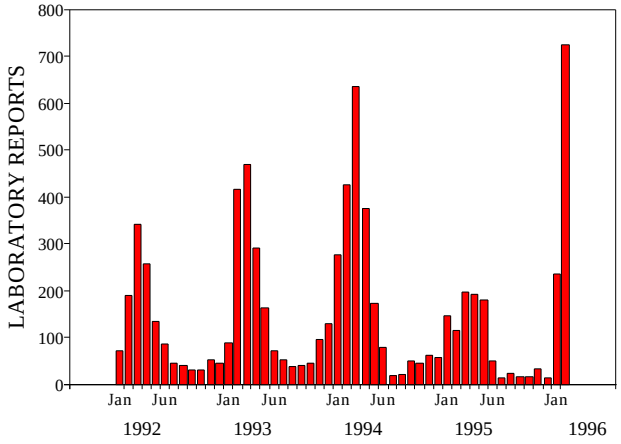
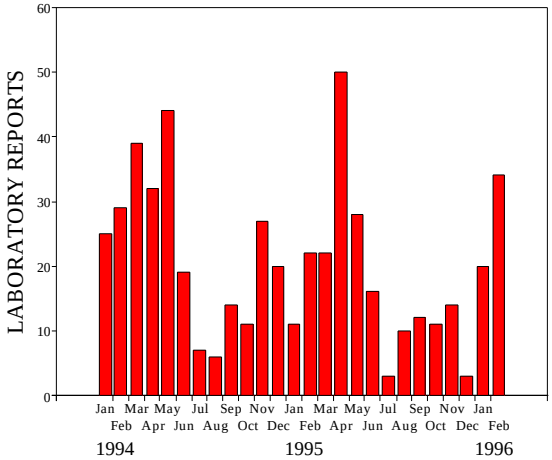
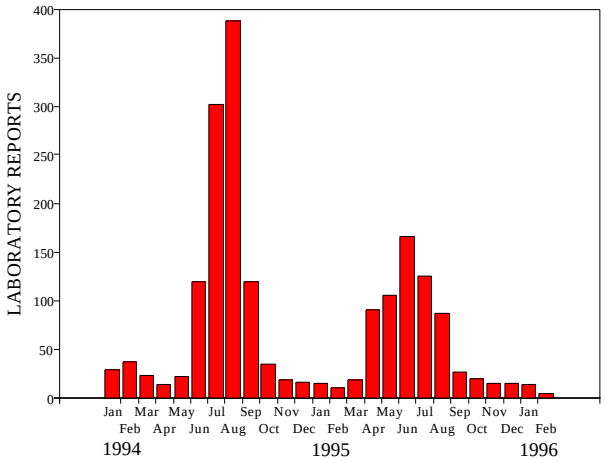


Figure 3. Barmah Forest virus laboratory reports, 1994 to 1996, by month of specimen collection



- **Parainfluenza virus type 3** was reported for 17 patients this period. Diagnosis was by virus isolation (2), single high titre (12) and antigen detection (3).
- Twenty reports of **respiratory syncytial virus (RSV)** were received this period. Diagnosis was by virus isolation (11), antigen detection (8) and single high titre (one). Seventeen patients were under 4 years of age.
- **Rotavirus** was reported for 7 patients this period. Included were 6 females and one male. Diagnosis was by antigen detection in all cases.
- One report of **calicivirus** was received this period.
- ***Chlamydia trachomatis*** was reported for 201 patients this period. Diagnosis was by isolation (31), antigen detection (9) and nucleic acid detection (161). Included were 137 females and 64 males.
- Three reports of ***Chlamydia psittaci*** were received from Victoria this period. Diagnosis was by single high titre (one) and fourfold change in titre (2).
- ***Chlamydia* species** were reported for 6 patients this period. Diagnosis was by single high titre in all cases.
- Twenty-four reports of ***Mycoplasma pneumoniae*** were received this period. Included were 12 females and 12 males. Method of diagnosis included single high titre (9), IgM detection (11) and fourfold change in titre (2).
- Ten reports of ***Coxiella burnetti*** (Q fever) were received this period. Diagnosis was by single high titre (4), fourfold change in titre (3) and IgM detection (3). The reports came from Victoria (3) and Queensland (7). Included were 9 males and one female.
- ***Rickettsia australis*** was reported for a 70 year old female. Diagnosis was by fourfold change in titre.

Figure 4. Influenza A laboratory reports, 1994 to 1996, by month of specimen collection.



- One report of ***Rickettsia tsutsugamushi*** was received this period. The patient was a 67 year old female from Queensland and diagnosis was by single high titre.
- Thirty four reports of ***Streptococcus* group A** were received this period. Diagnosis was by single high titre.
- One report of ***Brucella*** was received this fortnight. Diagnosis was by single high titre.
- ***Bordetella*** was reported for 34 patients this reporting period (3 *Bordetella pertussis* and 31 *Bordetella* species). Diagnosis was by antigen detection (2), single high titre (1), fourfold change in titre (2), IgM detection (13) and IgA detection (16). Included were 20 females and 14 males.
- Three cases of ***Legionella longbeachae*** were reported this period all diagnosed by fourfold change in titre. Included was a 60 year old male from Queensland.
- ***Legionella* species** was reported for one patient this period. The report came from Western Australia and was diagnosed by a fourfold change in titre.
- ***Cryptococcus* species** was reported for one patient this period.
- One report of ***Leptospira hardjo*** was received this period. Diagnosis was by single high titre.
- ***Leptospira* species** was reported for 5 patients this fortnight. All reports came from Queensland. Diagnosis was by isolation (3) and IgM detection.
- Twenty-seven reports of ***Treponema pallidum*** were received this period. Twelve patients were female and 15 male. Diagnosis was by single high titre (13), total antibody (11) and IgM detection (3).
- Three ***Entamoeba histolytica*** reports were received this period. The reports came from Victoria (2) and Queensland (one).
- One report of ***Toxoplasma gondii*** was received this period for a 27 year old female from Victoria.
- ***Schistoma* species** was reported for 30 patients this period. All were diagnosed by single high titre. Included were 2 males and one female who had recently returned from Africa.
- One report of ***Echinococcus granulosus*** was received this fortnight. The female patient had a hydatid cyst on the right lobe of her liver.

Table 5. Virology and serology laboratory reports by State or Territory[1] for the reporting period 22 February to 6 March 1996, historical data[2], and total reports for the year

	State or Territory[1]							Total this fortnight	Historical data[2]	Total reported this year
	NSW	NT	Qld	SA	Tas	Vic	WA			
MEASLES, MUMPS, RUBELLA										
Measles virus						8		8	24.2	20
Mumps virus			2	1				3	2.7	11
Rubella virus		2	16			9	3	30	22.7	185
HEPATITIS VIRUSES										
Hepatitis A virus	1	3	21	4		15	14	58	13.8	153
Hepatitis B virus						16		16	97.3	422
ARBOVIRUSES										
Ross River virus	70	21	561			6	132	790	95.2	986
Barmah Forest virus	1	2	28			3	3	37	12.5	65
Dengue type 3	1		1					2	0.0	2
Dengue type 4			1					1	0.0	1
Dengue not typed		1	1					2	1.7	4
Flavivirus (unspecified)						2		2	1.7	9
ADENOVIRUSES										
Adenovirus type 2				2		2		4	1.8	16
Adenovirus type 3				4		8		12	0.5	46
Adenovirus type 7				1		1		2	0.3	14
Adenovirus type 8						1		1	2.7	3
Adenovirus type 11						1		1	0.2	1
Adenovirus not typed / pending	2		5	6		5	12	30	37.7	347
HERPES VIRUSES										
Herpes simplex virus type 1	9	4	111	37		123	73	357	191.8	1,525
Herpes simplex virus type 2	10	17	103	35		112	85	362	197.7	1,560
Herpes simplex not typed / pending	2		1			1	6	10	20.5	121
Cytomegalovirus	11		22			32	18	83	58.2	369
Varicella-zoster virus	2	1	34	2	1	30	22	92	44.5	355
Epstein-Barr virus	3	4	59	7		7	27	107	82.2	533
Herpes virus group - not typed				1			19	20	1.0	42
OTHER DNA VIRUSES										
Poxvirus group not typed						1		1	0.0	2
Parvovirus			2			6	2	10	5.7	37
PICORNA VIRUS FAMILY										
Echovirus type 1				3				3	0.0	3
Echovirus type 9						1		1	0.2	16
Echovirus type 15				1				1	0.0	1
Echovirus type 33				1				1	0.0	1
Poliovirus type 1 (uncharacterised)	1							1	0.5	2
Rhinovirus (all types)						5		5	26.0	143
Enterovirus not typed / pending			2				27	29	43.2	203
ORTHO / PARAMYXOVIRUSES										
Influenza A virus			5			5	4	14	9.0	59
Influenza B virus						1		1	4.0	21
Parainfluenza virus type 1			1				5	6	3.3	13
Parainfluenza virus type 2				1			3	4	1.8	12
Parainfluenza virus type 3	1		1			1	14	17	12.0	201
Respiratory syncytial virus	1		4	3		4	8	20	19.3	220

Table 5. Virology and serology laboratory reports by State or Territory[1] for the reporting period 22 February to 6 March 1996, historical data[2], and total reports for the year, continued

	State or Territory[1]							Total this fortnight	Historical data[2]	Total reported this year
	NSW	NT	Qld	SA	Tas	Vic	WA			
OTHER RNA VIRUSES										
HIV-1			12				1	13	2.0	38
Rotavirus				2			5	7	23.3	251
Calici virus						1		1	0.0	1
Small virus (like) particle	1					2		3	0.2	7
OTHER										
Chlamydia trachomatis not typed	9	23	93	4	1	19	52	201	116.5	823
Chlamydia psittaci						3		3	5.3	41
Chlamydia species			6					6	2.5	43
Mycoplasma pneumoniae	1	1	14			5	3	24	24.0	128
Coxiella burnetii (Q fever)	1		6			3		10	7.0	37
Rickettsia australis					1			1	0.2	6
Rickettsia tsutsugamushi			1					1	0.0	2
Streptococcus group A	4	10	20					34	15.0	133
Salmonella species							2	2	0.0	2
Brucella species			1					1	0.2	1
Bordetella pertussis						2	1	3	37.2	113
Bordetella species	1		30					31	8.5	123
Legionella longbeachae							3	3	0.2	7
Legionella species							1	1	3.7	1
Cryptococcus species			1					1	1.0	3
Leptospira hardjo	1							1	1.0	2
Leptospira species			5					5	1.5	10
Treponema pallidum	8	5	10			1	3	27	20.0	83
Entamoeba histolytica			1			2		3	0.2	9
Toxoplasma gondii						1		1	2.2	6
Schistosoma species	1				1	24	4	30	1.2	101
Echinococcus granulosus						1		1	0.5	1
TOTAL	142	94	1181	115	4	471	552	2,559	1,309.7	9,702

1. State or Territory of postcode, if reported, otherwise State or Territory of reporting laboratory.
2. The historical data are the averages of the numbers of reports in 6 previous 2 week reporting periods: the corresponding periods of the last 2 years and the periods immediately preceding and following those.

Table 6. Virology and serology laboratory reports by clinical information for the reporting period 22 February to 6 March 1996

	Meningitis	Other CNS	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	muscle / joint	Genital	Other / Unknown	Total
MEASLES, MUMPS, RUBELLA											
Measles virus			1			3				4	8
Mumps virus			1							2	3
Rubella virus						13				17	30
HEPATITIS VIRUSES											
Hepatitis A virus				2	24					32	58
Hepatitis B virus										16	16
ARBOVIRUSES											
Ross River virus		1	2	1		75	1	231		479	790
Barmah Forest virus						4		12		21	37
Dengue type 3										2	2
Dengue type 4										1	1
Dengue not typed										2	2
Flavivirus (unspecified)										2	2
ADENOVIRUSES											
Adenovirus type 2			3							1	4
Adenovirus type 3			5				6			1	12
Adenovirus type 7							1			1	2
Adenovirus type 8							1				1
Adenovirus type 11										1	1
Adenovirus not typed / pending			11	9			3			7	30
HERPES VIRUSES											
Herpes simplex virus type 1			9			190	15		75	68	357
Herpes simplex virus type 2						143			157	62	362
Herpes simplex not typed / pending						6			2	2	10
Cytomegalovirus			21	1	3					58	83
Varicella-zoster virus			1			59	1			31	92
Epstein-Barr virus			13			1				93	107
Herpes virus group - not typed						14	1		4	1	20
OTHER DNA VIRUSES											
Poxvirus group not typed						1					1
Parvovirus						1				9	10
PICORNA VIRUS FAMILY											
Echovirus type 1			2	1							3
Echovirus type 9			1								1
Echovirus type 15			1								1
Echovirus type 33			1								1
Poliovirus type 1 (uncharacterised)			1								1
Rhinovirus (all types)			4							1	5
Enterovirus not typed / pending	2		7	12						8	29

Table 6. Virology and serology laboratory reports by clinical information for the reporting period 22 February to 6 March 1996, continued

	Meningitis	Other CNS	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	muscle/joint	Genital	Other/Unknown	Total
ORTHO/PARAMYXOVIRUSES											
Influenza A virus	1		6		1					6	14
Influenza B virus			1								1
Parainfluenza virus type 1			5							1	6
Parainfluenza virus type 2			2							2	4
Parainfluenza virus type 3			6					1		10	17
Respiratory syncytial virus			19							1	20
OTHER RNA VIRUSES											
HIV-1										13	13
Rotavirus				7							7
Calici virus				1							1
Small virus (like) particle				3							3
OTHER											
Chlamydia trachomatis not typed									104	97	201
Chlamydia psittaci			1							2	3
Chlamydia species			3							3	6
Mycoplasma pneumoniae			8					1		15	24
Coxiella burnetii (Q fever)								1		9	10
Rickettsia australis										1	1
Rickettsia tsutsugamushi										1	1
Streptococcus group A			3	1		3		2	1	24	34
Salmonella species										2	2
Brucella species										1	1
Bordetella pertussis			2							1	3
Bordetella species			18							13	31
Legionella longbeachae			2							1	3
Legionella species			1								1
Cryptococcus species										1	1
Leptospira hardjo										1	1
Leptospira species								2		3	5
Treponema pallidum		1			1				2	23	27
Entamoeba histolytica										3	3
Toxoplasma gondii										1	1
Schistosoma species										30	30
Echinococcus granulosus										1	1
TOTAL	3	2	161	38	29	513	29	250	345	1189	2559

Table 7. Virology and serology laboratory reports by contributing laboratories for the reporting period 22 February to 6 March 1996

STATE OR TERRITORY	LABORATORY	REPORTS
New South Wales	Royal Prince Alfred Hospital, Camperdown	10
	South West Area Pathology Service, Liverpool	26
Queensland	Queensland Medical Laboratory, West End	1228
	State Health Laboratory, Brisbane	110
South Australia	Institute of Medical and Veterinary Science, Adelaide	114
Tasmania	Northern Tasmanian Pathology Service, Launceston	1
Victoria	Microbiological Diagnostic Unit, University of Melbourne	7
	Monash Medical Centre, Melbourne	28
	Unipath Laboratories	47
	Victorian Infectious Diseases Reference Laboratory, Fairfield Hospital	401
Western Australia	Path Centre Virology, Perth	363
	Princess Margaret Hospital, Perth	50
	Western Diagnostic Pathology	174
TOTAL		2559