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Communicable Diseases Section
Department of Health, Housing and Community Services
GPO Box 9848 Canberra ACT 2601.
Fax: (06) 289 7802 Telephone: (06) 289 1555

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A MAJOR OUTBREAK OF ROSS RIVER VIRUS INFECTION IN THE SOUTH-WEST OF WESTERN AUSTRALIA AND THE PERTH METROPOLITAN AREA

Michael Lindsay[1], *Robert Condon*[2], *John Mackenzie*[1], *Cheryl Johansen*[1], *Maria D'Ercole*[1] *and David Smith*[3]

A total of 458 cases of epidemic polyarthritis (Ross River virus (RRV) infection) was reported from the south-west of Western Australia between 1 September 1991 and 30 April 1992. The most striking features of this outbreak were the number of cases which were acquired within the Perth metropolitan area, the involvement of freshwater breeding mosquito species and the possible role of humans in transporting the virus from rural to urban areas.

The number of cases reported was more than six times Western Australia's annual average, making this the second largest recorded outbreak in Western Australia. The largest outbreak occurred during the summer of 1988-89 when over 650 cases were diagnosed in the State's south-west[1,2].

This report discusses the epidemiology of the outbreak using notification and case follow-up information received by the Health Department of Western Australia (HDWA) and positive diagnoses made by the State Health Laboratory Services (SHLS) and four major private laboratories. Vector mosquito populations and environmental conditions in the south-west of Western Australia leading up to and during the outbreak are also discussed.

Human Cases

The first human case for this outbreak was reported to the HDWA on 23 September 1991 from the town of Pinjarra, approximately 85 kms south of Perth. The date of onset of symptoms for the case was 1 September. This was followed by a handful of cases in towns situated on the Peel Inlet, 80 to 100 kms south of Perth, including Mandurah, Pinjarra and South Yunderup. Some cases are reported from this area at this time every year, so there was no indication that an outbreak was about to commence until case numbers began to rise sharply in late November and December.

The locations of cases diagnosed between 1 September 1991 and 30 April 1992 in Western Australia are shown in Figure 1, and in the south-west region of the State in Figure 2. The vast majority of cases occurred in the south-west region (South-West Health Region and metropolitan Perth). The number of cases reported from the south-west peaked in February (Figure 3), based on the date of onset of symptoms. Onset date was used in preference to the date of notification, which in many instances was several weeks or even months after the date of onset of symptoms, and therefore misrepresents patterns of virus and vector activity.

For localities in which more than 20 cases occurred during the outbreak, cases have been broken down by month (Figure 4). Cases were recorded as being from 'the location at which the person was most likely to have been bitten by a mosquito carrying RRV'. This was determined using case follow-up questionnaires, which were available for most cases up to end of March, 1992.

The crude monthly notification rates per 100,000 peaked in the Perth metropolitan area in March and the South-West Health Region in February (Figure 5). Despite the much greater number of cases in Perth, the notification rate in the South-West Region remained at least three times that in the metropolitan area for the duration of the outbreak.

The most commonly infected age group during the epidemic was persons aged between 31 and 40 years (131 cases). This was followed by those aged between 41 and 50 years (104 cases), and then persons aged between 21 and 30 years (89 cases). The ratio of male to female cases was 234:224 (1.05:1). The youngest patient reported during the epidemic was a two year old male from Myalup, and the oldest was an 88 year old male from Yarloop.

Two isolates of RRV were obtained from human serum during the outbreak. One was from the acute phase serum of a patient from Australind with a date of onset of symptoms in October 1991. The other isolate came from the acute phase serum of a patient infected at Nannup in February 1992.

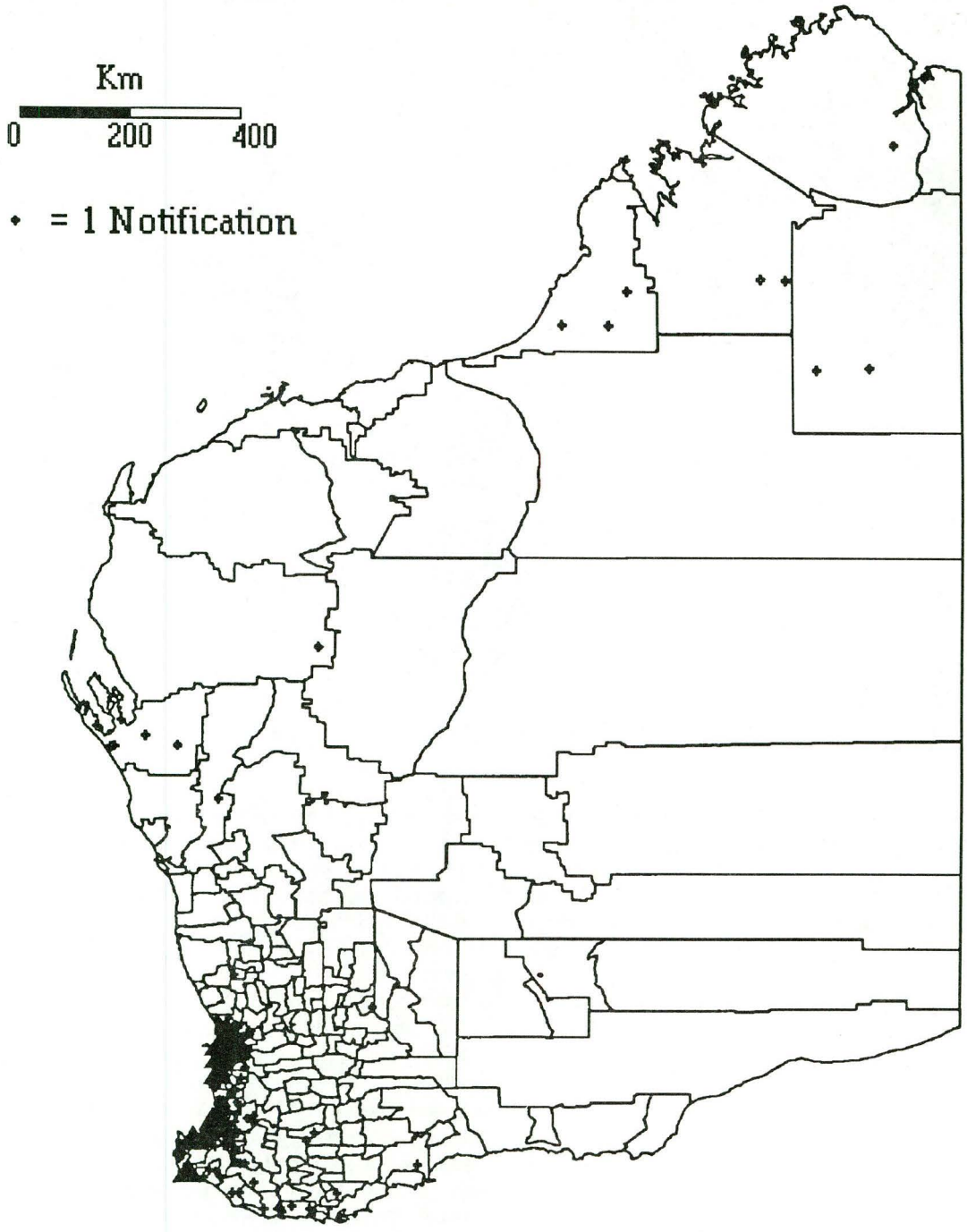
Epidemiology of the Outbreak

A record amount of rain fell in the south-west between November 1991 and the end of February 1992. Spring rains persisted into the summer months with very heavy showers in early December and around Christmas 1991 and again in early February 1992, when over ten times the monthly average fell. Summer temperatures were slightly below average. The mean sea level and tides off the south-west coast were normal, unlike during the 1988-1989 epidemic.

Monitoring of mosquito populations in regions of known RRV activity in the south-west showed that the unseasonal rains enabled both salt marsh and freshwa-

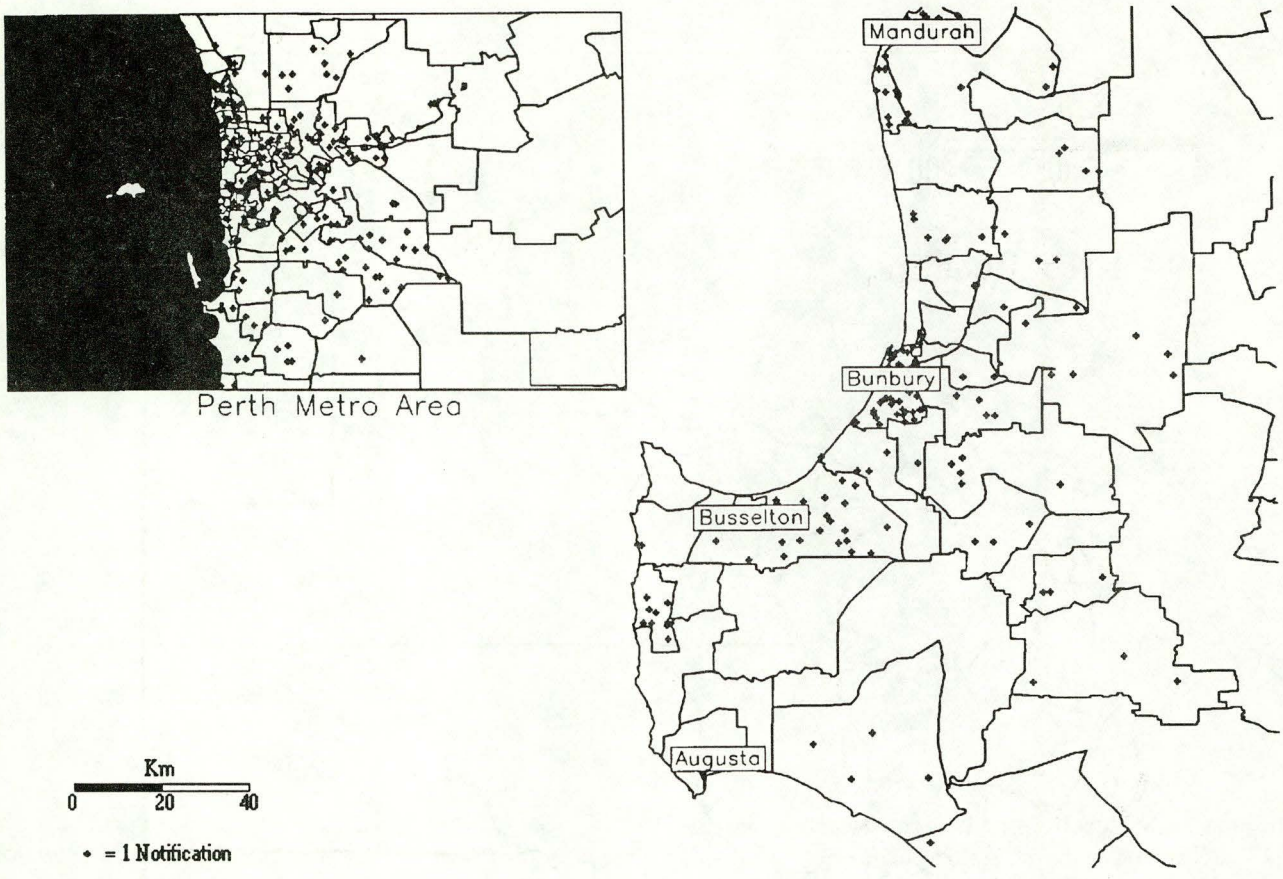
1. Department of Microbiology, The University of Western Australia, Nedlands, WA, 6009
2. NCEPH Epidemiology Registrar, Health Department of Western Australia
3. State Health Laboratory Service, Queen Elizabeth II Medical Centre Nedlands, WA, 6009

Figure 1. Spot map of Ross River virus infection notifications, Western Australia, 1 September 1991 to 30 April 1992



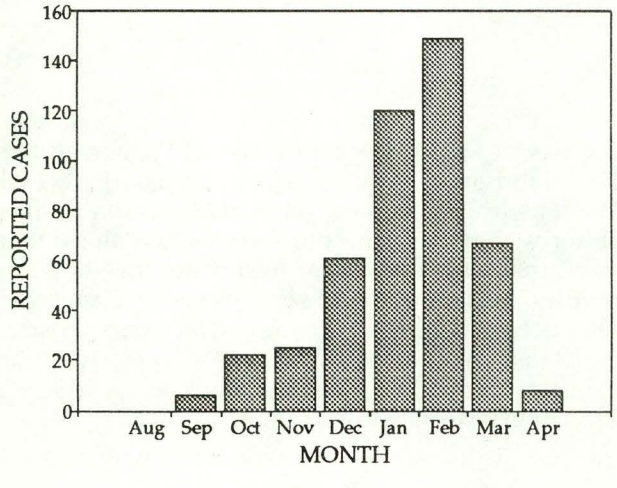
ter breeding mosquitoes to breed in large numbers throughout the summer months. In particular, *Aedes camptorhynchus*, the major vector of RRV in the south-west of Western Australia[1] was found to have persisted in large numbers throughout late spring and summer. It is interesting to note that during the 1988-89 outbreak, abnormally high summer tides were found to have enabled *Aedes camptorhynchus* to persist through that summer also. In most years *Aedes camptorhynchus* is replaced by *Aedes vigilax* during the hottest months of the year. *Aedes vigilax* does not appear to be as good a vector of RRV in the south-west of Western Australia[1]. (Lindsay *et al.*, manuscript in preparation). In the Perth metropolitan area, particularly in the southern suburbs, the late spring and summer rainfall led to big increases in the number of freshwater breeding mosquitoes, and *Culex annulirostris* and *Coquillettidia linealis*, two recognised vectors of RRV in other parts of Australia[3], were trapped in large number in several suburbs. Several other freshwater species were also present in unusually high numbers.

Figure 2. Spot map of Ross River virus infection notifications, Perth and South-West Region, 1 September 1991 to 30 April 1992



Thirteen isolates of RRV were obtained from mosquitoes trapped during the course of the outbreak. Ten of these were obtained from pools of *Aedes camptorhynchus* trapped near the south-west towns of Busselton, Capel, Australind and Mandurah. All of these locations are in regions where the virus is thought to be endemic (Lindsay *et al.*, unpublished results). All RRV isolations from *Aedes camptorhynchus* were made between September 1991 and late November 1991. RRV was also isolated from *Coquillettidia linealis* trapped near Rockingham in February 1992. A single RRV isolate was also obtained from *Coquillettidia linealis* trapped at Thompson's Lake in the southern metropolitan area, also in February 1992. This is the first RRV isolate ever obtained from the Perth metropolitan area. Finally, a single isolate of RRV was obtained from a pool of *Tripteroides* (species yet to be determined) mosquitoes trapped at Rockingham in February 1992. We believe that this is the first ever isolation of RRV from a member of the *Tripteroides* genus. The significance of the isolation is not yet known, but it is unlikely that this relatively rare species is involved in major cycles of RRV in the south-west.

Figure 3. Reported confirmed cases of Ross River virus infection, south-west of Western Australia, by date of onset of symptoms, August 1991 to April 1992



The results of analysis of mosquito population sizes and species together with the virus isolation data, suggest that the outbreak was initiated and maintained for the first two or three months by the large, late spring and early summer populations of *Aedes camptorhynchus*. These mosquitoes brought about increased levels of RRV transmission to humans in the Peel-Harvey and Leschenault-Bunbury regions in late October and November. From these regions the virus's activity spread to the Busselton-Capel region in late November and December. *Aedes camptorhynchus* was probably the major vector in this region too. In December 1991, the virus appears to have spread from the endemic parts of

Figure 4. Cases of Ross River virus infection, south-west of Western Australia, by month and geographical region

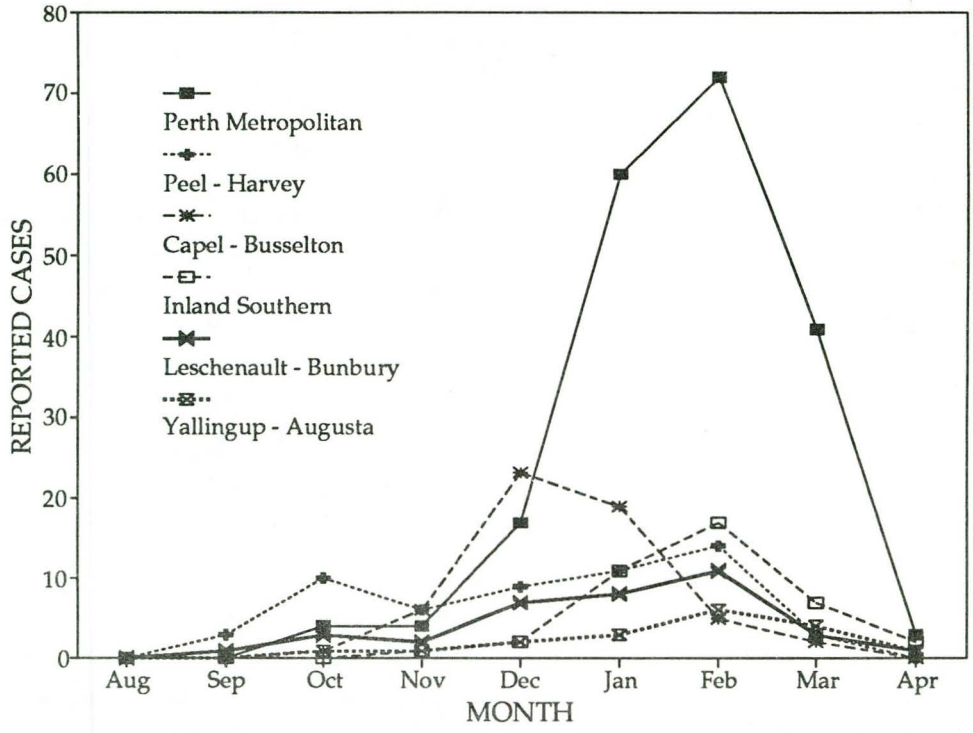
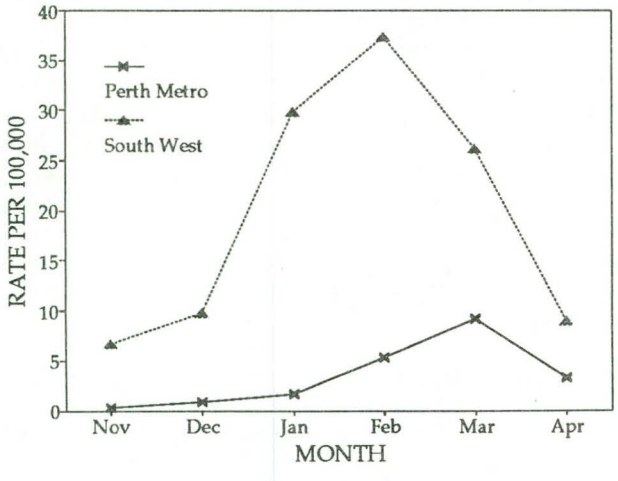


Figure 5. Crude Ross River virus notification rates, South-West and Metropolitan Regions, 1 November 1991 to 30 April 1992



the south-west to the Perth metropolitan area, particularly the outer suburbs, and also to inland parts of the south-west as the number of fresh water breeding mosquitoes increased in these regions.

We believe that the rapid spread of the virus to many parts of the south-west land division can be explained by the movement of infected humans. Over 200 cases of RRV were reported from the Perth metropolitan area, of which at least 160 were locally acquired. It seems probable that humans who acquired an infection in the south-west and then returned to Perth may have passed the virus on to some of the 'rain-enhanced' local mosquito population. This phenomenon was shown to be the probable means of transmission of RRV in the South Pacific islands during a massive outbreak in 1979-80[4,5]. This theory is further supported by the fact that in at least ten Perth suburbs, the first reported case was an individual who had been in the south-west and remembered being bitten in Perth by mosquitoes in the three weeks prior to the onset of symptoms. All subsequent cases in those suburbs were locally acquired.

The lower attack rates in the metropolitan area compared to elsewhere in the south-west and the fact that only one isolate of RRV was obtained from many tens of thousands of mosquitoes trapped in the metropolitan area suggest that the freshwater mosquito species were involved in short term, relatively inefficient virus transmission. Virus activity in the metropolitan area was widespread. The 200 cases were reported from at least 104 different suburbs, which suggests that there were no specific foci of viral activity. Medical practitioners in Perth may be less familiar with the presenting symptoms of RRV infection than their colleagues in the south-west region. This could have resulted in delays in the serological diagnosis of cases in the metropolitan area, and could have contributed to the late peak in notification rates in Perth shown in Figure 5.

This outbreak differs from the outbreak in 1988-89 in three ways: the cause, the major mosquito vectors and the human population affected. In 1988-89, the principal cause of the epidemic was the rise in mean sea level off the south-west coast of Western Australia and the

accompanying increase in the number of high tides which inundated the salt marshes along the south-west coast[1]. Consequently, the major mosquito vectors during that outbreak were the salt marsh breeding species, in particular *Aedes camptorhynchus*. The majority of cases in 1988-89 were persons living in coastal towns in the south-west. Only 90 cases of the 650 which were reported were from the Perth metropolitan area. The recent outbreak seems to have resulted from a dramatic increase in the amount of late spring and summer rainfall. Initially, the main mosquito vector was *Aedes camptorhynchus* but as more rains fell in the hot summer months, freshwater breeding mosquitoes (probably *Coquillettidia linealis* and *Culex annulirostris*) also assumed an important role, particularly in inland regions of the south-west and in the Perth metropolitan area, from where nearly half of the cases were reported.

Acknowledgement

This work was supported by the Health Department of Western Australia.

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AN ESTIMATE OF MEASLES VACCINE EFFICACY IN A CANBERRA PRIMARY SCHOOL

(David Cheah, Epidemiology Registrar, Communicable Diseases Section, Department of Health, Housing and Community Services)

Introduction

An outbreak of measles occurred in a south side primary school in Canberra between January and March 1992. Concerned individuals within the community alerted health authorities to the outbreak, even though no cases were notified through the communicable diseases surveillance system. Increased public awareness of measles following an outbreak in high schools during the autumn of 1991, and the fact that measles is not a notifiable disease in the ACT, made community interest more important than medical practitioner notifications in this outbreak[1].

Only seven cases attended a medical practitioner for advice or treatment. There were no known concurrent outbreaks of other childhood disease which may mimic measles. The primary school involved was an independent alternative school. It is the accepted belief within this school that immunisation is a personal choice. Immunisation records of the students are not kept within this school.

Methods

Once the outbreak was identified, a standardised questionnaire was devised to survey the whole school population, as the opportunity existed for a vaccine efficacy study. The school Principal agreed to the survey, but insisted upon anonymity of responses, an option for non responding and no follow up of non responders.

The questionnaire documented age, sex, disease status, vaccination status and methods of vaccination. A case of measles was defined as a child considered to have measles by doctors, parents or teachers. Serological confirmation was not possible under the constraints of the survey. Vaccination history was accepted without viewing records; many of the children came from outside the ACT.

Results

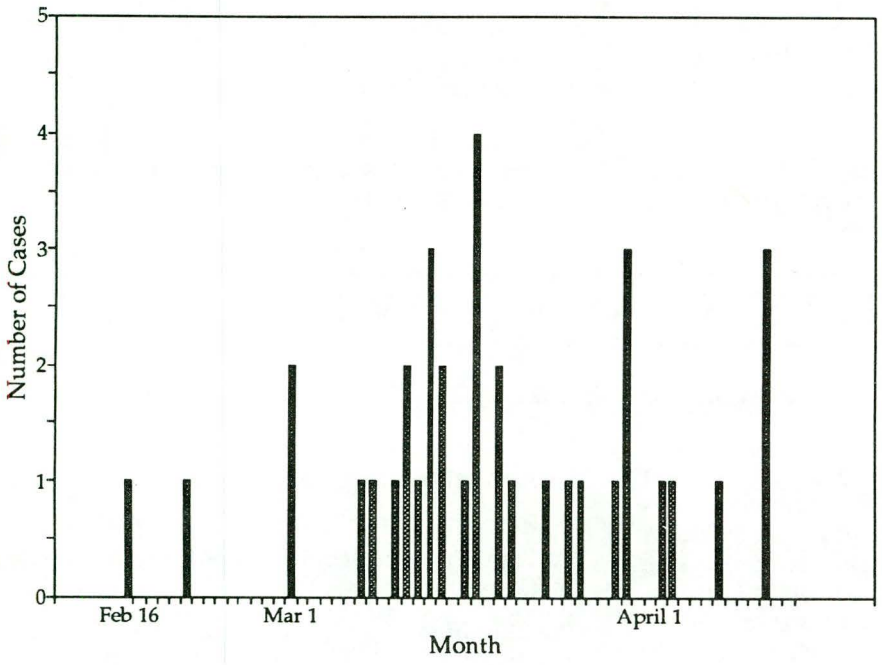
Cases occurred in this outbreak between 16 February and 11 April 1992 (Figure 1).

There were 151 children in seven grades, with an average of 21 children in each grade. The kindergarten class also had children who came to the school from time to time for occasional sessions.

One hundred and two full responses were received from 151 questionnaires (67.5%) and there was one incomplete response.

The ages of the children in this school varied from four to twelve years. The majority of children were not vaccinated (58.8%). There were 38 cases of measles, for

Figure 1. Measles cases by date of onset of symptoms



a crude attack rate of 37.2 per 100. Twenty-one cases were females (attack rate = 42.8 per 100) and 17 cases were males (attack rate = 32.1 per 100). The majority of cases occurred in the five to nine year age group (attack rate = 40.6 per 100) (Table 1). No case occurred in those who had a history of measles vaccination. Four children were 'vaccinated' by alternative homoeopathic methods; two of these developed measles.

Seven cases of measles were clinically confirmed by a medical practitioner. The rest were confirmed by their parents alone or in consultation with their teacher (1 case), a nurse (1 case) and their homoeopaths (5 cases). One case was diagnosed not to be measles by a medical practitioner.

Vaccine efficacy (VE) was calculated with the following formula[2,3]:

VE(per cent) = [(ARu - ARv) / ARu] x 100

where ARu is the attack rate in the unvaccinated and ARv is the attack rate in the vaccinated. Since no cases occurred in children with a history of vaccination, the vaccine efficacy rate was 100% in each age group.

Discussion

This study estimates the vaccine efficacy for measles to be 100% in children under ten years old. In interpreting the data, it is important to note possible biases. Vaccination status could not be validated through viewing the records and serological confirmation was not possible. Some cases of measles may have been misdiagnosed. The number of cases may be exaggerated, leading to increased attack rates. Ideally a case of measles should fulfil a standard case definition, but no other outbreaks of childhood diseases which may mimic measles were occurring in the ACT at the time. In considering the possible effects of the non responses, it may be likely that they are biased towards children who were not immunised. As all the reported cases were from non immunised children, the vaccine efficacy would not change.

This study demonstrates the value of immunisation. None of the 42 immunised children had measles, compared with 38 of the 60 unimmunised children. Control of the disease can only be achieved by a high vaccine coverage rate. A figure of at least 90% is required to provide herd immunity against measles[4]. In the United Kingdom, vaccine coverage for measles is increasing, with a prediction that in 1995, 97% of their children will be immunised against measles[5]. In Australia, similar data on vaccine coverage are difficult to obtain. A significant proportion of children in this school were unprotected because of religious or philosophical beliefs of their parents. A vaccination strategy should consider options for reaching this small but significant group of children in our community.

Acknowledgment

The author of this article would like to acknowledge the help provided by the Principal of the school studied.

Table 1. Attack rates by age group and immunisation status in a measles outbreak in a primary school, Canberra, 1992

Age Group (years)	Number of Reports	Per cent Immunised	Attack Rate (Immunised)	Attack Rate (Unimmunised)	Vaccine Efficacy (%)
0 - 4	4	50	0	100	100
5 - 9	69	39	0	67	100
10 - 14	29	45	0	50	100
Total	102	42	0	63	100

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LEGIONELLOSIS IN QUEENSLAND - A REVIEW

(Michael Pearce (National Centre for Epidemiology and Population Health), John Sheridan and Gerard Neville, Queensland Health)

In Queensland, pathology laboratories and medical practitioners are required to notify Queensland Health of all patients with 'positive serology* for, or isolation or detection of *Legionella* species from humans'. The annual rate of notifications of legionellosis in Queensland is above the national average[1]. In this article, we examine the 80 notifications of legionellosis since July 1988.

Case Definition

For the purposes of the review, we divided all notifications into three categories - confirmed, consistent and inconsistent.

We classified a notification as confirmed if the patient exhibited clinical signs and symptoms consistent with legionellosis and:

- had circulating IgM antibodies to one or more *Legionella* species at the time of clinical signs and symptoms and/or
- had a four-fold or greater rise in total antibody titre to ≥1:128 against one or more *Legionella* species and/or
- legionellae were isolated from sputum, bronchial washings or from a site that is normally sterile.

Figure 1. Cases of legionellosis, by *Legionella* species and month of onset, Queensland, 1989 to 1991

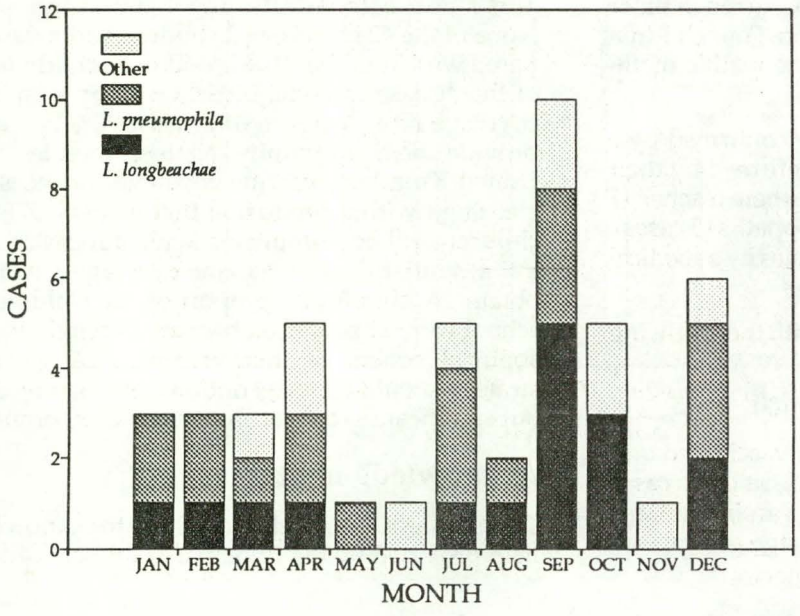


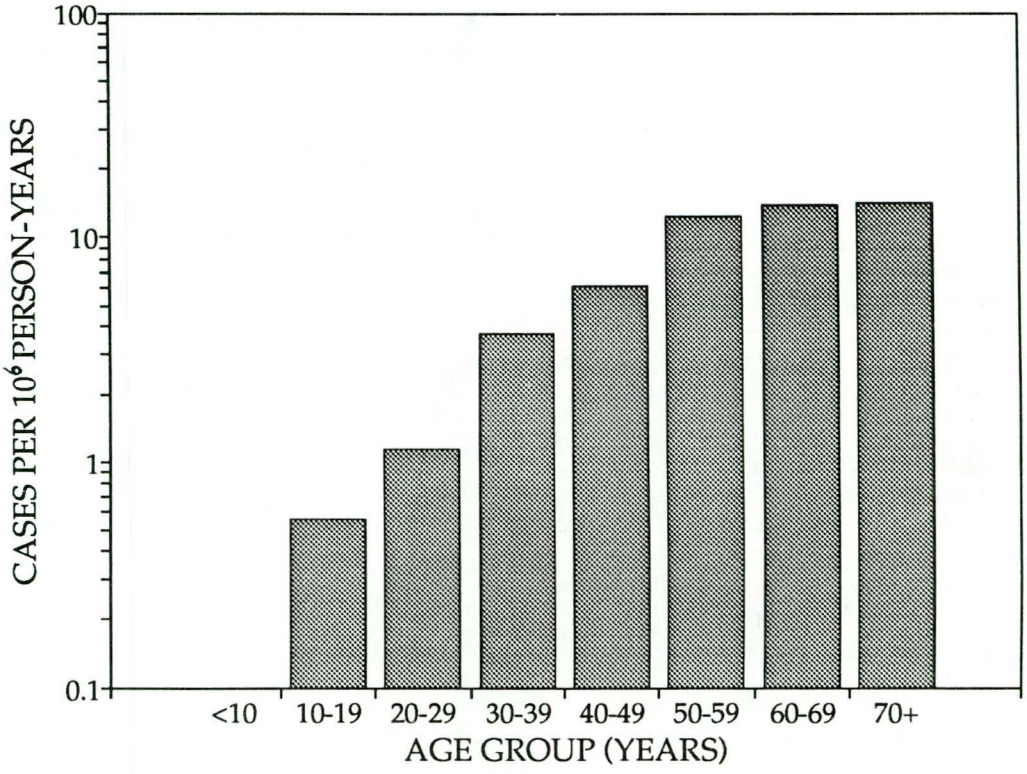
Table 1. Legionellosis cases by patient sex and *Legionella* species, Queensland, July 1988 to March 1992

SEX	*Legionella* species						
	L. pneumophila	*L. longbeachae*	*L. bozemanii*	*L. gormanii*	*L. micdadei*	Possible Mixed Infection	Total
M	14	12	6	0	0	2	34
F	5	6	2	1	1	2	17
Total	19	18	8	1	1	4	51

Table 2. Aetiology of legionellosis cases, Queensland, July 1988 to March 1992

Species	Year				
	Jul-Dec 1988	1989	1990	1991	Jan-Mar 1992
L. pneumophila	1	6	8	4	0
L. longbeachae	0	0	6	10	2
L. bozemanii	0	1	2	4	1
L. gormanii	0	0	0	0	1
L. micdadei	0	0	0	1	0
Mixed	0	1	1	1	1
Total	1	8	17	20	5

Figure 2. Incidence of legionellosis, by age group, Queensland, July 1988 toMarch 1992



We classified notifications as consistent if the patient exhibited clinical signs and symptoms consistent with legionellosis, and had a single or repeat antibody titre ≥1:256 against one or more *Legionella* species.

All other notifications were classified as inconsistent with legionellosis.

The percentage of notifications classified as inconsistent with legionellosis has dropped, from 87.5% in 1988 to a current level of around 16%. Conversely, the percentage of notifications confirmed as legionellosis rose from 12.5% in 1988 to 60% in 1991; since the beginning of 1992, it has been 83%.

For this review, cases include all notifications classified as confirmed or consistent under our case definition.

Review

Fifty-one cases of legionellosis have occurred in Queensland since July 1988; the average annual incidence of legionellosis cases was 4.68/10^6 person-years from July 1988 to March 1992; the annual average incidence since January 1990 has been 6.54 cases/10^6 person-years. *Legionella pneumophila* and *L. longbeachae* have been the cause in most cases (Table 1). The proportion of legionellosis patients apparently infected with *L. pneumophila* has declined since 1988, while the proportion infected with *L. longbeachae, L. gormanii and L. bozemanii* has increased (Table 2). In three cases, diagnostic levels of IgG or IgM against both *L. longbeachae* and *L. bozemanii* occurred in the same patient. A fourth patient had diagnostic serological changes for both *L. longbeachae* and *L. gormanii*. It was not estab-

lished whether the serological changes in these four cases were dual infections or the result of serological cross-reactions.

Legionellosis is generally sporadic and occurs throughout the year although legionellosis caused by *L. longbeachae* is more common in the spring and summer (Figure 1).

There are marked trends in the age and sex of patients with legionellosis. Overall, the ratio of disease in men to women was 2:1 (Table 1). Only 6% of patients were 30 years of age or under, and nobody less than 20 years was affected, with the exception of one patient aged nineteen years (Figure 2). Sixty-eight per cent of patients were over 50 years of age. These patterns in age and sex distribution of patients are similar to those seen in South Australia[2].

The average case fatality rate for legionellosis in Queensland from July 1988 to March 1992 was 17.6%. The case fatality rate for *L. longbeachae* was 41%, but only 5% for *L. pneumophila*.

Records on the case histories of many patients are incomplete, however, there were some trends apparent amongst those patients infected with *L. longbeachae*; of 7 patients questioned about their gardening background, 6 had worked soil in the garden in the two weeks before the onset of their illness; 13 patients out of the total of 17 who were asked about potting mix usage had used potting mix in the two weeks before the onset of illness, and 8 out of 9 patients were known to have had a concurrent systemic illness (for example chronic heart failure, renal failure, diabetes) at the presumed time of infection.

Confirmation of legionellosis remains a problem. Legionellae are usually successfully isolated from patients who die of legionellosis, but they are difficult to isolate from live patients without invasive techniques such as bronchoscopy. In 56% of *L. longbeachae* infections, but in only 21% of *L. pneumophila* infections, the causative organism was isolated. Unfortunately, the risks associated with bronchoscopy have suppressed its use for bacterial sampling. Diagnostic serology techniques have improved and now allow differentiation of the aetiological agents of legionellosis to the serogroup level.

Conclusion

Numerically, *L. pneumophila* has been the most common cause of legionellosis in Queensland. Improved isolation and serological techniques are now showing *L. longbeachae* and *L. bozemanii* to be important causes of legionellosis and both have been isolated from potting mixes[3]. The high case fatality rate with *L. longbeachae* infection gives added importance to this organism. The epidemiology of *L. longbeachae* and *L. bozemanii* infections is not well defined; potting mixes are a potential source of these organisms and intercurrent medical conditions might well be an important risk factor.

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* Positive serology is defined in the Queensland Health Act 1937-1990 as:

(i) a level of antibody in a single specimen which is regarded by the pathologist performing the test as diagnostic for a specific notifiable disease;

(ii) a four-fold change in the level of antibody between paired specimens for a specific notifiable disease;

(iii) the presence of immunoglobulin M antibodies specific to a notifiable disease.

AUSTRALIAN HIV SURVEILLANCE REPORT, VOLUME 8 NUMBER 5

The National Centre in HIV Epidemiology and Clinical Research reports that as of 30 April 1992, a total of 16,190 diagnoses of HIV infection and 3228 cases of AIDS had been reported in Australia. For the period 1 April to 30 April 1992, 1 new case of AIDS and 98 new diagnoses of HIV infection were reported.

The following tables provide more detailed information on a State/Territory basis (Tables 1 and 2).

The cumulative figures are subject to retrospective revision, so there may be discrepancies between the number of new cases for the reporting month and the increment in the cumulative figure from the previous report.

Table 1. New diagnoses of AIDS and deaths from AIDS occurring during the period 1 April to 30 April 1992, and cumulative to 30 April 1992, by sex and State/Territory in which diagnosis was made

State/ Territory	April 1992		Cumulative to 30 April 1992					
	Total Cases[1]	Total Deaths[1]	Cases			Deaths		
			Male	Female	Total	Male	Female	Total
ACT	0	0	42	2	44	27	1	28
NSW[2]	0	11	1893	60	1955	1226	37	1263
NT	0	0	10	0	10	5	0	5
Qld	0	1	246	9	255	161	7	168
SA[3]	1	1	119	6	125	65	1	66
Tas	0	1	17	1	18	10	1	11
Vic[4]	0	1	659	14	674	435	9	444
WA	0	2	149	8	157	87	3	90
Total	1	17	3135	100	3238	2016	59	2075

1. All males unless otherwise specified.
2. Cumulative cases of AIDS for NSW includes 2 persons whose sex was reported as transsexual.
3. Both the new case and the death reported from South Australia were females.
4. Cumulative cases of AIDS for Victoria includes 1 person whose sex was reported as transsexual.

Table 2. Number of new diagnosis of HIV infection in the period 1 April to 30 April 1992, and cumulative diagnoses since the introduction of HIV antibody testing to 30 April 1992, by sex and State/Territory

State/ Territory	April 1992	Cumulative to 30 April 1992			
	Total[1]	Male	Female	Sex not reported	Total
ACT	0	130	7	0	137
NSW[2]	65	8395	432	2022	10853
NT	0	58	6	0	64
Qld[3]	12	1082	54	1	1141
SA	2	458	32	0	490
Tas	0	60	3	0	63
Vic[4]	19	2595	101	67	2770
WA[5]	0	636	35	0	672
Total[6]	98	13414	670	2090	16190

1. All males unless otherwise specified.
2. Total for NSW for April includes 3 females and 1 person whose sex was not reported. Four persons whose sex was reported as transsexual are included in the cumulative total.
3. Total for Queensland for April includes 1 female. Four persons whose sex was not reported as transsexual are included in the cumulative total.
4. Total for Victoria for April includes 3 females and 1 person whose sex was not reported. Seven persons whose sex was reported as transsexual are included in the cumulative total.
5. Cumulative total for WA includes 1 person whose sex was reported as transsexual.
6. Total for April includes 7 females and 2 persons whose sex was not reported.

OVERSEAS BRIEFS

In the last two weeks, the following information has been supplied by the World Health Organization and the Australian International Development Assistance Bureau.

Cholera Update

An outbreak of cholera has been reported from Tuvalu. The islands of Nuitao and Nanumea have been affected. Precautions have been taken to prevent the spread of the disease to the other islands.

In Ecuador, the Province of Napo has recently been declared infected.

Cases have been reported for May from Angola, Brazil, El Salvador, French Guiana, Guatemala, Honduras, India, Kenya, Mozambique, Niger, Panama, Peru, Venezuela and Zaire.

Disease in Laos

For some weeks there have been unconfirmed reports in the press of smallpox in Laos. KLP Newagency, Laos, have issued a correction to these reports and report that there have been deaths in Sekong Province due to measles.

COMMUNICABLE DISEASES SURVEILLANCE

Laboratory Reporting Schemes

There were 1440 reports received in the *CDI* 'Viruses' Reporting Scheme this fortnight (Tables 8, 9 and 10), and 155 reports of isolates from sterile sites for June (LabDOSS, Table 4).

- There were 159 reports of **influenza**. One hundred and fifty-four of these were **influenza A**, 40 of these were further identified as H3N2, and 5 of these were reported as A/Biejing/353/89-like.

  Two reports of influenza A (H3N2) were in persons over the age of 65 years, as were 24 of the reports for untyped influenza A.

  The reports included an influenza A (H3N2) isolated from the post mortem lung tissue of a 70 year old female, and untyped influenza identified in a 1 year old male with febrile convulsions, a 7 months old female who required ventilation in intensive care, and a 1 year old male who had meningitis. Cardiac symptoms were reported for a 46 year old male.

- Two reports of **influenza B** was also received this fortnight, bringing the total for the year so far to 29. Influenza B reports have not begun to increase until June or July in influenza B epidemic years in Australia.

- The winter peak in **respiratory syncytial virus** continued this fortnight, with 363 reports. This fortnight's patients included a 5 year old chronic myelogenous leukaemia patient who suffered respiratory failure, and two sets of twins, females aged less than one month, and males aged 4 months.

- **Rotavirus** infection was reported for 38 patients this fortnight, 335 so far this year, about the average for recent years.

- There were a further 28 reports of **dengue 2** this fortnight, bringing the total for the year to 35. They were associated with the outbreak in the Townsville area, and had specimen collection dates in May. Seven of the **untyped dengue** reports this fortnight also came from Townsville.

- **Ross River virus** infection was reported for 75 patients this period, and specimen collection dates for most were May or June. Two were reported by Victorian laboratories, 44 from Queensland (Brisbane, Cairns, Gladstone, Gympie, Ipswich, Maryborough, Mackay, Nambour, Rockhampton, Sunshine Coast, Townsville and Toowoomba) and 29 from Western Australia (Carnarvon, Fremantle, Geraldton, Kalgoorlie, Laverton, Mandurah, Newman).

- There were 5 reports of **adenovirus type 19** received from a Victorian laboratory. The reported syndrome for all the patients was eye disease. This virus was reported as causing outbreaks of eye and genital disease in the late 1970s and early 1980s but has been reported only rarely since.

- Ten reports of **echovirus type 6** infection were received this fortnight. All were from Western Australia and all but 1 had meningitis as the reported syndrome and/or CSF as the specimen from which the virus was isolated.

- **Echovirus type 9** was reported for 14 patients, 10 from Western Australia, 3 from New South Wales and 1 from the ACT. All but 2 of the New South Wales reports were of meningitis and/or CSF isolates.

- **Herpes simplex virus** reports this fortnight included type 1, isolated from a 17 year old male with Guillain Barré Syndrome, and from a 60 year old female with multi-organ failure, sepsis and ulceration of the mouth, pharynx and bronchial tree. Type 2 was isolated from 2 pregnant women, 1 at 12 weeks and the other at 38 weeks. Untyped herpes

simplex was identified for 2 patients with encephalitis and 1 with meningitis.

- There were 45 reports of **cytomegalovirus** infection. They included a pre-term 1 month old male who had acquired the infection congenitally and had cysts near the caudate nucleus on ultrasound scan. There was also a case in a 28 year old female, acquired from a cmv-positive renal graft, and two patients for whom cardiac symptoms was the reported syndrome, an 8 month old male and a 43 year old female.
- **Hepatitis C** was reported for 71 patients. A history of injecting drug was reported for 10 patients, 2 patients were HIV positive, and 2 patients were haemophiliacs. Cardiac symptoms were the reported syndrome for 1 patient, a 37 year old male.
- There were 7 reports of **Q fever**, 3 from New South Wales and 4 from Queensland. One 20 year old male patient was reported as being a meat worker.

Australian Sentinel Practice Research Network

The Australian Sentinel Practice Research Network collected data from 6905 patient encounters in Week 26 and 6266 patient encounters in Week 27 (Table 1). Influenza and gastroenteritis were again reported more commonly than the other conditions.

Victorian Influenza Surveillance System

Results from the latest fortnight for the Victorian Influenza Surveillance System are included in this issue of *CDI*, as well as updated information for the first 3 fortnights (Table 2).

This system has been set up by the Infectious Diseases Unit of the Health Department, Victoria, and includes surveillance data supplied by sentinel general practices, diagnostic laboratories, hospitals, schools and industry. Total deaths (which usually increase during influenza epidemics) are also being monitored.

Table 1. Australian Sentinel Practice Research Network, Weeks 26 and 27, 1992

Condition	Week 26, to 28 June 1992		Week 27, to 5 July 1992	
	Reports	Rate per 1000 encounters	Reports	Rate per 1000 encounters
Influenza	127	18.39	105	16.76
Measles	2	0.29	0	0
Mumps	0	0	2	0.32
Rubella	1	0.14	0	0
Pertussis	0	0	3	0.48
Genital herpes	4	0.58	2	0.32
Gastroenteritis	61	8.83	59	9.42

Table 2. Victorian Influenza Surveillance System, Fortnights 1-4 1992 (4 May to 26 June 1992)

	Fortnight 1 4 May - 15 May	Fortnight 2 18 May - 29 May	Fortnight 3 1 June - 12 June	Fortnight 4 15 June - 26 June
General Practices (34) Influenza cases per 100 patients seen	1.5	2.1	2.6	2.7
Laboratories (2) Influenza cases (per 100 specimens)	12 (-)	21 (9)	58 (19)	36 (8)
Hospitals (3) Admissions with influenza and/or pneumonia	48	41	48[1]	51[2]
Schools (30) Total absenteeism, Tuesday, per 100 persons	21.0	-[3]	23.0	21.0
Industry (2) Total absenteeism, per 100 employees	6.2	3.4	5.8	5.3
Deaths Total per 10,000 population	3.3	3.1	2.6	3.5

1. One per 100 admissions.
2. Data missing from one hospital. Two per 100 admissions.
3. No school data for Fortnight 2.

The rates of influenza reporting from the sentinel practices have risen over the period of surveillance so far.

(Raina MacIntyre, Health Department Victoria)

WHO Influenza Reference Laboratory Typing Results

There have been 90 influenza strains sent to the WHO Influenza Reference Laboratory at CSL this year from laboratories which contribute to *CDI*. One of these was an influenza B strain, from Adelaide. The remainder have been influenza A. There have been 2 influenza A (H1N1), which have been typed as A/Texas/36/91. Thirty have been typed as H3, and 19 as H3N2. Ten of these strains have been typed as closely related to A/Washington/15/91, 15 as closely related to A/Shanghai/24/90, 6 as closely related to A/Beijing/353/89, and 15 as intermediate between A/Shanghai/24/90 and A/Beijing/353/89.

Pertussis in Cairns

In the past month, 2 infants have been hospitalised in Cairns with laboratory proven pertussis.

The first child, aged 2 months, was from Cairns and was probably infectred by her father (who had a persistent paroxymal cough, but who was culture-negative). No further local cases of pertussis have yet to be identified in Cairns.

The second child, also aged 2 months, was from an isolated Aboriginal community. The child had several respiratory arrests prior to hospitalisation and required intensive care management. The source of the child's infection is unknown.

The close contacts of both children have been given erythromycin. This has been logistically complex for the contacts of the second child as Aboriginal people have large, extended, very nomadic families.

(Tropical Centre for Disease Control, Cairns)

Rotavirus in Cairns

The number of stool samples positive for rotavirus by the latex agglutination test on diarrhoeal fluid at Cairns Base Hospital increased markedly during June. Despite the fact that the laboratory only tests for rotavirus when specifically requested, positive tests rose from nil in the weeks in mid-May to 23 in the week ending 22 June (Table 3).

Table 3. Positive rotavirus tests, Cairns Base Hospital, 11 May to 1 July 1992, by Week

Week Beginning	Number Positive
11 May	0
18 May	0
25 May	3
1 June	6
8 June	5
15 June	6
22 June	23
29 June[1]	13

1. Up until 1 July

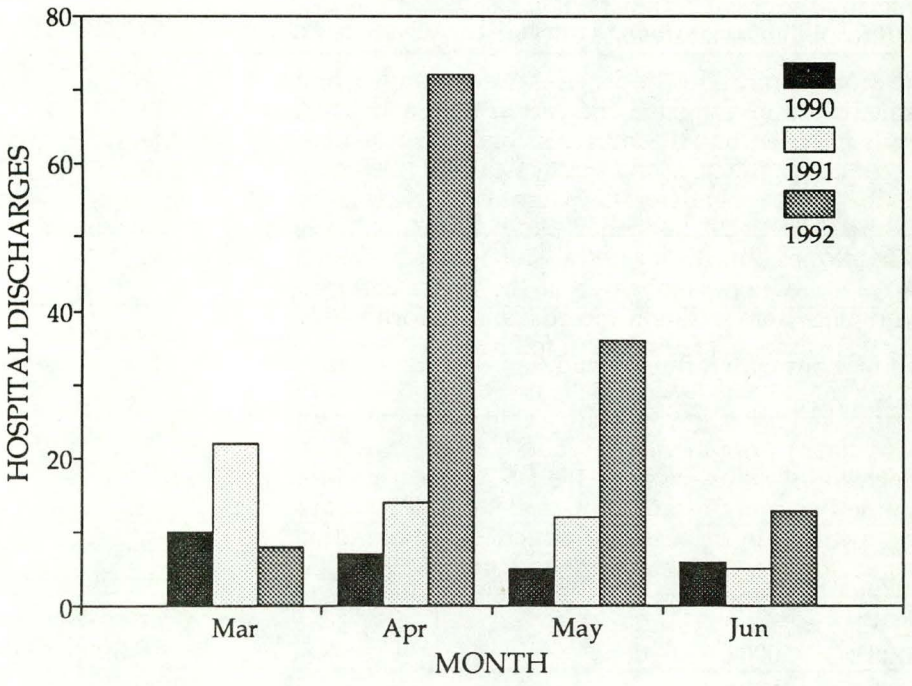
(Tropical Centre for Disease Control, Cairns)

Western Australian Viral Meningitis Update

A total of 135 cases have been analysed so far, the last admission being on 15 June. Comparison of hospital discharges (Figure 1) over the last 3 years indicates that the outbreak is still with us.

Enteroviruses have been isolated from the CSF in 82 cases (Confirmed), and throat and/or faeces in 18 (Probable) cases. The rest (35) are classified as Compatible cases. Four different types of enterovirus have been identified. Echovirus type 6 has been isolated in 40 cases, echovirus type 9 in 42, echovirus type 24 and coxsackievirus B4 in one each. The State Health Labo-

Figure 1. Hospital discharges due to viral meningitis, Western Australia, March to June 1990, 1991 and 1992, by month



1. Data for June 1992 are incomplete

ratory Services are still isolating enteroviruses in other cases.

The outbreak began mid March, although a few isolated cases occurred earlier. The peak number of cases occurred in the 7 day period from 5 to 11 April, 1992. Most patients have been children, and 4 were sick at birth or within 6 days of birth. The majority of cases have been occurring in the Perth Metropolitan Region, south of the river. Twenty percent are from the country.

Echovirus types 6 and 9 have been compared to see if there are any differences in their patterns of incidence. The only difference seems to be that echovirus type 6 is evenly distributed between north of the river, south of the river and the country regions, whereas echovirus type 9 is found mainly south of the river with an occasional case in the country. Patients with echovirus type 9 seem to have been slightly sicker than those with echovirus type 6.

The presenting symptoms for all cases are fever, headache, neck stiffness, vomiting, photophobia, lethargy and irritability. The headache and lethargy may persist for 2 weeks. Patients are usually only admitted to hospital for 2 to 4 days, but some stay longer. Spread is continuing in the community with many not sick enough to be admitted.

(Margaret Ashwell, Health Department of Western Australia)

Diphtheria Case in the North of Western Australia

A 12 year old boy from the Kimberley Region presented in May with a sore throat, but was otherwise well. A throat swab was taken and the boy commenced on Erythromycin (as he was allergic to Ampicillin). A toxigenic strain of *Corynebacterium diphtheriae* was isolated from the throat swab.

The Community Health Services were notified and immediately investigated the carrier state of all the family members and the immunisation state of most of the contacts. The nose and throat swabs of the family members were negative. They were all given a booster as were 23 of the 27 classmates. Four of the classmates could not be contacted or permission was not granted for immunisation. Only two of the classmates had incomplete immunisation records, and unfortunately they were amongst those lost to follow-up.

Diphtheria vaccination is usually given at 2, 4, 6 and 18 months, just prior to school entry at 5 years, and again at 15 years or prior to leaving school[1]. In W.A. the fifth injection is given in the twelfth year to ensure completing immunisation in case the child leaves school early. In this case the patient's immunisation was up to date. The children were not due for their boosters until the end of the year but received them early.

Reference

1. National Health and Medical Research Council. *Immunisation Procedures*. Canberra: Australian Government Publishing Service, 1991.

(Margaret Ashwell, Health Department of Western Australia)

National Notifiable Diseases Reports, 14 June to 27 June 1992

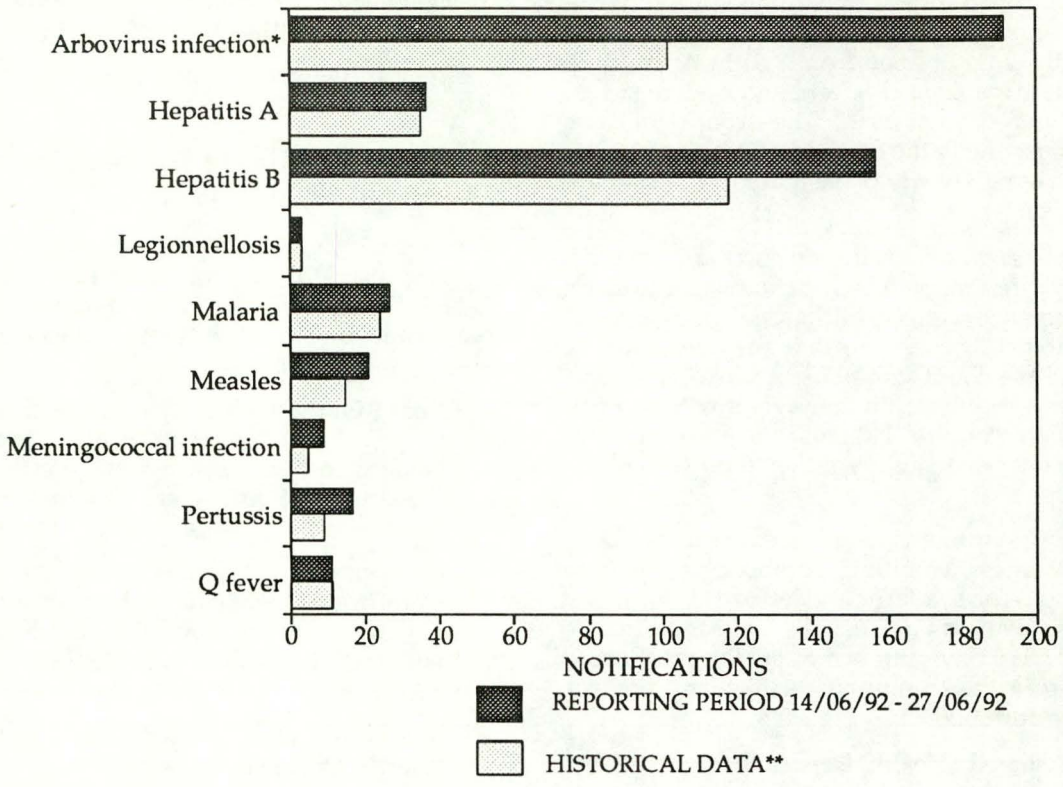
A total of 1595 notifications were reported for the reporting fortnight 14 June to 27 June 1992 (Figure 2, Tables 5, 6 and 7) and were available for analysis. Notifications from New South Wales were not available.

- **Ross River virus infection** continues to be notified at high levels. Activity centred around coastal Queensland and south-west Western Australia. There were 79 males and 55 females (one sex unknown) and 78% were in the age range 20-59 years.
- **Dengue** was notified 44 times. All bar 3 reports were from Townsville and surrounding districts. Twenty- nine cases were in females, 14 in males with one of unknown sex. Reports were from age 3 to 72.
- **Brucellosis** was reported from a male aged 65-69 years in Queensland.
- There were 21 notifications of ***Haemophilus influenzae* type b infection**, 10 males, 41 females, 1 sex unknown. Of these cases 18 were aged less than 5 years with 8 aged less than 2 years. Three cases notified occurred in two contiguous postcode areas over a 7 day period.
- There were 3 notification of **hydatid infection**, 2 males and one female. One was 30-34 years, two were 70-79 years of age.
- There were 3 notifications of apparently sporadic **legionellosis** cases. All were in males 60-69 years.
- **Measles** was notified 21 times. Three cases were in children less than one year of age, 14 males and 7 females. Sex cases were notified from the same postcode area over a 10 day period.

  The 6 cases above were part of a cluster of eight cases reported from a school in a South Australian country town in June. Of these children 5 were known to be immunised and 2 required hospitalisation.

  (John Carrangis and Ossama El Saadi, South Australian Health Commission)
- There were 9 cases of **meningococcal** meningitis reported, 6 males and 3 females. All were aged less than 15 years, 2 less than one year.
- **Pertussis** was notified 17 times. Nine cases were in children less than 5 years of age, 5 in children less than one year of age. Four cases notified from two contiguous postcode areas had onset dates over a

Figure. Selected National Notifiable Diseases Reports, 14 June to 27 June 1992, and historical data**



*Includes Ross River virus and Dengue

**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.

period of 5 days. Twelve of the cases were reported as confirmed.

- There were 11 notifications of **Q fever**, 7 males and 4 females, all within the age range 15-44 years.
- There were 23 notifications of **rubella**. Six of these were in females 15-44 years of age.
- A single case of **typhoid** was reported in a male under 5 years of age.

Sterile Sites Surveillance (LabDOSS)

Data for June have been provided by seven laboratories. The Prince Charles Hospital, Brisbane, Northern Tasmania Pathology Service and Royal Hobart Hospital are new additions to the Scheme this month.

A total of 155 reports were received (Royal Prince Alfred 63, Royal Hobart Hospital 21, Liverpool 28, The Prince Charles Hospital 10, Northern Tasmania Pathology Service 1, Nambour 10 and Toowoomba 22).

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

Gram positive: 1 *Streptococcus* Group A, 1 *Streptococcus* Group B, 1 *Streptococcus* Group C, 3 *Streptococcus milleri*, 2 *Streptococcus* Group G, 2 *Staphylococcus* coagulase negative, 1 *Aerococcus* species, 1 *Enterococcus faecium*, 1 *Corynebacterium* species.

Gram negative: 3 *Klebsiella* species, 2 *Klebsiella oxytoca*, 2 *Klebsiella pneumonia*, 1 *Enterobacter* species, 1 *Pseudomonas cepacia*, 4 *Pseudomonas aeruginosa*, 1 *Serratia liquefaciens*, 1 *Proteus* species, 2 *Proteus mirabilis*, 1 *Neisseria meningitidis*, 1 *Xanthomonas maltophilia*, 2 *Acinetobacter* species, 3 *Haemophilus influenzae* type b, 1 *Citrobactor freundii*, 1 *Moraxella* species.

Anaerobes: 2 *Bacteroides* species, 1 *Bacteroides thetai*, 1 *Peptostreptococcus* species, 1 *Clostridium* species.

Fungi: 1 *Candida albicans*, 1 *Pseudallescheria boydii*, 1 *Torulopsis glabrata*.

Mycoplasma: 1 *Mycoplasma species*, 1 *Ureaplasma urealyticum*.

CSF Isolates and Meningitis Reports

There were seven reports of meningitis during this period. One was an isolate of *Haemophilus influenzae* type b from a 10 month old male. Other CSF isolates were *Neisseria meningitidis* in a 5 month old female, *Cryptococcus neoformans* in an immunocompromised female and in a 57 year old immunocompromised male and *Nocardia* species in a 24 year old male. Both *Staphylococcus aureus* and *Staphylococcus epidermidis* were isolated from a 44 year old male following neurosurgery.

Isolates from Sites other than Blood or CSF

Peritoneal dialysate: 1 *Staphylococcus aureus*, 2 *Staphylococcus epidermidis*, and 1 *Enterobacter agglomerans* from persons with peritonitis complicating chronic ambulatory peritoneal dialysis. *Escherichia coli* was isolated from a 45 year old female with gastrointestinal illness.

Joint fluid: *Clostridium perfringens* from a 88 year old male with no history of injury.

Other: 4 *Staphylococcus aureus* (1 from femur tissue, 1 MRSA from a patient with endocarditis who died) 1 *Streptococcus* Group B, 2 *Pseudomonas aeruginosa* following orthopaedic surgery.

Table 4. LabDOSS reports of blood isolates for June 1992

Organism	Total[1]	Clinical Information					Risk Factors				
		Lower respiratory	Endocarditis	Gastrointestinal	Urinary Tract	Skin	Surgery	Immunosuppressed	IV line	Perinatal	Neonatal
Staphylococcus aureus	20	1	1	2		3	7	1	8		1
Staphylococcus epidermidis	15	1		2		1	2	2	4		3
Streptococcus pneumoniae	5	3									
Streptococcus sanguis	5		1	1			1	1			
Enterococcus faecalis	6			2			2	1	1		
Escherichia coli	27	2		5	10		4	7		2	
Enterobacter cloacae	6			2				1	4		

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

Table 5. Diseases preventable by vaccines recommended by the NHMRC for routine childhood immunisation for the reporting period 14 June to 27 June 1992

DISEASES	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	TOTALS FOR AUSTRALIA[1]			
									This Period 1992	This Period 1991	Year to Date 1992	Year to Date 1991
Diphtheria	0		0	0	0	0	0	0	0	2	9	5
Measles	2		0	6	7	0	5	1	21	31	408	599
Mumps	0		NN	NN	NN	NN	0	NN	0	NN	0	NN
Pertussis	1		0	6	1	0	8	1	17	8	207	200
Poliomyelitis	0		0	0	0	0	0	0	0	0	0	0
Rubella[2]	1		0	8	2	0	12	0	23	29	211	206
Tetanus	0		0	0	0	0	0	0	0	0	6	5

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, WA: CRS only; ACT, NSW, Qld: rubella only; SA, Vic: rubella and CRS

NN Not Notifiable.

Table 6. Other Notifiable Diseases[1], for the reporting period 14 June to 27 June 1992

DISEASES	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	TOTALS FOR AUSTRALIA[2] This Period 1992	This Period 1991	Year to Date 1992	Year to Date 1991
Arbovirus infection (NEC)[3]	0		0	11	0	0	2	0	13	0	232	160
Ross River virus infection	0	-	3	98	0	0	3	31	135	130	4626	3119
Dengue	0	-	0	44	0	0	0	0	44	0	96	40
Campylobacteriosis[4]	0	-	9	92	68	7	73	35	284	319	3942	3704
Chlamydial infection (NEC)[5]	1	NN	12	148	0	11	36	0	208	187	2954	2017
Donovanosis	0	NN	6	1	0	0	0	0	7	6	37	33
Gonococcal infection[6]	0		25	29	0	0	8	28	90	91	1365	1170
Haemophilus influenzae type b[7]	2		0	7	3	0	9	0	21	33	212	227
Hepatitis A	0		4	16	3	0	12	2	37	169	905	660
Hepatitis B	1		6	76	1	3	66	4	157	221	2808	1666
Hepatitis C	3		10	162	0	7	42	0	224	421	3631	1520
Hepatitis (NEC)	0		0	2	0	0	0	0	2	22	32	191
HIV infection[8]	1		0	0	3	0	0	0	4	1	124	14
Legionellosis	0		0	0	2	0	0	1	3	5	78	59
Leptospirosis	0		0	3	1	0	1	0	5	1	49	74
Listeriosis	0		0	0	0	0	0	0	0	1	20	17
Malaria	0		0	22	1	1	3	0	27	38	348	411
Meningococcal infection	0		0	2	1	0	5	1	9	16	90	115
Ornithosis	0	NN	0	0	0	0	1	0	1	5	46	46
Q fever	0		0	11	0	0	0	0	11	17	206	342
Salmonellosis (NEC)	0		16	47	7	1	31	28	130	184	2791	3220
Shigellosis[4]	0	-	9	5	1	0	4	10	29	20	317	495
Syphilis	0		22	27	0	0	2	8	59	67	1025	986
Tuberculosis	1		1	6	1	0	0	2	11	17	295	207
Typhoid[9]	0		0	0	1	0	0	0	1	1	26	38
Yersiniosis[4]	0	-	1	8	6	0	2	0	17	21	358	315

1. For rarely notified diseases, see Table .
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 notifications and the increment in the cumulative figure from the previous period.
3. NSW and SA: includes Ross River virus and dengue.
4. NSW: only as 'foodborne disease' or 'gastroenteritis in an institution'.
5. ACT: trachoma only.
6. NT, Qld, SA and Vic: includes gonococcal neonatal ophthalmia.
7. SA: only as 'bacterial meningitis'; meningococcal infection is separately notified; Tas: only as 'non-meningococcal meningitis'; Vic: eppiglottitis and meningitis only.
8. More complete data on new diagnoses of HIV infections are presented in the monthly *Australian HIV Surveillance Report*. ACT: AIDS only.
9. NSW and Vic: includes paratyphoid.

NN Not Notifiable.

NEC Not Elsewhere Classified.

- Elsewhere Classified.

Table 7. Rarely Notified Diseases[1] for the reporting period 14 June to 27 June 1992

DISEASES	Total this period	Reporting States or Territories	Total for 1992 to Date
Botulism			0
Brucellosis	1	Qld	6
Cholera			1
Chancroid			2
Hydatid infection	3	Vic (2), WA (1)	21
Leprosy			6
Lymphogranuloma venereum	1	Vic	2
Plague			0
Rabies			0
Yellow fever			0
Other viral haemorrhagic fevers			0

1. Fewer than 50 cases of each of these diseases were notified each year during the period 1986 to 1991.

Table 8. Laboratory reports by State or Territory of reporting laboratory for the reporting period 17 June to 30 June 1992[1]

	STATE OR TERRITORY OF REPORTING LABORATORY						Total this fortnight
	ACT	NSW	Qld	SA	Vic	WA	
MEASLES, MUMPS, RUBELLA							
Measles virus		1	2	2			5
Mumps virus		1			1		2
Rubella virus		2			1		3
HEPATITIS VIRUSES							
Hepatitis A virus		2				2	4
Hepatitis B virus		20		3	12	15	50
Hepatitis C virus	11			35		25	71
Hepatitis D virus						1	1
ARBOVIRUSES							
Ross River virus			44		2	29	75
Barmah Forest viurs			5			2	7
Dengue type 1			2				2
Dengue type 2			28				28
Dengue not typed			8		1	2	11
Kunjin virus			1				1
ADENOVIRUSES							
Adenovirus type 1					3		3
Adenovirus type 3					2		2
Adenovirus type 5		1					1
Adenovirus type 9					1		1
Adenovirus type 11					1		1
Adenovirus type 19					5		5
Adenovirus type 37					1		1
Adenovirus not typed/pending		8		14	6	7	33
HERPES VIRUSES							
Herpes simplex virus type 1		1		12	31	29	73
Herpes simplex virus type 2		14		16	35	48	113
Herpes simplex not typed/pending	3	16			4	3	26
Cytomegalovirus	1	16	4		20	4	45
Varicella-zoster virus	1	4		5	5	8	20
Epstein-Barr virus		22	2		2	6	32
Herpes virus group-not typed						1	1
OTHER DNA VIRUSES							
Parvovirus					7		7
PICORNA VIRUS FAMILY							
Coxsackievirus A16					1		1
Coxsackievirus B5						1	1
Echovirus type 6						10	10
Echovirus type 9		4				10	14
Echovirus type 17					3		3
Echovirus type 22		1			1		2
Poliovirus type 1 (uncharacterised)		1			3		4
Poliovirus type 2 (uncharacterised)		1					1
Poliovirus not typed/pending		1					1
Rhinovirus (all types)		2			17	1	20
Enterovirus not typed/pending		21			2	8	31

Table 8. Laboratory reports by State or Territory of reporting laboratory for the reporting period 17 June to 30 June 1992[1], continued

	STATE OR TERRITORY OF REPORTING LABORATORY						Total this fortnight
	ACT	NSW	Qld	SA	Vic	WA	
ORTHO/PARAMYXOVIRUSES							
Influenza A virus		11		1	28		40
Influenza A virus H3N2	3	24	2	27	26	32	114
Influenza B virus		2	1	2			5
Parainfluenza virus type 1		3		5	2	5	15
Parainfluenza virus type 2			1		1		2
Parainfluenza virus type 3	2	5	1	1	2	1	12
Parainfluenza virus typing pending					6	1	7
Respiratory syncytial virus	4	87	1	12	155	104	363
OTHER RNA VIRUSES							
Rotavirus		9			11	18	38
Reovirus (unspecified)					1		1
Coronavirus		1					1
Small virus (like) particle		3				2	5
OTHER							
Chlamydia trachomatis - A-K					1		1
Chlamydia trachomatis not typed		6	17	11	12	26	72
Chlamydia pneumonia					3		3
Chlamydia psittaci (ornithosis)		2			3		5
Mycoplasma pneumoniae	1	13		3	8	8	33
Mycoplasma hominis					2		2
Coxiella burnetti (Q fever)		3	4				7
TOTAL	26	308	123	147	427	409	1440

1. Historical data and totals reported this year are unavailable for this period.

Table 9. Laboratory reports by clinical information for the reporting period 17 June to 30 June 1992

	Encephalitis	Meningitis	Other CNS	Congenital	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	Muscle/joint	Genital	Other/unknown	Total
MEASLES, MUMPS, RUBELLA													
Measles virus								4				1	5
Mumps virus												2	2
Rubella virus								1				2	3
HEPATITIS VIRUSES													
Hepatitis A virus							3					1	4
Hepatitis B virus							2					48	50
Hepatitis C virus				1			3	1				66	71
Hepatitis D virus												1	1
ARBOVIRUSES													
Ross River virus			1		1			5		31		37	75
Barmah Forest virus								2		1		4	7
Dengue type 1										1		1	2
Dengue type 2						1				4		23	28

Table 9. Laboratory reports by clinical information for the reporting period 17 June to 30 June 1992, continued

	Encephalitis	Meningitis	Other CNS	Congenital	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	Muscle/joint	Genital	Other/unknown	Total
Dengue not typed								1				10	11
Kunjin virus												1	1
ADENOVIRUSES													
Adenovirus type 1					1			1				1	3
Adenovirus type 3									2				2
Adenovirus type 5					1								1
Adenovirus type 9											1		1
Adenovirus type 11												1	1
Adenovirus type 19									5				5
Adenovirus type 37									1				1
Adenovirus not typed/pending					11	16		1				7	35
HERPES VIRUSES													
Herpes simplex virus type 1					4			47	1		14	7	73
Herpes simplex virus type 2								49	1		61	2	113
Herpes simplex not typed/pending	2	1	2					9			3	9	26
Cytomegalovirus				2	9	3	2		3			26	45
Varicella-zoster virus								16	1			3	20
Epstein-Barr virus					3		3			1		25	32
Herpes virus group - not typed								1					1
OTHER DNA VIRUSES													
Parvovirus							1			3		3	7
PICORNA VIRUS FAMILY													
Coxsackievirus A16								1					1
Coxsackievirus B5		1											1
Echovirus type 6		8										2	10
Echovirus type 9		12				1						1	14
Echovirus type 17		1										2	3
Echovirus type 22					1							1	2
Poliovirus type 1 (uncharacterised)					4								4
Poliovirus type 2 (uncharacterised)					1								1
Poliovirus not typed/pending					1								1
Rhinovirus (all types)					13	1		2				4	20
Enterovirus not typed/pending	1		1		12	8		1				8	31
ORTHO/PARAMYXOVIRUSES													
Influenza A virus		1	2		82	1				1		27	114
Influenza A virus H3N2					31			1				8	40
Influenza B virus					2							3	5
Parainfluenza virus type 1			1		12							2	15
Parainfluenza virus type 2					1							1	2
Parainfluenza virus type 3					10	1						1	12
Parainfluenza virus typing pending					7								7
Respiratory syncytial virus					352							11	363

Table 9. Laboratory reports by clinical information for the reporting period 17 June to 30 June 1992, continued

	Encephalitis	Meningitis	Other CNS	Congenital	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	Muscle/joint	Genital	Other/unknown	Total
OTHER RNA VIRUSES													
Rotavirus					1	32						5	38
Reovirus (unspecified)												1	1
Coronavirus												1	1
Small virus (like) particle						5							5
OTHER													
Chlamydia trachomatis - A-K												1	1
Chlamydia trachomatis not typed									5		62	5	72
Chlamydia pneumoniae					3								3
Chlamydia psittaci					3							2	5
Mycoplasma pneumoniae			1		25			1				6	33
Mycoplasma hominis					1							1	2
Coxiella burnetti (Q fever)												7	7
TOTAL	3	24	8	3	592	69	14	144	19	42	141	381	1440

Table 10. Laboratory reports by contributing laboratories for the reporting period 17 June to 30 June 1992

STATE	LABORATORY	REPORTS
Australian Capital Territory	Woden Valley Hospital, Canberra	26
New South Wales	Institute of Clinical Pathology & Medical Research, Westmead	107
	Prince Henry/Prince of Wales Hospitals, Sydney	72
	Royal Alexandra Hospital for Children, Camperdown	60
	Liverpool Hospital	69
Queensland	State Health Laboratory, Brisbane	123
South Australia	Institute of Medical & Veterinary Science, Adelaide	147
Victoria	Fairfield Hospital, Melbourne	262
	Microbiological Diagnostic Unit, University of Melbourne	7
	Royal Childrens Hospital, Melbourne	158
Western Australia	Princess Margaret Hospital, Perth	142
	State Health Laboratory Services, Perth	267
TOTAL		1440