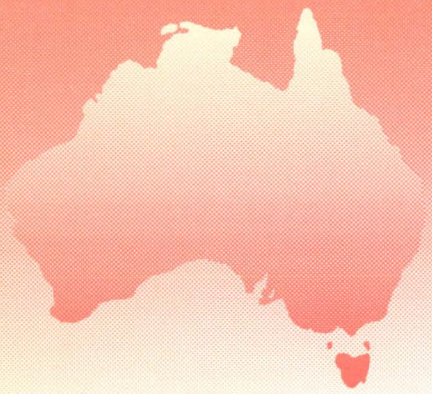

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COMMUNICABLE DISEASES NETWORK-AUSTRALIA
A National Network for Communicable Diseases Surveillance

BARMAH FOREST VIRUS DISEASE IN WESTERN AUSTRALIA

MD Lindsay[1], DW Smith[2], CA Johansen[1], JS Mackenzie[1]; reproduced from the Western Australian Notifiable Diseases Bulletin 1994;4(4):1-4

Barmah Forest (BF) virus is a mosquito-borne alphavirus, found only in Australia, that causes a disease similar to Ross River (RR) virus in humans. BF virus activity was first detected in Western Australia when it was isolated from mosquitoes trapped in the south-east Kimberley in 1989[1].

Small clusters of human cases in Western Australia were diagnosed by the State Health Laboratory Service in 1992 (DW Smith, unpublished results) and the first substantial outbreak occurred in the south-west during spring and summer of 1993-94.

As with all arboviruses, BF virus is maintained in natural cycles between arthropod vectors and vertebrate hosts. The virus was named after the forest next to the Murray River in northern Victoria where the virus was isolated from *Culex annulirostris* mosquitoes in 1974[2]. BF virus was first shown to infect humans in New South Wales in 1986[3] and 1987[4] and reported as a cause of clinical disease in 1988[5]. Since then it has also been cultured from the blood of a patient suffering from epidemic polyarthritis-like symptoms in Queensland[6]. The illness is similar to that caused by RR virus and common clinical features include polyarthritis, arthralgia, myalgia, fever, rash and lethargy. As with RR virus disease, the duration of symptoms of BF virus disease is variable, with recovery taking between one day and several weeks, although in some cases symptoms persist for months. Treatment with analgesics and anti-inflammatory agents provides symptomatic relief.

Cases in New South Wales, Queensland and Victoria[7] have occurred in small clusters or individually, often in association with cases of RR virus disease. The first true outbreak of BF virus disease occurred concurrently with RR virus at Nhulunbuy in the Northern Territory[8] in early 1992. Most epidemiological information about BF comes from New South Wales and Queensland where overall seropositivity rates in humans were 2%[4] and 6.5%[6], respectively. This compares with a seropositivity rate of 31.6% for RR virus in Queensland. In the Queensland study it was estimated that 0.23% of the resident population became infected with BF virus each year. A ratio of male to female cases of approximately 1.5:1 was found in both Queensland and New South Wales.

The principle vectors of BF, as with most alphaviruses, are mosquitoes, although BF virus has been isolated from a species of biting midge (*Culicoides* species) in the Northern Territory[9]. The vertebrate hosts of BF virus are not known although serological surveys in Victoria suggest that marsupials are frequently infected[7]. Marsupials and certain placental mammals are thought to be the main hosts of RR virus.

Of the four alphaviruses found in Australia (RR, BF, Sindbis and Getah viruses), only RR and BF viruses frequently cause human disease. Diagnosis of acute infection with either of these viruses is based upon clinical suspicion and subsequent detection of a four-fold rise in haemagglutination inhibiting (HI) antibody or by conversion from IgG negative to positive by enzyme immunoassay (EIA) in paired sera. Detection of IgM can mean either recent or past infection because IgM commonly persists for several months after infection[10].

The first Western Australian cases of BF virus disease were reported individually or in small clusters from towns in the Pilbara, Gascoyne, Murchison and Goldfields areas between April and September 1992. Most activity was reported from Exmouth (six cases) and Carnarvon (four cases). All of these early cases were during or just after much larger outbreaks of RR virus disease in those areas. This suggested that the two viruses may have similar mosquito vectors and require similar environmental conditions. The main environmental factor contributing to the 1992 outbreaks was extremely heavy rain in these normally arid regions during autumn and winter[11]. Six cases of BF virus infection were also reported following record wet season rains in the Kimberley in 1993. As BF virus infection has only recently become notifiable in Western Australia, the incidence of disease may have been under-reported.

Research at the Arbovirus Laboratory in the Department of Microbiology, The University of Western Australia has shown that BF and RR viruses co-circulate in the Kimberley and Pilbara regions. Both viruses have been isolated from individual members of the same mosquito species caught in the same trap. In coastal regions the main vector of BF virus appears to be *Aedes vigilax*, a saltmarsh breeding species. Large numbers of this species develop after very high tides or heavy rains on saltmarshes. In inland areas several other species of freshwater-breeding species can carry the virus. These include *Aedes normanensis, Aedes eidsvoldensis, Culex annulirostris* and *Anopheles amictus*.

In January 1993, BF virus was isolated from *Culex annulirostris* and *Coquillettidia linealis* mosquitoes trapped at Karnup, south of Rockingham, by staff of The University of Western Australia Arbovirus Laboratory. Soon after, a single case was reported from an address less than 1 km from the site at which the isolates were

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obtained. Then, between August 1993 and March 1994, a larger outbreak occurred in the south-west. Of twenty reported cases, over half were in the Peel area (City of Mandurah, Shires of Murray and Waroona). Cases were also reported from Perth, Collie, Busselton, Mullalyup, Manjimup and Esperance. BF virus was isolated on 12 occasions from *Aedes camptorhynchus* mosquitoes trapped just prior to and during the outbreak in the Peel and Busselton areas, thereby implicating that species, along with *Culex annulirostris* and *Coquillettidia linealis*, as an important vector in those regions. *Aedes camptorhynchus* is also the main vector of RR virus in the south-west[11,12]. BF virus was also isolated from *Culex annulirostris* mosquitoes trapped in the southern suburbs of Perth, suggesting that under certain circumstances the virus may be transmitted to humans in the metropolitan area. This has occurred with RR virus during two previous outbreaks in the south-west[11,12].

The 1993-94 outbreak of BF virus is the first report from anywhere in Australia of a substantial number of cases in the absence of a RR virus activity. Only one case of RR virus disease was reported from the Peel region during spring-summer 1993-94, the lowest recorded number of cases in spring and summer in that region. Environmental conditions and vector mosquito populations in the south-west were unfavourable for RR virus transmission during the BF outbreak (MD Lindsay, CA Johansen, JS Mackenzie, unpublished results). It is not known whether the outbreak occurred because BF virus can circulate under conditions that are not suitable for RR virus activity, or whether extremely low levels of immunity in 'virgin' vertebrate host and human populations in the south-west may have enhanced transmission cycles.

The only evidence of BF virus activity anywhere in Western Australia prior to 1989 and in the south-west prior to late 1992 was from a serosurvey of RR virus-like illnesses in the south-west in 1988-89 (L O'Connor and M Bucens, unpublished results). Two patients had evidence of infection with BF virus by HI but the samples were not tested for IgM antibody, and no travel histories were available, so it was not possible to determine whether the infections were recent and acquired in Western Australia. No BF virus isolates were obtained from more than 400,000 mosquitoes trapped throughout the south-west between 1987 and 1992[11,12,13]. This suggests that the virus responsible for the recent outbreaks was recently introduced or re-introduced into Western Australia after a long period of absence. The means of introduction, initially to the north-west and now to the south-west, is not known. In view of the activity at Nhulunbuy in the Northern Territory, just prior to the first Western Australian cases in 1992, it is possible that the virus may have been introduced from that region in a viraemic human or in livestock. This means of movement around Australia and even to South Pacific islands has been shown for RR virus.

We do not know whether BF virus will persist in Western Australia, like RR virus has, either in low level maintenance cycles or by vertical transmission in certain *Aedes* mosquitoes. These questions along with others about the vector competence of different mosquito species for BF virus and environmental conditions which predispose to outbreaks must be addressed before future outbreaks can be predicted. The Health Department of Western Australia and The University of Western Australia Arbovirus Laboratory recently commenced more intensive monitoring of BF and RR viruses in the Peel region where mosquito breeding may be enhanced by more frequent tidal inundation caused by the opening of the Dawesville Cut. In view of the recent BF activity in Western Australia, BF virus should be added to the differential diagnosis of patients with arthritis, myalgia or rash, who may have been exposed to the virus.

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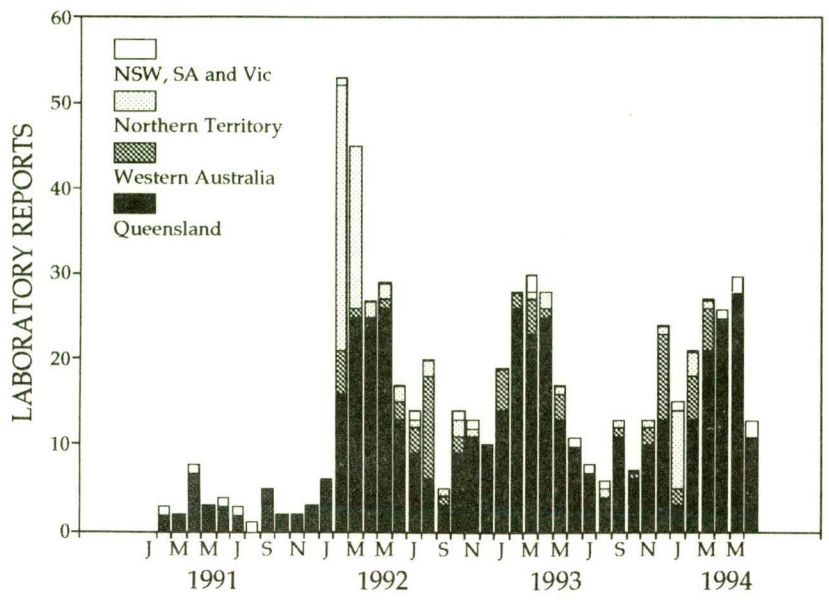
CDI editorial comment

The National Health and Medical Research Council recommends that arbovirus infections be notifiable diseases throughout Australia. Barmah Forest virus infection is only currently notifiable as a separate condition in Western Australia where it became notifiable in June 1994. In all States and Territories except Western Australia 'other arbovirus infections' or 'arbovirus infections, not elsewhere classified' are notifiable and could include Barmah Forest virus infection.

Most States and Territories report alphavirus infection notifications for the National Notifiable Diseases Surveillance System as 'Ross River virus infection' or 'arbovirus infection, not elsewhere classified'. Where Barmah Forest cases are reported separately, they are combined with the latter group for publication in *CDI* at present. Separation by virus type of the 'other arbovirus infection' notifications for the national dataset publication could be introduced as more States and Territories are able to specify the causative alphaviruses or flaviviruses in these reports.

The *CDI* Virology and Serology Laboratory Reporting Scheme first received reports of Barmah Forest virus in 1989. Most have been from Queensland (463) but there have been 67 reports from Western Australia and 65 from the Northern Territory, reflecting the outbreaks described above (Figure). Reports overall have been seasonal, peaking in autumn each year. There have been 325 reports for males and 305 reports for females (3 unknown; M:F ratio 1.00:0.94). Five hundred reports (79.0%) have been for persons in the 25 to 64 year age group. Thirty-three reports have been confirmed cases (fourfold change in titre); the remaining 600 were presumptive cases.

Figure. *CDI* Virology and Serology Reporting Scheme Barmah Forest virus reports, 1991 to 1994, by month of specimen collection and State or Territory[1]



1. State or Territory of postcode, if reported, otherwise State or Territory of reporting laboratory.

INFLUENZA A OUTBREAK AT A MOUNT GAMBIER JUNIOR PRIMARY SCHOOL, SOUTH AUSTRALIA

Sue Selden[1,2] *and Scott Cameron*[1]

Introduction

At 10.30am on Monday 20 June 1994 the Communicable Disease Control Unit (CDCU) of the South Australian Health Commission (SAHC) received a call from the Environmental Health Officer (EHO) of the city of Mount Gambier in South Australia. The principal of a primary school had informed him that 60% of the children and a third of the adults in the junior primary school were absent. They were suffering from a 'flu'-like illness with fever, aching joints and gastric symptoms. The school had two buildings, senior and junior, which shared a common canteen and playing grounds but were separate physically. Attendance at the whole school had been normal on the Friday and attendance in the senior school this Monday was normal.

Initially there was concern about the heating system of the building and whether some form of contamination could account for the illness being experienced. The Council medical officer had reported that there had been increasing numbers of cases of flu and colds being seen in the city clinics but nothing specifically in children. He had thought it unlikely that any form of environmental contamination would account for the early clinical picture, although such a factor still had to be considered.

The EHO was asked by CDCU to determine the number of children and classes affected, the symptoms in more detail (with some children being seen by a doctor if possible) and a list of activities, particularly those common to all children, for the previous week. The SAHC Regional EHO in Mount Gambier assisted.

Methods

On Monday afternoon the building was inspected by the EHOs and appropriate maintenance was planned. On Tuesday afternoon, a further inspection of the building was completed by the headmaster, the EHOs and a CDCU staff member.

A questionnaire, with questions on symptoms, onset time/date, affected family members, activities during the previous week and whether medical care had been sought, was prepared, and administered by telephone on the Tuesday or Wednesday to the parents of all children absent on Monday 20 and Tuesday 21 June.

Children off sick on Wednesday and children sick the previous week but not sick on Monday or Tuesday were not followed up. It was planned that they would only be followed up if laboratory results were unclear as to the cause of the outbreak.

Staff of the IMVS virology department travelled to Mount Gambier on the Tuesday and carried out nasopharyngeal aspirate (NPA) sampling on 30 children and adults with the most recent onset of symptoms.

Blood samples were also taken from five adults (parents who now had symptoms) and convalescent blood sampling was planned.

The 30 NPAs were tested by the rapid antigen detection method and viral culture for adenovirus, influenza A and B, *Mycoplasma pneumoniae*, parainfluenza virus types 1, 2 and 3, and respiratory syncytial virus. The IMVS had seen increasing numbers of influenza A, adenovirus and parainfluenza in the previous week and it was thought that one of these was the most likely cause of this outbreak.

Results

The first building inspection revealed that in the junior school, heating was via two oil-fired heaters, each serving one side of the building. The air filters were dirty and the air filter room very dusty. Heat was ducted off to each classroom and air was not recycled. Air left the classrooms via windows to the exterior (mostly kept shut because of the cold) or through the door to a common corridor. There was thought to be no humidifying, and thus no water, in the system. The heaters had not been serviced 'for a long time'. Later staff were complaining about peculiar smells in the corridor and some of the rooms.

During the second inspection, we were informed by a member of the maintenance staff that the heater to the north side of the building and the Activity Room was non-functioning but had now been fixed. He was not able to say if it had been functioning on the previous Friday. The filters had all been changed and the rooms cleaned.

Review of the previous week's activities revealed that at 2.45pm on the Friday afternoon all children and most of the teachers had attended assembly in the Activities Room. This room was a little bigger than an ordinary sized classroom and crowding would have been intense. There were no other common activities identified at which children or their parents were present in the week prior to the onset of illness.

1. Communicable Diseases Control Unit, South Australian Health Commission.
2. National Centre for Epidemiology and Population Health, Canberra.

Table 1. Age-specific attack rates[1] for influenza-like illness in the junior primary school, 14 to 22 June 1994

Age (years)	Total	Ill	Attack rate (%)[1]
5	25	18	72 (70)
6	56	43	77 (72)
7	60	45	74 (72)
8	27	19	70 (68)
9	35	28	80 (77)
10	7	5	71 (71)
Total	210	158	75 (72)

1. The attack rates in parentheses are if the 23 children whose details are not known are not included.

Sixty per cent (127/210) of the enrolled children were absent from school on Monday 20 June, as were five adults. Some of the 87 attending children had symptoms of illness and five children had been sent home during the day. Absenteeism in the various classrooms had ranged from 50% to 70%.

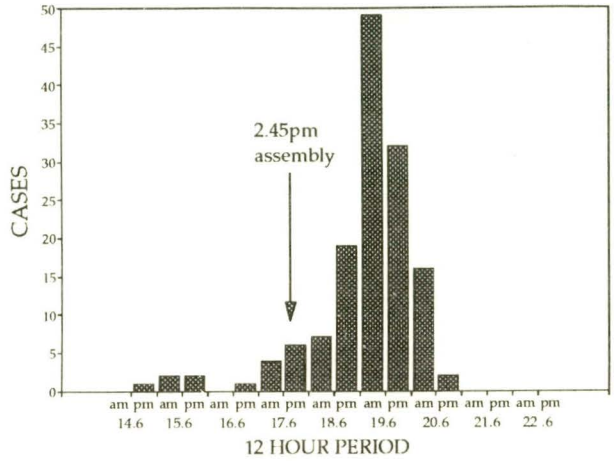
By Wednesday afternoon 76% (159/210) had been or were absent from class. Teachers had come to school ill stating they could not get in to see a doctor (for a medical certificate) for at least a week.

Questionnaire results

The parents or guardians of 91% (134/147) of the children absent on Monday and Tuesday were able to be contacted by phone. One child was absent because of an asthma attack and is not included in this description. Seven adults who worked at the school (both teachers and ancillary staff) were also ill and provided the same information. The majority of the 23 absent Monday to Wednesday who could not be contacted or were not contacted were known to be ill and so are included in the following summary.

Six children had onset of flu-like symptoms during the period 14 to 16 June and three of those were at school on Friday 17 June. Nine children and one teacher had onset of symptoms before or during school hours on the Friday and all were at school that day. Of the 124 with known time of onset beginning after close of school on Friday, 93% (116/124) began experiencing symptoms from 24 to 72 hours from the time of the assembly (Figure).

Figure. Influenza-like illness cases in the junior primary school, by 12 hour period of onset, 14 to 22 June 1994[1]



1. Further cases with unknown onsets were absent from school on 20, 21 and 22 June; 10 on 20 June, 2 on 21 June and 11 on 22 June.

The age-specific attack rates ranged from 70 to 80% (Table 1) and the class-specific attack rates from 60 to 83% (Table 2). There were no statistically significant differences in the age-specific attack rates by classroom.

The most commonly reported symptoms were fever, headache and generalised aches, with or without gastro-intestinal symptoms (Table 3). Three children were said to have only a cough with no other symptoms. One child was said not to have had a fever but to be delirious at times. Not all parents knew if their child had body aches unless the child had specifically complained of them. The questionnaire was not specific for influenza symptoms and the category 'other' symptoms 'specify' was not completed comprehensively by all interviewees.

Table 2. Classroom-specific attack rates[1], for influenza-like illness in the junior primary school, 14 to 22 June 1994

Room	Year	Age (years)	Class total	Ill	Attack rate (%)	At school with symptoms on Friday 17 June
1	Reception, 1	5-7	25	18[2]	72 (72)	2 children
2	Reception, 1	5-7	25	21[2]	84 (83)	1 child, teacher
3	Reception, 2	5-8	25	19	76 (76)	1 child
4	1, 2	6-8	25	19	76 (74)	1 child
5	3, 4	8-10	30	23[2]	74 (75)	2 children
7	Reception, 1, 2	5-7	25	19	76 (60)[3]	
8	Reception, 1, 2	5-8	25	15	60 (60)	3 children
10	Reception, 3, 4	8-10	30	24[2]	80 (79)	1 child

1. The attack rates in parentheses if the 23 children whose details are not known are not included.
2. Teacher also.

Two children (in classrooms 5 and 8) had other family members with flu-like symptoms 48 hours prior to the onset of their symptoms. Three children had a parent ill at the same time or shortly thereafter and all three of these had been at the school for an extended period on the Friday.

The questionnaire revealed that 27 families had about 37 members who did not attend the junior school either with flu-like symptoms established or just beginning. Of 16 families with an ill child attending the school, seven had a second child become ill 24 hours or more after the first.

By the time of the interviews, 48/140 (34%) had been seen either by a general practitioner or at the outpatient department of the local hospital with a viral illness being the diagnosis given. A few were still waiting to see their doctor.

Laboratory results

Nineteen (63%) of the 30 NPAs tested were positive for influenza A virus, 16 by enzyme immunoassay and a further three had virus isolated by culture. No other organisms were isolated. Initial typing identified the virus as influenza A H_3N_2, Beijing-like; further typing is being done by the World Health Organization Collaborating Centre for Influenza Reference and Research, Melbourne.

The 19 positive results included 14 students and five associated family members. The 14 students with positive results were aged between five and nine years. Nine were female and five male. Samples were taken an average of 46 hours after onset of symptoms (range 26 to 56 hours). Of the five negative results in ill school attenders three had ill family members test positive. Overall, NPAs were collected from 20 families and of these, 15 families were positive.

Table 3. Symptoms reported for 133 children and 7 adults with influenza-like illness in the junior primary school, 14 to 22 June 1994

	Children (n = 133)		Adults (n = 7)	
Symptoms	number	percent	number	percent
Cough	125	94.0	7	100
Fever	119	89.5	7	100
Headache	107	80.4	7	100
Aching/myalgia	91	68.4	6	86
Nausea	89	66.9	4	57
Vomiting	56	42.1	1	14
Sore throat	30	22.6	1	14
Stomach ache	28	21.0	2	29
Lethargy	27	21.0	1	14
Diarrhoea	19	14.3	2	29
Earache	11	8.2	0	0
Coryza	10	7.5	1	14
Dizzy/off balance	9	6.8	2	29
Sore eyes	9	6.8	3	43
Delirious	4	3.0	0	0
Double vision	2	1.5	0	0
Precipitated asthma	2	1.5	0	0

Discussion

Influenza A is an acute viral disease which can cause major outbreaks. The high infectivity of influenza in confined populations has been well demonstrated[1,2] where clinical attack rates, which usually range from 10% to 30% in the general community during an epidemic, may be greater than 50%. In the general population incidence is often highest in young school-aged children and reflects their previous non-exposure to the particular outbreak subtype[3].

In this instance the overall rate of at least 75% is not unusual given that:

(i) there were infectious children in most classrooms prior to the weekend

(ii) the crowding of the children, including a pool of infectious children, in a poorly ventilated room would have facilitated viral spread and

(iii) some infections were probably acquired at home from ill siblings who also attended the school.

However, given the apparent explosive nature of the outbreak and the implication of a malfunctioning heating system, it was necessary to consider a toxic aetiology. Concerns about the safety of the building continued to be addressed throughout the Monday but by the evening a viral illness was considered to be the most likely cause of the outbreak. The fact that the IMVS staff collected specimens on the Tuesday and would be able to identify (hopefully) the organisms by Wednesday evening allayed the fears of both staff and parents. The transportation of the specimens the 434 km to the Adelaide laboratory accounted for the delay in results.

There had been at least 16 children and one teacher with flu-like symptoms in the week prior to the outbreak. At least nine children and one teacher were at school on Friday with flu-like symptoms, although for a few the symptoms started just after school finished. Many of the children would have been infected in their classroom and for the rest infection would have occurred during the afternoon assembly when all the children were closely packed together in a poorly ventilated room.

On Wednesday afternoon, the results from the IMVS had been received and

the Council medical officer and the headmaster were informed. The City EHO had prepared a media release on influenza A and the appropriate care of those with symptoms. The headmaster was interviewed on radio and advised parents to keep children with symptoms at home. He had also prepared a letter to go home to all parents advising them of the cause of the outbreak, the appropriate care of ill children and the fact that 'the building has a clean bill of health (even if the occupants haven't)'.

This was the first major outbreak of influenza A in South Australia this year and anecdotal reports of school classes in Adelaide with half the students absent were beginning to be received at the time. Given that influenza numbers can be expected to increase through to September, general practitioners have been encouraged to identify and suggest vaccination for those at risk who have not already been vaccinated.

Acknowledgments

The investigation of this outbreak would not have been possible without the assistance of the following: Mr Don Whitmore, EHO for the city of Mount Gambier, and his co-opted helpers; Mr Bob Dunstone, SAHC Regional EHO, Mount Gambier; the headmaster and staff of the junior primary school involved; parents of the children concerned, and IMVS virology staff, particularly Jill Thompson and Gwen Simmonds. Other staff of the Public and Environmental Health Service, SAHC, gave continuing advice on environmental factors to be considered in the building concerned.

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REVIEW OF *STREPTOCOCCUS PNEUMONIAE* REPORTS, *CDI* STERILE SITES SURVEILLANCE, JANUARY 1992 TO JUNE 1994

Leslee Roberts, AIDS and Communicable Diseases Branch, Department of Human Services and Health, and CDI Contributing Laboratories[1]

Introduction

CDI sentinel laboratory based surveillance of invasive pneumococcal infection commenced in 1992 with the development of LabDOSS, the Laboratory Database of Organisms from Sterile Sites. Twenty laboratories from seven States and Territories currently provide fortnightly reports of organisms isolated from usually sterile sites. Most laboratories provide data in computerised format utilising a LabDOSS system written in EpiInfo[1]. Reports include demographic, clinical and microbiological information. There have been 11,894 reports to the scheme in the period 1 January 1992 to 30 June 1994.

Surveillance of organisms from usually sterile sites detects episodes of sepsis by invasive organisms including *Streptococcus pneumoniae*. Pneumococcal infections are not notifiable in any of the States or Territories.

Methods

The LabDOSS scheme has undergone growth since commencement of surveillance in 1992, so to enable comparison of reports of *Streptococcus pneumoniae* during periods of differing numbers of contributing laboratories we have standardised the data by two methods. First we present pneumococcal reports per 10 contributing laboratories by month. Second we present a ratio of pneumococcal reports to total reports by month.

1. ***CDI* LabDOSS contributing laboratories are**
New South Wales: South West Area Pathology Health Service, Liverpool; Royal North Shore Hospital, Sydney; Central Coast Hospital Service, Gosford; Institute of Clinical Pathology and Medical Research, Westmead; John Hunter Hospital, Newcastle; Royal Prince Alfred Hospital, Sydney (1993).
Queensland: Sullivan, Nicolaides and Partners, Brisbane; Nambour General Hospital; Greenslopes Repatriation Hospital; Central Queensland Pathology Laboratory, Mackay; Mackay Base Hospital; Toowoomba Pathology Laboratory; Ipswich General Hospital; Royal Brisbane Hospital (1992); TB Lynch Pathogist, Rockhampton (1992).
South Australia: Institute of Medical and Veterinary Science, Adelaide.
Western Australia: Princess Margaret Hospital for Children, Perth; Sir Charles Gairdner Hospital, Perth.
Northern Territory: Alice Springs Hospital.
Tasmania: Royal Hobart Hospital, Northern Tasmanian Pathology Service.
ACT: Woden Valley Hospital, Canberra.

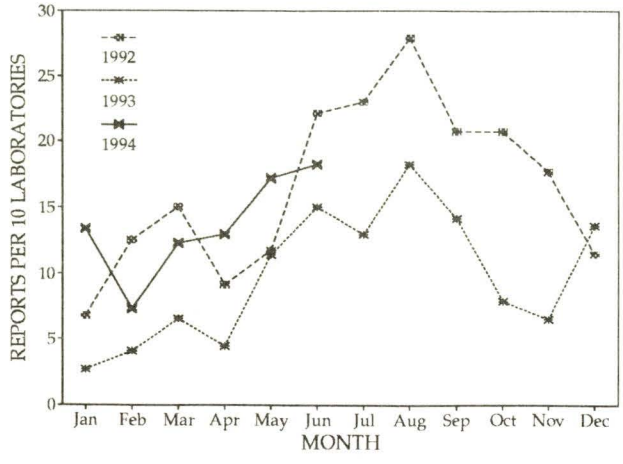
Table 1. ***Streptococcus pneumoniae*** **LabDOSS reports, January 1992 to June 1994 by reported clinical diagnosis**

Clinical diagnosis	Reports (%)
Lower respiratory tract disease	53.8
Meningitis	9.2
Gastrointestinal disease	2.5
Septic arthritis	0.9
Osteomyelitis	0.2
Cellulitis	1.4
Urinary tract	0.2
No diagnosis provided	31.8
Total	100.0

Table 2. ***Streptococcus pneumoniae*** **LabDOSS reports, January 1992 to June 1994, by reported risk factor**

Risk factor	Reports (%)
HIV infection	1.3
Neutropaenia	0.4
Diabetes	0.7
Renal failure	0.7
Transplant	0.4
Other immunocompromised	2.5
Malignancy	3.6
Pregnant	0.4
Preterm neonate	0.7
Abdominal surgery	0.4
Orthopaedic surgery	0.2
Other surgery	0.4
Hospital-acquired	0.2
No risk factor	88.3
Total	100.0

Figure 1. ***Streptococcus pneumoniae*** **LabDOSS reports per 10 contributing laboratories, January 1992 to June 1994, by month of specimen collection**



Results

There were 554 reports of pneumococcal sepsis reported to the LabDOSS scheme from 1 January 1992 to 30 June 1994. The sexes were equally represented, the male to female ratio being 1.1:1.0. In children under five years of age, there was a slight predominance of males, the male to female ratio for the years 1992 to 1994 ranging from 1.2:1 to 1.3:1. A clinical diagnosis was provided for 378 reports (68.2%) (Table 1). Lower respiratory tract disease was the most frequently reported diagnosis, reported for 79% of cases with known diagnosis. Meningitis was second most frequently reported diagnosis reported for 13.5% of cases with known diagnosis. Data on risk factors for acquiring sepsis were only provided for 65 reports (11.7 %); they included a variety of immunosuppressive and other conditions (Table 2).

Reports of *Streptococcus pneumoniae* sepsis have been increasing in recent months, with 132 reports from 1 January 1994 to 30 June 1994. Both techniques of standardisation of pneumococcal reports in this expanding surveillance system reveal an increase in pneumococcal sepsis reports in 1994 compared with 1993 (Figures 1 and 2). The reporting levels in 1994 are similar to levels seen in 1992, the first year of LabDOSS surveillance.

The age distribution of pneumococcal reports in 1994 has altered with a greater proportion of reports of sepsis in children (Figure 3). Children under five years of age comprised 31% of reports in 1992, 22% of reports in 1993 and 41% of reports from January to June 1994.

New South Wales laboratories provided half of the reports for all organisms in 1994 (Table 3). Only 3% of all reports originated in the Northern Territory, yet 11% of pneumococcal reports were provided from this Territory. Sixteen per cent of pneumococcal reports for children under five years of age were from the Northern Territory.

Figure 2. ***Streptococcus pneumoniae*** **LabDOSS reports as a proportion of total reports, January 1992 to June 1994, by month of specimen collection**

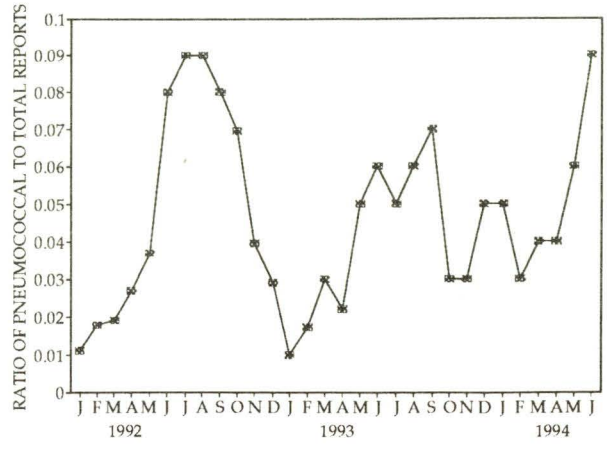
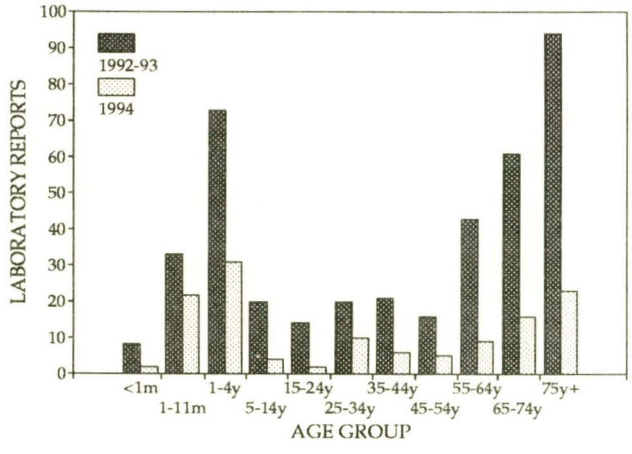


Table 3. LabDOSS reports of all organisms, *Streptococcus pneumoniae* for all age groups and *Streptococcus pneumoniae* for children under five years, January 1994 to June 1994, by State or Territory of contributing laboratory

State or Territory	All organisms (%)	*Streptococcus pneumoniae*, all ages (%)	*Streptococcus pneumoniae*, children under 5 years (%)
New South Wales	51	47	49
Queensland	14	16	19
South Australia	11	6	0
Western Australia	8	6	5
ACT	6	3	4
Tasmania	7	9	7
Northern Territory	3	11	16
Total	100	100	100

Figure 3. *Streptococcus pneumoniae* LabDOSS reports, January 1992 to June 1994, by age group and time period



Discussion

Limitations of the LabDOSS system include bias in utilising sentinel laboratories, provision of potentially incomplete clinical information by laboratory personnel, and for pneumococcal reports, the absence of serotype data. However, establishment of the LabDOSS surveillance scheme has enabled development of baseline data for invasive pneumococcal disease. The age distribution and clinical pattern of illness in LabDOSS reports are similar to known patterns of invasive pneumococcal disease.

These preliminary data suggest invasive pneumococcal disease in Australia is following a biennial trend with peaks in the winter months. Half of the reports of sepsis were reported associated with respiratory symptoms, most likely due to *Streptococcus pneumoniae*. An interesting observation is the parallel pattern of parainfluenza type 1 laboratory reports with epidemic periods in autumn 1992 and 1994[2].

The age distribution shift to a larger proportion of children in 1994 is largely attributable to growth of the scheme incorporating Princess Margaret Hospital for Children, Western Australia and Alice Springs Hospital, Northern Territory.

High rates of pneumococcal disease, an outbreak of *Streptococcus pneumoniae* serotype 1 infection and presence of risk factors for developing pneumococcal sepsis have been shown in studies in the Northern Territory[3,4]. The high proportion of 1994 LabDOSS reports of pneumococci from one hospital laboratory in the Northern Territory, particularly in children under five years of age, may reflect the high endemicity of pneumococcal disease[5] in that area of Australia.

Continuing surveillance by the LabDOSS scheme will assist in elucidating the consistency of these patterns.

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OVERSEAS BRIEFS

In the last two weeks, the following information has been supplied by the World Health Organization.

Influenza in New Zealand

New Zealand has experienced small outbreaks of influenza since the beginning of May. Isolates have been mainly influenza A H_3N_2 but there have also been two influenza B isolates and one influenza A H_1N_1 isolate. General practitioner consultation rates have been highest in the Southland and Otago health Districts.

Plague in Peru

A total of 420 cases of plague and 19 deaths have been reported from 1 January to 20 May this year from Peru. They occurred in the Departments of Cajamarca, La Libertad and Lambayeque. La Libertad and Lambayeque Departments have been added to the infected areas list.

Cholera update

Cases have been reported for April, May and June from Brazil, Costa Rica, El Salvador, Ghana, Hong Kong, India, Laos, Mozambique, Nepal (for the first time this year), and Somalia.

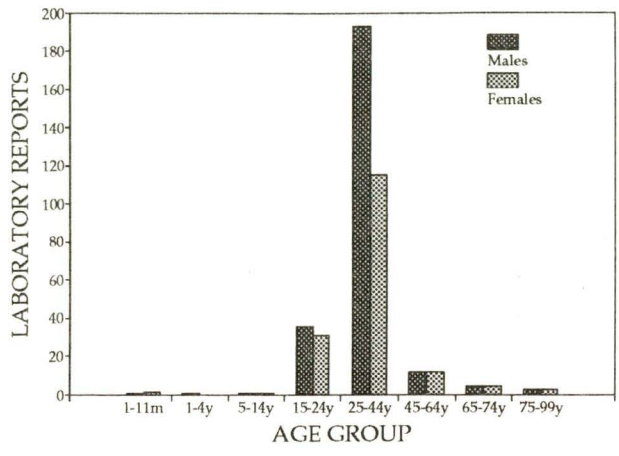
COMMUNICABLE DISEASES SURVEILLANCE

Virology and Serology Reporting Scheme

There were 2610 reports received in the *CDI* Virology and Serology Reporting Scheme this fortnight (Tables 8, 9 and 10). Included were 1015 reports from South Australia with specimen collection dates dating back to April.

- Twenty-six reports of **measles** were received this period, 15 from Queensland. Included were 15 males and 11 females, 22 of whom were in the 5 to 24 year age group. Included was a 14 year old male with clinical SSPE (diagnosis by single high titre in CSF and blood). The number of reports has remained stable since January.
- **Mumps** was reported for 6 patients this fortnight, 4 males including a 31 year old with orchitis, and 2 females. Diagnosis was by viral IgM detection in all cases.
- **Rubella** was reported for 8 patients this fortnight, 2 females 27 and 30 years of age and 6 males in the age range one month to 21 years. Included was a one month old male with congenital disease (congestive cardiac failure and hepatosplenomegaly), diagnosed by IgM detection.
- Thirteen reports of **hepatitis A** were received, 7 males and 6 females, all in the age range 5 to 44 years. One patient reported recent overseas travel.
- Positive **hepatitis B** serology was reported for 86 patients this fortnight, 50 males and 35 females (1 sex not stated). Forty two patients were in the 25 to 44 year age group, and 22 in the 15 to 24 year age group. One patient reported a history of injecting drug use.
- Positive **hepatitis C** serology was reported for 434 patients this fortnight, 255 males and 170 females (9 sex not stated). Three hundred and sixteen reports were for the 25 to 44 year age group (Figure 1). Included were 20 injecting drug users, 2 immunocompromised patients, a 67 year old male with hepatocellular carcinoma, one HIV positive patient, one haemophiliac and the index case in a needle stick injury.
- **Ross river virus** was reported for 29 patients this period, 14 males and 15 females. All but one, a 46 year old female from Rosevale, Queensland were presumptive diagnoses.
- **Barmah forest virus** was reported for 6 patients this fortnight, 3 males and 3 females, all in the age range 45 to 79 years. All were presumptive diagnoses (IgM positive), with specimen collection dates in mid-June.

Figure 1. Hepatitis C laboratory reports for the reporting period by age group and sex



- Eighty-two reports of **adenovirus** were received this fortnight, 51 virus isolations, 27 antigen detections and 4 serological diagnoses. Included was **adenovirus type 5** isolated from the nasopharynx of a one year old male with pneumonia (parainfluenza virus type 1 was also diagnosed for this patient). **Untyped adenovirus** was isolated from the urine of a 9 year old male bone marrow transplant recipient and from the eye of a 6 year old female with eye disease. This virus was also diagnosed by fourfold rise in titre for a 74 year old male with pneumonia.
- **Herpes simplex virus type 1** was reported for 270 patients this fortnight, 266 isolations and 4 antigen detections. Included was virus isolated from a genital specimen from a 29 year old pregnant female at 39 weeks gestation.
- Two hundred and ninety reports of **herpes simplex virus type 2** were recieved this period, 7 diagnosed by antigen detection, the remainder by virus isolation.
- There were 81 reports of **cytomegalovirus** infection this fortnight, 39 virus isolates, one antigen detection, 33 IgM detections and 8 single high titres. Included was isolation from the nasopharynx of a 10 month old female with congenital heart disease. Also included were 4 transplant recipients, 2 patients with malignancies, 3 pregnant women (one, a serological diagnosis for a 24 week pregnant female) and one pre-term neonate.
- **Varicella-zoster virus** was reported for 50 patients this fortnight, 32 virus isolations, 12 antigen detections and 6 IgM detections. Included was a serological diagnosis for a 19 year old pregnant female with clinical chickenpox at 9 weeks gestation.
- **Papovavirus** was isolated from the urine of a 33 year old HIV positive male. This patient also had CMV retinitis.
- Orf-like **poxvirus** was detected by electron microscopy in a skin specimen from a 23 year old Victorian male.
- Five reports of **parvovirus** were recieved this fortnight including 22, 37 and 44 year old females all with arthralgia.
- **Coxsackievirus type A16** was reported for 6 patients this fortnight, all from Victoria. Included were isolations from the skin of a 15 year old and the skin, nasopharynx and faeces of a 20 year old, both males with hand, foot and mouth disease. More reports than usual were received for the month of March.
- **Echovirus type 30** was isolated from the faeces of a febrile 5 day old male whose mother had fever and abdominal pain prior to delivery. The number of reports continued to decline in April and May.
- Forty-two untyped **enterovirus** reports were received this period, 38 virus isolations and 4 single high titres. Included was virus isolation from the brain of a 2 year old female who had died of SIDS.
- **Rhinovirus** was reported for 37 patients this fortnight 16 of whom were under the age of 4 years.
- **Influenza A** was reported for 111 patients this fortnight, 19 antigen detections, 71 virus isolations, 5 fourfold rises in titre and 16 single high titres. Included were 63 males and 48 females, 11 over the age of 65. An A/Guangdong/25/93-like (H_3N_2) virus was isolated from a 30 year old Victorian male, and an H_3N_2 isolate reported for a 39 year old Victorian female. For the year to date 50% of influenza A reports have been for the under 14 year age group and 14% over the age of 65 years (Figure 2).
- Five reports of **influenza B virus** were received this period, 2 for patients over the age of 65 years. Method of diagnosis was antigen detection (3) and fourfold rise in titre (2).
- **Parainfluenza virus type 1** was reported for 56 patients this period 49 of whom were under the age of 4 years. Twenty-eight diagnoses were by virus isolation and 28 by antigen detection. The number of reports remained high for the month of June.
- Fourteen reports of **parainfluenza virus type 3** were received this fortnight, 9 reported for patients under the age of 4 years. Diagnosis was by virus isolation (9), antigen detection (4) and single high titre (one).
- Untyped **parainfluenza virus** was reported for 6 patients this period, all under the age of 4 years (diagnosis by antigen detection).

Figure 2. Influenza A laboratory reports, 1994, by age group and sex

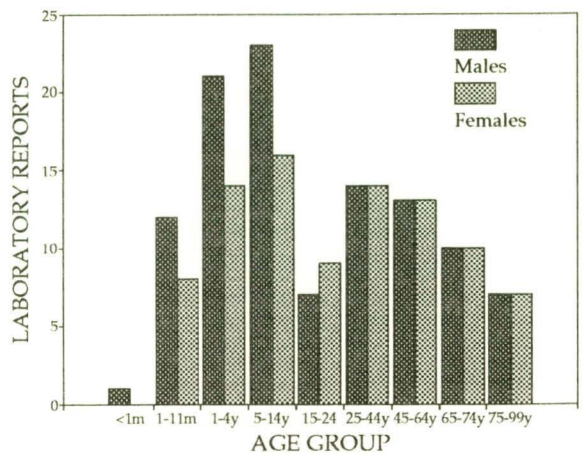


Figure 3. RSV laboratory reports, 1989-93 average and 1994, by month of specimen collection

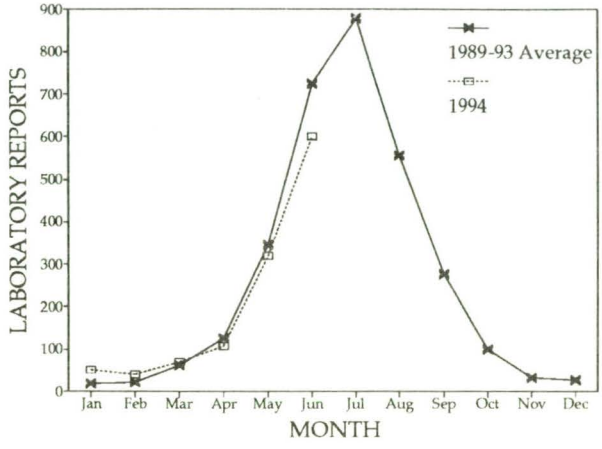
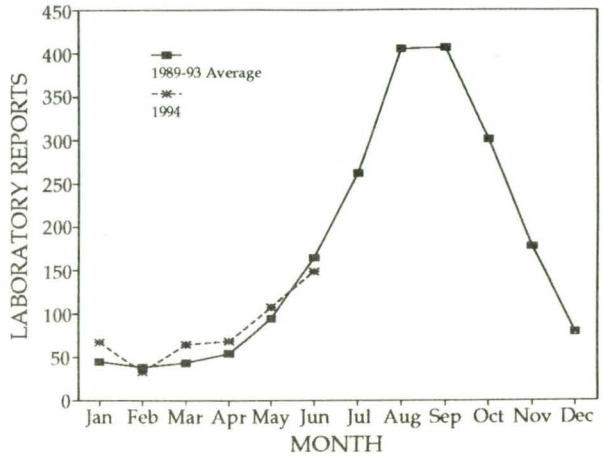


Figure 4. Rotavirus laboratory reports, 1989-93 average and 1994, by month of specimen collection



- Four hundred and forty-two reports of **respiratory syncytial virus (RSV)** were received this fortnight, 314 for patients under one year of age and a total of 419 under the age of 4 years. Diagnosis was by virus isolation (118), antigen detection (323) and single high titre (one). The number of reports continues to rise (Figure 3).
- **Rotavirus** was reported for 91 patients this period, 47 males and 44 females. Eighty-four patients were less than 4 years of age, 34 being in the under one year age group. The number of reports continues to increase as is usual for the time of year (Figure 4).
- One hundred and forty-six reports of *Chlamydia trachomatis* were received this fortnight, 91 females and 53 males (2 sex not stated). One hundred and twenty-two patients were in the 15 to 44 year age group. Diagnosis was by culture (69), antigen detection (74) and serology (3).
- *Chlamydia psittaci* was reported for five patients this period. Included was a 51 year old Victorian female with a 9 day history of pneumonia and fever who had recently acquired parrots.
- Forty-three reports of *Mycoplasma pneumoniae* were received, 21 males and 22 females.
- **Q fever** was reported for 13 patients this period diagnosed by fourfold rise in titre (5), and IgM detection (8). Included was a 47 year old unimmunised South Australian male who works with hides.
- Nineteen reports of *Bordetella species* were recieved this fortnight, 14 *Bordetella pertussis* and 5 *Bordetella* **species**. Included were 10 males and 9 females, age range one month to 74 years. Diagnosis was by IgA detection (12), IgM detection (4), antigen detection (2) and single high titre (one).
- *Toxoplasma gondii* was reported for 12 patients this period, 6 from New South Wales, 4 from Victoria and one each from Queensland and Tasmania. Included were 7 males and 5 females, 2 of whom were pregnant and another who had had a recent missed abortion.

Australian Sentinel Practice Research Network

Data for weeks 26 and 27 are included in this issue of *CDI* (Table 1). There were 9657 consultations reported for week 26 and 9365 for week 27. Influenza was reported at slightly higher rate this fortnight than last fortnight. Gastroenteritis continues to be reported at weekly rates between 10 and 15 per 1000 encounters.

Table 1. Australian Sentinel Practice Research Network, weeks 26 and 27 1994

Condition	Week 26, to 3 July 1994		Week 27, to 10 July 1994	
	Reports	Rate per 1000 encounters	Reports	Rate per 1000 encounters
Influenza	227	23.5	281	30.0
Measles	2	0.2	0	0
Chickenpox	15	1.6	9	1.0
Pertussis	2	0.2	8	0.9
Gastroenteritis	104	10.8	103	11.0

National Influenza Surveillance 1994

Australian Capital Territory Department of Health; Australian Defence Force; Australian Sentinel Practice Research Network; Communicable Diseases Intelligence Virology and Serology Reporting Scheme Contributing Laboratories; New South Wales Department of Health; Telecom Australia; Victorian Department of Health and Community Services; World Health Organization (WHO) Collaborating Centre for Influenza Reference and Research, Melbourne

Overall this fortnight, there was a large number of laboratory reports of influenza received, mainly influenza A and mainly from South Australia and Western Australia. The rate of influenza reporting from sentinel general practitioner surveillance increased this fortnight and the reported rate of absenteeism remained static. No data were available for the New South Wales surveillance schemes this fortnight.

Sentinel general practitioner surveillance (Figure 5)

- The **Australian Sentinel Practice Research Network** reported for 9657 consultations for week 26 (ending 3 July) and 9365 consultations for week 27 (ending 10 July). There were 227 reports of influenza in week 26 (23.5 per 1000 encounters) and 281 reports in week 27 (30.0 per 1000 encounters). Reporting rates in Queensland, Tasmania and Victoria have been above the National average and those of New South Wales, Western Australia and the Northern Territory were lower. Victorian sentinel GPs reported influenza at a rate of 48.1 per 1000 consultations in week 27.
- The **Australian Capital Territory Sentinel General Practitioner Scheme** reported 19 influenza consultations for the week ending 2 July (44.8 per 1000 consultations) and 35 for the week ending 9 July (63.0 per 10000 consultations). The rates have continued to rise this fortnight.
- The **Victorian Sentinel Practitioner Scheme** reported 62 influenza cases in the fortnight ending 8 July. They were reported at a rate of 14 per 1000 consultations, lower than the rate for the previous fortnight.

Absenteeism surveillance (Figure 6)

- **Telecom Australia Absenteeism Surveillance** reported absenteeism rates of 1.2% on 6 July and 0.4% on 13 July. Recent absenteeism rates reported by this Scheme are lower than those reported earlier in the year.
- The **Australian Capital Territory Schools Absenteeism Surveillance** revealed absenteeism rates of 6.4% on Tusday 12 July and 7.4% on Tuesday 19 July.

Laboratory surveillance

- The ***CDI* Virology and Serology Reporting Scheme** has received 191 reports of influenza A so far this year, 120 other than single high titres. A marked increase was observed in the number of reports with specimen collection dates in late June (Figure 7). **Influenza A** was reported for 111 patients this fortnight, 19 antigen detections, 71 virus isolations, 5 fourfold rises in titre and 16 single high titres. Included were 63 males and 48 females, 74 in the under 14 year age group and 11 over the age of 65 years. Included was an A/Guangdong/25/93-like H_3N_2 virus isolated from a 30 year old Victorian male, and an H_3N_2 isolate reported for a 39 year old Victorian female.
- There have been 30 reports of influenza B so far this year, 12 with diagnoses other than single high titre (Figure 8). Five reports of **influenza B virus** were received this period, 2 for patients over the age of 65 years. Method of diagnosis was antigen detection (3) and fourfold rise in titre (2).

Figure 5. Sentinel general practitioner influenza cases per 1000 encounters, by week and scheme

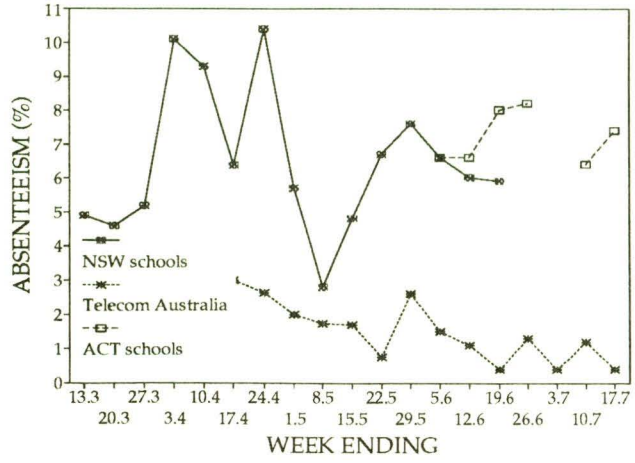


Figure 6. Absenteeism rates per 100 employees or students, by week and scheme

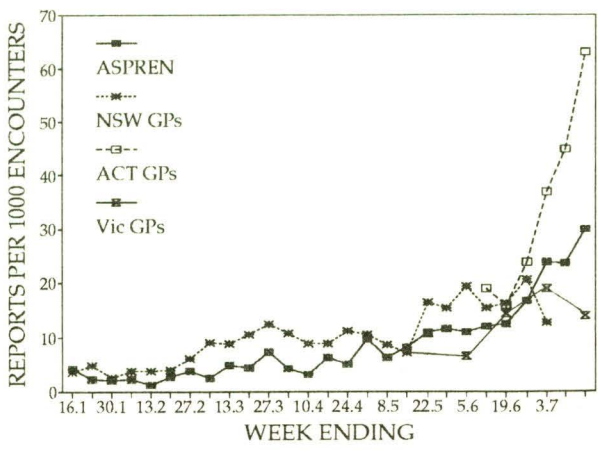


Figure 7. Influenza A laboratory reports, 1994, by method of diagnosis and week of specimen collection

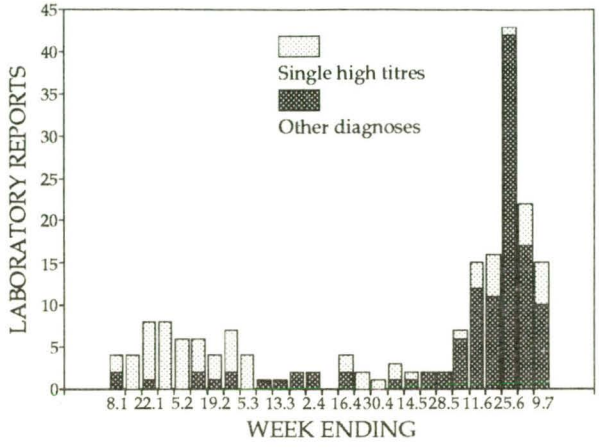
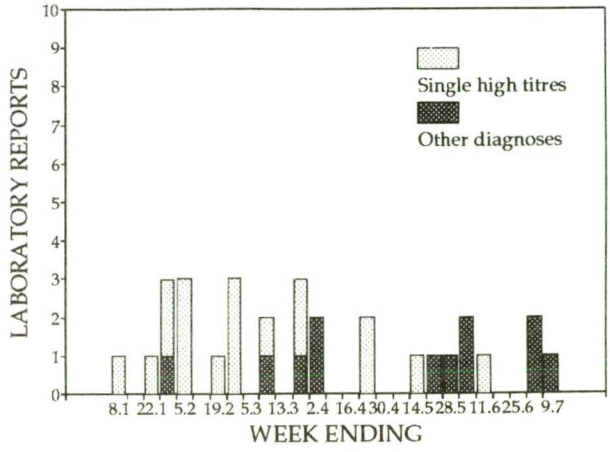


Figure 8. Influenza B laboratory reports, 1994, by method of diagnosis and week of specimen collection



- The majority of influenza isolates (94%) received for analysis by the **WHO Collaborating Centre for Influenza Reference and Research** have been influenza A. Twenty-one influenza A isolates and 2 influenza B isolates have been analysed to date. All of the influenza A strains studied have been H_3 subtype viruses and are antigenically related to A/Beijing/32/92. There is some antigenic heterogeneity and the isolates generally react strongly with antisera prepared against A/Beijing/32/92 and the further drift variants A/Shandong/9/93 and A/Guangdong/25/93 (Table 2). The 2 type B isolates analysed to date are antigenically close to B/Panama/45/90.

Other surveillance

- **Victorian total deaths surveillance:** there were 1417 deaths reported in Victoria in the fortnight ending 8 July. This was a rate of 3.1 per 10,000 population, higher than the rate reported for the previous fortnight.
- **Victorian hospital admissions:** there were 59 admissions for influenza and/or pneumonia in three Victorian hospitals in the fortnight ending 8 July, at a rate of 1.2 per 100 admissions. This was a higher rate than in the previous fortnight.

Table 2. Haemagglutination-inhibition reactions for influenza H_3 strains analysed by the WHO Collaborating Centre for Influenza Reference and Research, 1994

	Antiserum		
Virus strain	A/Beijing	A/Shandong	A/Guangdong
A/Beijing/32/92	**640**	160	160
A/Shandong/9/93	320	**640**	160
A/Guangdong/25/93	160	320	**1280**
A/Perth/3/94	320	640	160
A/Victoria/1/94	640	640	640
A/South Aust/3/94	320	640	1280

Sterile Sites Surveillance (LabDOSS)

There were 211 reports of recent sepsis this fortnight, provided by 11 laboratories:

New South Wales: South West Area Pathology Health Service, Liverpool 42; John Hunter Hospital, Newcastle 48.

Queensland: Sullivan, Nicolaides and Partners 12; Nambour General Hospital 7; Greenslopes Repatriation Hospital 11; Toowoomba Pathology Laboratory 20; Ipswich General Hospital 8.

Western Australia: Princess Margaret Hospital for Children, Perth 9.

Tasmania: Royal Hobart Hospital 31; Northern Tasmanian Pathology Service, Launceston 4.

ACT: Woden Valley Hospital, Canberra 19.

A further 26 records were provided by South West Area Pathology Service, Liverpool for sepsis prior to 1 June 1994.

Organisms reported 5 or more times from blood are detailed in Table 3. Other blood isolates not included in Table 3 were:

Gram positive: 1 *Bacillus* species, 2 *Enterococcus faecalis*, 1 *Enterococcus faecium*, 1 *Enterococcus* species, 2 group A *Streptococcus*, 1 group D *Streptococcus*, 1 group F *Streptococcus*, 1 *Streptococcus* 'milleri', 1 group G *Streptococcus*, 1 *Streptococcus mitis*, 1 *Streptococcus oralis*, 2 *Streptococcus salivarius*, 3 *Streptococcus sanguis*, 2 *Streptococcus* 'viridans'.

Table 3. LabDOSS reports of blood isolates, by organism and clinical information

Organism	Clinical information						Risk factors					Total[1]
	Bone/joint	Lower respiratory	Endocarditis	Gastrointestinal	Urinary tract	Skin	Surgery	Immunosuppressed	IV line	Hospital acquired	Neonatal	
Staphylococcus aureus	7	1	1	1	3	5	4	6		1		41[2]
Staphylococcus epidermidis		3			1			2	1			10
Staphylococcus coagulase negative								7				20
Streptococcus Group B		1	1				1				1	5
Streptococcus pneumoniae		13										19
Escherichia coli					11							31
Klebsiella pneumoniae		1										5
Pseudomonas aeruginosa								2		1		5

1. Only organisms with 5 or more reports are included in this table.
2. MRSA 7.

Table 4. LabDOSS reports of meningitis and/or CSF isolates, by organism and age group

	1-11 months	1-4 years	5-14 years	15-24 years	45-54 years	65-74 years	75+ years	Total
Neisseria meningitidis[1]	2	2			1			5
Probable *Neisseria meningitidis*[2]			1					1
Escherichia coli							1	1
Staphylococcus epidermidis				1				1
Haemophilus influenzae		1						1
Streptococcus pneumoniae		1				1		2

1. 3 NSW, 1 group B, 1 group C, 1 not groupable; 1 WA group C, 1 ACT goup B.
2. Clinical meningitis and gram negative diplococci seen in CSF.

Gram negative: 1 *Neisseria meningitidis* serogroup C (42 year old male from New South Wales), 1 *Kluyvera* species (2 year old with neutropaenia), 1 *Acinetobacter baumanii*, 2 *Acinetobacter* species, 1 *Branhamella catarrhalis*, 3 *Enterobacter cloacae*, 1 *Enterobacter* species, 4 *Klebsiella oxytoca*, 2 *Klebsiella* species, 3 *Proteus mirabilis*.

Anaerobes: 1 *Clostridium barati*, 2 *Bacteroides fragilis*, 2 *Bacteroides* species.

Meningitis and/or CSF isolate reports

There were 11 reports of meningitis and/or CSF isolates (Table 4).

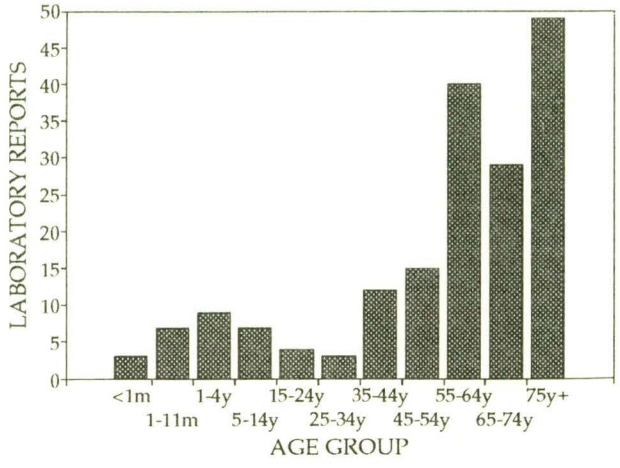
Most patients were over the age of 65 years (Figure 9).

Isolates from sites other than blood or CSF

Peritoneal fluid: 2 *Staphylococcus aureus*, 1 *Streptococcus* 'viridans'.

Joint fluid: 1 *Staphylococcus aureus*, 1 *Streptococcus sanguis*, 1 *Clostridium perfringens*.

Figure 9. LabDOSS reports of blood isolates, by age group



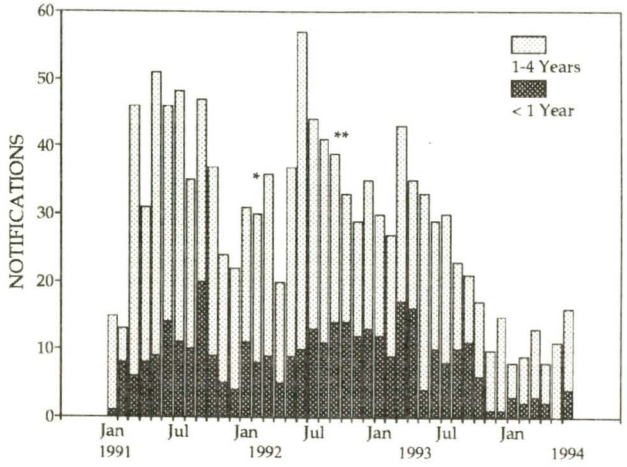
Other: 4 *Staphylococcus aureus*, 1 MRSA, 3 *Streptococcus milleri*, 1 *Enterococcus faecalis*, 2 *Escherichia coli*, 1 *Klebsiella oxytoca*, 1 *Pseudomonas aeruginosa*, 1 coagulase negative *Staphylococcus*.

National Notifiable Diseases Surveillance System, 26 June to 9 July 1994

There were 1745 notifications received in the period (Tables 5, 6 and 7 and Figure 13).

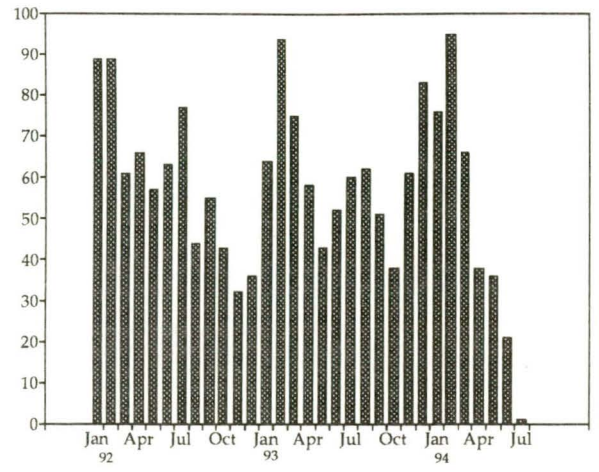
- Fifty-four notifications of **Ross River virus infection** received; 27 cases were male and 27 were female. Recorded ages ranged from the 5-9 to the 75-79 years age group. Onset dates were April (3), May (10), and June (41).
- A single case of **brucellosis** was notified for a male in the 55-59 years age group who was a resident of rural Queensland. The recorded onset date was in June.
- There were 77 cases of **gonococcal infection** reported in the period. Fifty-five cases were male and 22 were female. The cases were aged between the 10-14 and the 60-64 years age group.
- Seven cases of ***Haemophilus influenzae* type b infection** were reported (Figure 11). Six cases were male and one was female. Cases were aged between the 0-4 to the 30-34 years age group with 5 cases aged less than five years of age. All recorded onset days were in June and there no apparent clusters.
- There were 84 cases of **hepatitis A** reported; 42 cases were male, 39 were female, and sex was unrecorded for 3 cases. Recorded ages ranged from the 0-4 to the 60-64 years age groups with 63% of cases aged less than 30 years.
- Forty-four notifications of **hepatitis B** were received; 11 cases from States or Territories that report incident cases only. Six incident cases were male, 4 were female, and the sex of one incident case was unrecorded. Recorded ages of incident cases ranged from the 15-19 to the 55-59 years age group.
- There were 4 notifications of **hydatid infection**; 3 cases were male and one case was female. The cases ranged in age from the 15-19 to the 45-49 years age group. Two cases were resident in the Sydney Statistical Division, one case resident in the Hunter Statistical Division in New South Wales, and one case resident in the Perth Statistical Division.
- Eight notifications of **legionellosis** were received; 6 cases were male and 2 were female. One case was in the 25-29 years age group and the remainder were in the 60-69 years age group. Four of the cases were resident in the Sydney Statistical Division with onset dates with in a nine day period in late June.
- A single case of **leptospirosis** was reported for a male in the 40-44 years age group who was resident in Far North Queensland. The recorded onset date was May.
- Seven cases of **malaria** were reported. All cases were male and they ranged in age from the 20-24 to the 30-34 years age group. Onset dates were February (one), May (one), June (6), and July (one). Data from January 1992 show a peak in notifications in the first 3 months of each year (Figure 12).
- The number of notifications of **measles** remains high with 168 cases reported in the period. Ninety cases were male, 71 cases were female, and sex was unrecorded for 7 cases. Recorded ages were between the 0-4 to the 70-74 years age group with a mean age of 13.6 years. Twelve cases were recorded for infants less than one year. There were 25 apparent clusters of two or more cases each from the same postcode area.

Figure 11. *Haemophilus influenzae* type b infection notifications, January 1991 to June 1994, by age and month of onset



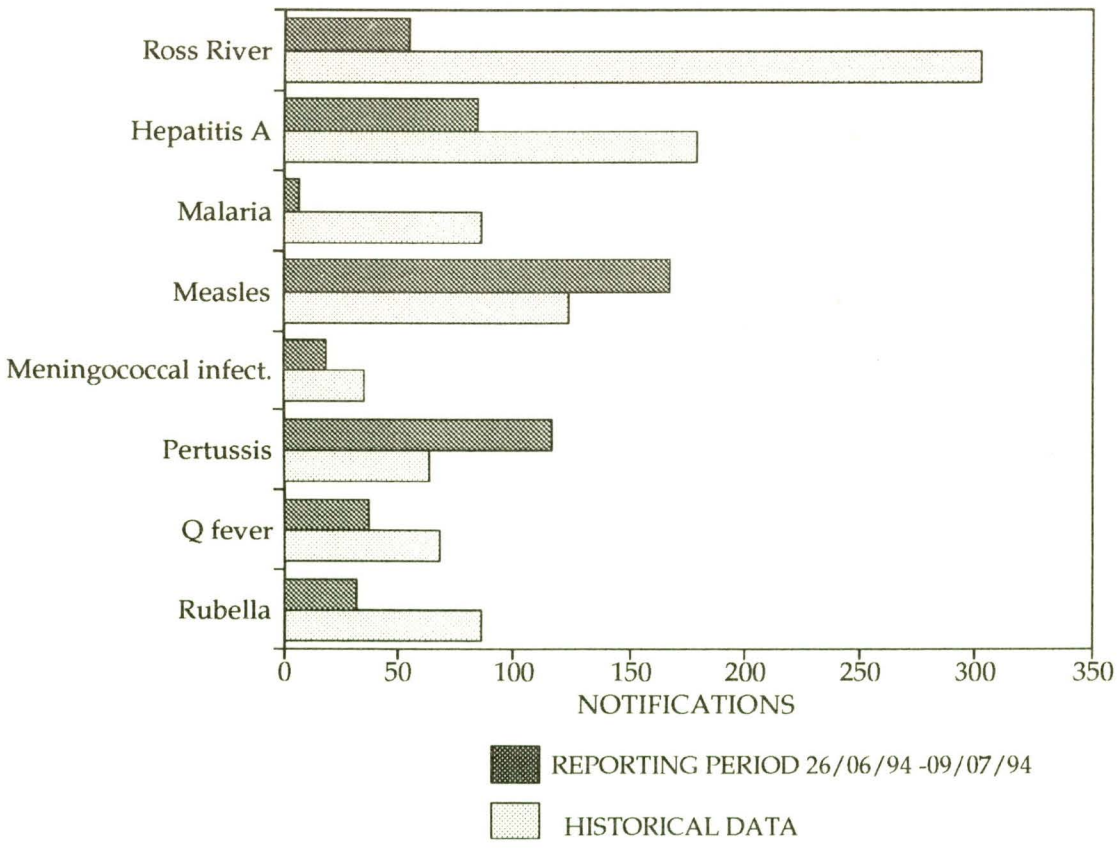
* PRP-D approved in February 1992.
** Infant vaccine approved in September 1992.

Figure 12. Malaria notifications by month of onset January 1992 to June 1994



- Nineteen cases of **meningococcal infection** were reported; 8 cases were male and 11 were female. Recorded ages were between the 0-4 to the 75-79 years age group with 13 of the cases aged less than 20 years. There was an apparent cluster of two cases in the same postcode area in Queensland with onset dates 7 days apart in June.
- There were 117 notifications of **pertussis** received; 60 cases were male and 57 were female. Recorded ages were between the 0-4 and the 75-79 years age group with 7 cases aged less than one year. There were 18 apparent clusters of two or more cases each in the same postcode area.
- Thirty-seven cases of **Q fever** were reported; 31 cases were male and 6 were female. Recorded ages were between the 15-19 and the 65-69 years age group. Fifty-four percent of the cases were resident in Queensland.
- Thirty-two cases of **rubella** were reported; 18 cases were male and 14 cases were female. Recorded ages were from the 0-4 to the 70-74 years age group with a mean age of 20.6 years. Nine cases were recorded in females in the 15-44 years age group.
- There were 46 cases of **syphilis** reported in the period; 21 cases were male, 22 were female, and sex was unrecorded for 3 cases. A single cases was recorded for an infant less than one year.
- Twenty-one notifications of **tuberculosis** were received; 11 cases were male and 10 cases were female. Cases were aged between the 0-4 and the 85-89 years age group. Onset dates were in January (one), February (2), March (one), May (8), and June(9).
- A single case of **typhoid** was reported in a female in the 10-14 years age group who was resident in Perth.

Figure 13. Selected National Notifiable Diseases Surveillance System reports, and historical data[1]



1. The historical data are the averages of the number of notifications in 6 previous 2-week reporting periods: the corresponding periods of the last 2 years and the periods immediately preceding and following those.

Table 5. Notifications of diseases preventable by vaccines recommended by the NHMRC for routine childhood immunisation, received by State and Territory health authorities in the period 26 June to 9 July 1994

DISEASES	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	TOTALS FOR AUSTRALIA[1]			
									This period 1994	This period 1993	Year to date 1994	Year to date 1993
Diphtheria	0	0	0	0	0	0	0	0	0	0	23	12
Haemophilus influenzae b infection	0	1	0	5	0	0	1	0	7	19	115	252
Measles	2	4	4	146	2	4	4	2	168	132	1882	917
Mumps	1	0	NN	NN	0	NN	0	0	1	2	10	6
Pertussis	0	18	0	61	20	1	3	14	117	68	2824	863
Poliomyelitis	0	0	0	0	0	0	0	0	0	0	0	0
Rubella[2]	2	0	2	17	2	0	4	5	32	74	789	1617
Tetanus	0	0	0	NN	0	0	0	0	0	0	9	7

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.
2. NT, Tas: CRS only.

NN Not Notifiable.

Table 6. Notifications of other diseases[1] received by State and Territory health authorities in the period 26 June to 9 July 1994

DISEASES	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	TOTALS FOR AUSTRALIA[2]			
									This period 1994	This period 1993	Year to date 1994	Year to date 1993
Arbovirus infection												
Ross River virus infection	0	11	0	42	-	NN	1	0	54	152	3578	4624
Dengue	0	-	0	0	-	NN	0	0	0	38	13	274
NEC[3]	0	2	NN	15	0	0	1	0	18	20	428	358
Campylobacteriosis[4]	11	-	10	80	93	9	60	43	306	231	4905	4080
Chlamydial infection (NEC)[5]	6	NN	13	99	0	14	39	28	199	262	3348	3517
Donovanosis	0	NN	0	0	NN	NN	0	0	0	5	55	29
Gonococcal infection[6]	0	11	15	27	0	0	0	24	77	123	1543	1624
Hepatitis A	0	18	2	48	3	0	2	11	84	65	1079	1115
Hepatitis B[7]	0	3	1	26	1	1	1	4	37	64	939	1308
Hepatitis C	0	0	0	124	1	2	72	81	280	328	4630	3470
Hepatitis (NEC)	0	0	0	0	1	0	0	NN	1	2	24	41
Legionellosis	0	6	0	1	1	0	0	0	8	5	116	107
Leptospirosis	0	0	0	1	0	0	0	0	1	7	88	97
Listeriosis	0	0	0	0	0	0	0	0	0	2	17	28
Malaria	1	4	0	0	0	2	0	0	7	8	388	346
Meningococcal infection	0	7	1	6	0	0	2	3	19	18	158	130
Ornithosis	0	NN	0	0	1	0	0	0	1	2	51	49
Q fever	0	10	0	20	7	0	0	0	37	33	365	435
Salmonellosis (NEC)	2	29	28	50	11	5	23	18	166	125	3477	2876
Shigellosis[4]	0	-	4	4	0	0	3	6	17	17	428	430
Syphilis	0	29	6	11	0	0	0	0	46	75	1120	1222
Tuberculosis	1	9	0	6	0	0	2	3	21	73	537	572
Typhoid[8]	0	0	0	0	0	0	0	1	1	0	23	26
Yersiniosis (NEC)[4]	0	-	0	11	5	0	1	0	17	11	262	238

1. For HIV and AIDS, see Tables 2 and 3, *CDI* 1994;18:317. For rarely notified diseases, see Table 7.
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. SA, Tas: includes Ross River virus and dengue.
4. NSW: only as 'foodborne disease' or 'gastroenteritis in an institution'.
5. WA: genital only.
6. NT, Qld, SA and Vic: includes gonococcal neonatal ophthalmia.
7. Acute cases only are reported by NSW, NT, SA, Tas, ACT and WA.
8. NSW and Vic includes paratyphoid.

NN Not Notifiable.

NEC Not Elsewhere Classified.

- Elsewhere Classified.

Table 7. Notifications of rare[1] diseases received by State and Territory health authorities in the period 26 June to 9 July 1994

DISEASES	Total this period	Reporting States or Territories	Year to date 1994
Botulism	0		0
Brucellosis	1	Qld	9
Chancroid	0		0
Cholera	0		3
Hydatid infection	4	NSW 3, WA 1	25
Leprosy	0		3
Lymphogranuloma venereum	0		0
Plague	0		0
Rabies	0		0
Yellow fever	0		0
Other viral haemorrhagic fevers	0		0

1. Fewer than 50 cases of each of these diseases were notified each year during the period 1988 to 1993.

Table 8. Virology and serology laboratory reports by State or Territory[1] for the reporting period 30 June to 13 July 1994, historical data[2], and total reports for the year

	State or Territory[1]							Total this fortnight	Historical data[2]	Total reported this year
	ACT	NSW	Qld	SA	Tas	Vic	WA			
MEASLES, MUMPS, RUBELLA										
Measles virus		1	15	2		6	2	26	6.7	603
Mumps virus			1		1	4		6	1.7	49
Rubella virus		2	2			1	3	8	16.7	303
HEPATITIS VIRUSES										
Hepatitis A virus			7	4	1		1	13	13.7	196
Hepatitis B virus	1	5	18	25		17	20	86	82.5	1,400
Hepatitis C virus	4	43	46	270	2	6	63	434	132.3	3,257
Hepatitis D virus			1					1	1.3	12
ARBOVIRUSES										
Ross River virus		3	18	5	1	2		29	59.5	1,412
Barmah Forest virus		1	5					6	10.7	177
Flavivirus (unspecified)						1		1	7.0	11
ADENOVIRUSES										
Adenovirus type 1				4		1		5	3.8	40
Adenovirus type 2				2		1		3	3.5	37
Adenovirus type 3				5		1		6	7.7	31
Adenovirus type 5				3		1		4	1.3	8
Adenovirus type 6				1				1	.0	1
Adenovirus type 7				1				1	.5	4
Adenovirus not typed/pending		8	15	27		8	4	62	51.3	703

Table 8. Virology and serology laboratory reports by State or Territory[1] for the reporting period 30 June to 13 July 1994, historical data[2], and total reports for the year, continued

	State or Territory[1]							Total this fortnight	Historical data[2]	Total reported this year
	ACT	NSW	Qld	SA	Tas	Vic	WA			
HERPES VIRUSES										
Herpes simplex virus type 1		8	51	144	1	42	24	270	136.7	2,703
Herpes simplex virus type 2		19	72	127	2	35	35	290	181.7	3,018
Herpes simplex not typed/pending	6	3	1	1		8	1	20	33.7	391
Cytomegalovirus	1	10	37	8		21	4	81	59.2	923
Varicella-zoster virus		3	12	23		8	4	50	28.8	594
Epstein-Barr virus	1	5	10	61	1	13	8	99	57.8	829
Herpes virus group - not typed						1		1	1.5	11
OTHER DNA VIRUSES										
Papovavirus group						1		1	.2	2
Poxvirus group not typed						1		1	.3	3
Parvovirus			3			1	1	5	5.8	42
PICORNA VIRUS FAMILY										
Coxsackievirus A16						6		6	.3	40
Coxsackievirus B2				1				1	.0	19
Echovirus type 5				1				1	.0	5
Echovirus type 6		2						2	4.2	42
Echovirus type 11		1						1	4.2	37
Echovirus type 22						1		1	.7	5
Echovirus type 30				3		2		5	1.5	243
Poliovirus type 1 (uncharacterised)		1				1		2	2.3	17
Poliovirus type 2 (uncharacterised)		3		2				5	1.8	21
Poliovirus not typed/pending		2						2	1.5	20
Rhinovirus (all types)		5	8	1		18	5	37	25.3	528
Enterovirus not typed/pending		5	17	1	1	8	10	42	36.5	787
ORTHO/PARAMYXOVIRUSES										
Influenza A virus		2	3	86		7	11	109	65.3	268
Influenza A virus H_3N_2						2		2	13.2	4
Influenza B virus						5		5	19.5	99
Influenza virus - typing pending						1		1	.5	1
Parainfluenza virus type 1	1		6	22		17	10	56	5.3	433
Parainfluenza virus type 2				2				2	6.8	44
Parainfluenza virus type 3		1	1	6		3	3	14	17.2	161
Parainfluenza virus typing pending						5	1	6	4.0	41
Respiratory syncytial virus	19	100	78	46	4	64	131	442	433.7	1,445
Paramyxovirus (unspecified)		1						1	.0	1
OTHER RNA VIRUSES										
HIV-1		2	1					3	1.7	54
Rotavirus	14	25		20	1	22	9	91	106.5	637
Calici virus		1						1	.8	5
Small virus (like) particle							1	1	2.5	13

Table 8. Virology and serology laboratory reports by State or Territory[1] for the reporting period 30 June to 13 July 1994, historical data[2], and total reports for the year, continued

	State or Territory[1]							Total this fortnight	Historical data[2]	Total reported this year
	ACT	NSW	Qld	SA	Tas	Vic	WA			
OTHER										
Chlamydia trachomatis not typed	3	5	25	89	1	1	22	146	86.7	1,496
Chlamydia psittaci				2		3		5	3.3	43
Chlamydia spp typing pending			2					2	.0	6
Mycoplasma pneumoniae			26	13		4		43	56.2	569
Coxiella burnetii (Q fever)		1	4	6		2		13	16.0	184
Streptococcus group A		2	5					7	7.5	161
Bordetella pertussis	1		1		1	11		14	4.3	346
Bordetella species			5					5	2.0	170
Crytococcus neoformans		2						2	.0	2
Cryptococcus species	1	1						2	.3	10
Leptospira species			1					1	.8	14
Treponema pallidum		7	1					8	16.5	213
Toxoplasma gondii		6	1		1	4		12	1.3	46
Schistosoma species		1						1	.0	3
TOTAL	52	287	499	1014	18	367	373	2,610	1,856.2	24,993

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 9. Virology and serology laboratory reports by clinical information for the reporting period 30 June to 13 July 1994

	Encephalitis	Meningitis	Other CNS	Congenital	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	Muscle/joint	Genital	Other/unknown	Total
MEASLES, MUMPS, RUBELLA													
Measles virus								12				14	26
Mumps virus												6	6
Rubella virus				1				3				4	8
HEPATITIS VIRUSES													
Hepatitis A virus						1	8					4	13
Hepatitis B virus							25					61	86
Hepatitis C virus							97					337	434
Hepatitis D virus												1	1
ARBOVIRUSES													
Ross River virus								3		6		20	29
Barmah Forest virus										2		4	6
Flavivirus (unspecified)												1	1

Table 9. Virology and serology laboratory reports by clinical information for the reporting period 30 June to 13 July 1994, continued

	Encephalitis	Meningitis	Other CNS	Congenital	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	Muscle/joint	Genital	Other/unknown	Total
ADENOVIRUSES													
Adenovirus type 1					5								5
Adenovirus type 2					3								3
Adenovirus type 3					5							1	6
Adenovirus type 5					4								4
Adenovirus type 6					1								1
Adenovirus type 7					1								1
Adenovirus not typed/pending					17	26			3			16	62
HERPES VIRUSES													
Herpes simplex virus type 1					5			127	11		51	76	270
Herpes simplex virus type 2								62			171	57	290
Herpes simplex not typed/pending	3							6			3	8	20
Cytomegalovirus			1		19		1	1	1			58	81
Varicella-zoster virus					2			44		1		3	50
Epstein-Barr virus			1		1		4	1				92	99
Herpes virus group - not typed								1					1
OTHER DNA VIRUSES													
Papovavirus group									1				1
Poxvirus group not typed								1					1
Parvovirus								2		2		1	5
PICORNA VIRUS FAMILY													
Coxsackievirus A16					1			5					6
Coxsackievirus B2												1	1
Echovirus type 5					1								1
Echovirus type 6		2											2
Echovirus type 11												1	1
Echovirus type 22					1								1
Echovirus type 30		1			2							2	5
Poliovirus type 1 (uncharacterised)					2								2
Poliovirus type 2 (uncharacterised)		1			1	1						2	5
Poliovirus not typed/pending												2	2
Rhinovirus (all types)		1			29							7	37
Enterovirus not typed/pending	1	1	2		12	4		3				19	42
ORTHO/PARAMYXOVIRUSES													
Influenza A virus					93							15	108
Influenza A virus H_3N_2					2								2
Influenza B virus					2							3	5
Influenza virus - typing pending					1								1
Parainfluenza virus type 1					56								56
Parainfluenza virus type 2					2								2
Parainfluenza virus type 3					14								14
Parainfluenza virus typing pending					6								6
Respiratory syncytial virus					416							26	442
Paramyxovirus (unspecified)								1					1

Table 9. Virology and serology laboratory reports by clinical information for the reporting period 30 June to 13 July 1994, continued

	Encephalitis	Meningitis	Other CNS	Congenital	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	Muscle/joint	Genital	Other/unknown	Total
OTHER RNA VIRUSES													
HIV-1												3	3
Rotavirus						71						20	91
Calici virus						1							1
Small virus (like) particle						1							1
OTHER													
Chlamydia trachomatis not typed					2				5		125	14	146
Chlamydia psittaci					3							2	5
Chlamydia spp typing pending					2								2
Mycoplasma pneumoniae					20							23	43
Coxiella burnetii (Q fever)					1		1					11	13
Streptococcus group A								1		1		5	7
Bordetella pertussis					12							2	14
Bordetella species					3							2	5
Crytococcus neoformans												2	2
Cryptococcus species		1										1	2
Leptospira species												1	1
Treponema pallidum												8	8
Toxoplasma gondii		1										11	12
Schistosoma species												1	1
TOTAL	4	8	4	1	748	105	136	273	21	12	350	948	2610

Table 10. Virology and serology laboratory reports by contributing laboratories for the reporting period 30 June to 13 July 1994

STATE OR TERRITORY	LABORATORY	REPORTS
Australian Capital Territory	Woden Valley Hospital, Canberra	54
New South Wales	Institute of Clinical Pathology & Medical Research, Westmead	11
	Prince Henry/Prince of Wales Hospitals, Sydney	128
	Royal Alexandra Hospital for Children, Camperdown	119
Queensland	Queensland Medical Laboratory, West End	364
	State Health Laboratory, Brisbane	163
South Australia	Institute of Medical and Veterinary Science, Adelaide	1015
Tasmania	Northern Tasmanian Pathology Service, Launceston	14
	Royal Hobart Hospital	1
Victoria	Commonwealth Serum Laboratories, Melbourne	2
	Monash Medical Centre, Melbourne	14
	Royal Children's Hospital, Melbourne	157
	Victorian Infectious Diseases Reference Laboratory, Fairfield Hospital	195
Western Australia	Princess Margaret Hospital, Perth	167
	State Health Laboratory Services, Perth	206
TOTAL		2610