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COMMONWEALTH DEPARTMENT OF HUMAN SERVICES AND HEALTH

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

IMPORTATION AND SUBSEQUENT LOCAL TRANSMISSION OF DENGUE 2 IN CAIRNS

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Imported case

In late January 1995, a 46 year old Caucasian woman returned to her home in Cairns after four months' of extensive travel in Thailand. Four days after returning she presented to a local medical practitioner with a 24 hour history of fever, nausea and headache. Apart from an elevated temperature, there were no clinical findings of note; her liver function tests were mildly abnormal and malaria films were negative. Dengue serology was requested; she was reported as having 'high level' flavivirus IgG but was flavivirus IgM negative.

She was seen again two days later with persistent fever and slight dehydration. A full blood count showed a 'reactive lymphocytosis' and a 'mild thrombocytopaenia' (Table 1). She was seen again two days later (five days after the onset of symptoms); a fine petechial rash of 24 hours' duration was now present over her limbs and she was admitted to hospital.

The symptoms elicited on admission were fevers and sweats, lethargy, anorexia, headache, arthralgia, and pruritis in the distribution of the rash. Neither liver nor spleen was enlarged; the rash became widespread within 24 hours to include her trunk. A tourniquet test was not performed. Blood cultures, malaria films and hepatitis A, B and C tests were all negative. She had repeated full blood counts (Table 1) and blood was taken for a variety of serological tests including dengue virus infection. The patient discharged herself three days after admission; the diagnosis at the time was 'probable virus infection'. She had not received any intravenous fluids whilst in hospital.

Eighteen days after the onset of symptoms the Tropical Public Health Unit (TPHU) in Cairns was notified by the Laboratory of Microbiology and Pathology (LMP) in Brisbane that the serum sample taken eight days after onset of symptoms was low level positive for flavivirus IgM using the ultracentrifugation-haemagglutination (UC-HAI) test. However the infecting virus could not be identified because of the presence of cross reacting antibodies to several viruses within the flavivirus group (Table 2). The low level acute phase flavivirus IgM, the intense cross reactivity and the high HAI titres are all consistent with a secondary dengue infection[1]; this explains the 'high level' flavivirus IgG/IgM negative result one day after the onset of symptoms. Of note, the patient had spent her childhood in West Africa and had previously travelled extensively throughout Asia.

Local transmission

In mid-March the LMP notified the TPHU of two further cases of dengue. Both patients had flavivirus IgM detected by UC-HAI and both had a high acute phase HAI titre (160) to dengue 2 virus.

Both patients (a male aged 32 years and a female aged 34 years) became ill within 24 hours of each other, ten days after the end of the estimated viraemic period in the original imported case. Each had a mild rubella-like illness with fever, headache, a fine rash and lethargy being the predominant features. Both were rubella IgM negative. On further questioning, they admitted to experiencing considerable pruritis and an unpleasant metallic sense of taste.

Neither patient had travelled away from Cairns during the calculated incubation period. They were not close acquaintances, but they were next door neighbours. Furthermore, both lived in the same street as, and a few houses away from, the imported case (Figure).

In early May the LMP notified the TPHU of another case of dengue, identified as dengue 2 by UC-HAI. The patient (a female aged 49 years) became unwell the day before the two other locally acquired cases; she too had a relatively mild illness with fever, arthralgia, myalgia,

Table 1. Haematological parameters of the imported case over time

	Days after onset of symptoms				
	3	6	7	8	18
Haematocrit (%)	-	39	45	37	36
WBC ($x10^9$/L)	3.0	4.1	3.8	4.6	7.3
Lymphocytes (%)	25	61	66	41	36
Platelets ($x10^9$/L)	52	123	82	192	317

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Table 2. Serological results of the imported case over time

Virus	Days after onset of symptoms			
	8		18	
	IgM[1]	HAI[2]	IgM[1]	HAI2
Flavivirus unspecified	POS	-	-	-
Dengue 1	NEG	2560	NEG	2560
Dengue 2	POS	5120	NEG	5120
Dengue 3	POS	5120	NEG	5120
Dengue 4	NEG	640	NEG	640
Murray Valley encephalitis	POS	2560	NEG	2560
Kunjin	POS	2560	NEG	2560
Alfuy	POS	2560	NEG	2560
Kokobera	NEG	2560	NEG	2560
Stratford	NEG	1280	NEG	2560
Edge Hill	NEG	2560	NEG	2560

1. IgM detected by HAI on serum fractions separated by ultracentrifugation
2. HAI titres on unfractionated sera

hyperaesthesia and a foul taste being the predominant symptoms.

A blood sample taken on the day of onset of symptoms was flavivirus negative by enzyme immunoassay (EIA). However a repeat sample taken six weeks later was EIA positive, and the HAI titre to dengue 2 had risen from <20 to 2560. This patient had not travelled away from Cairns during the incubation period and she too was a close neighbour of the imported case (Figure).

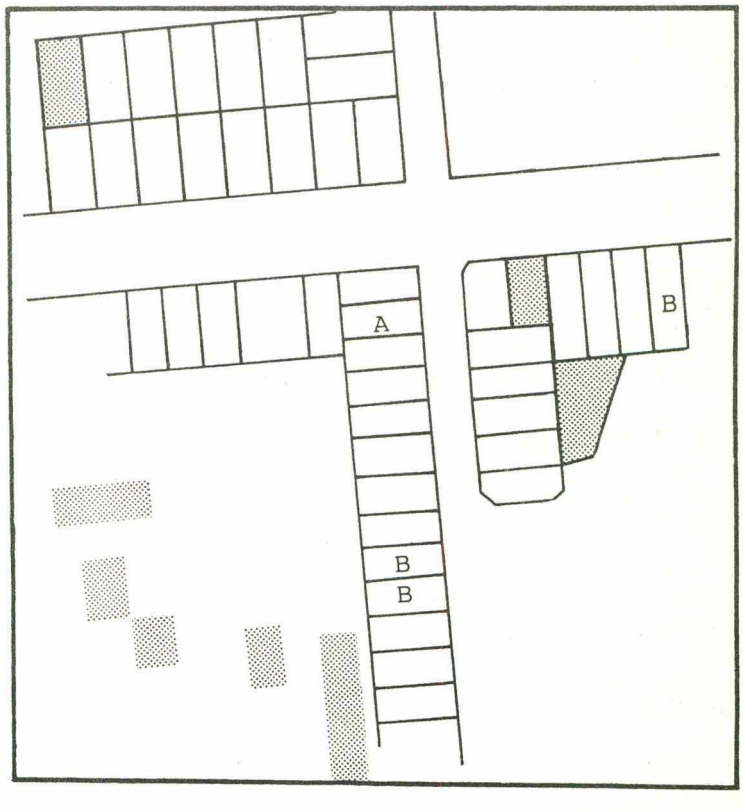
No further associated locally acquired cases had been notified up to mid-July 1995.

Mosquito surveillance and control

With the notification of the imported case in mid-February the importance of emptying or removing containers that could be breeding sites for *Aedes aegypti* (the only known dengue vector in Australia) was conveyed to the public via the media.

Vector Control and Environmental Health personnel from the TPHU and Cairns City Council conducted a house to house survey in the immediate neighbourhood (the core area) of the case. The purpose of the survey was to identify and eliminate containers in each property containing *Ae. aegypti* larvae. The Breteau Index (the number of containers breeding *Ae. aegypti* per 100 houses) was also determined (Table 3). The World Health Organization considers a Breteaux Index of >5 as the hypothetical lower limit required for the transmission of yellow fever, a limit also applied to dengue transmission[2].

Figure. Partial detail of the area of residence of the imported case (A) and the locally acquired cases (B)[1] of dengue



1. Shaded areas indicate properties with breeding containers of *Ae. aegypti* identified in the initial survey.

Because the initial Breteau Index in the core area was >5, those properties in which either breeding containers or adult *Ae. aegypti* were found were treated with an ultra low volume pyrethrin insecticide to kill adult mosquitoes. A follow up survey conducted in early March in a site adjacent to the core area indicated that there was still significant breeding of *Ae. aegypti* in the vicinity of the imported case (Table 3).

With the notification of the first two locally acquired cases in mid-March a series of surveys was conducted to include properties within a one kilometre radius of the imported case. The core area was resurveyed several more times and had Breteau Indices of 11, 19 and 13 on three successive occasions over the month. All containers found in the last core area survey (17-20 March) were located in premises that could not be surveyed earlier. One such container was a 20 litre home beer brewing barrel, containing hundreds of *Ae. aegypti* larvae, found on a property within two blocks of the four cases. These subsequent data indicate that there had been no decline in *Ae. aegypti* breeding in the target area over the one month period.

The majority (65%) of the containers with larvae (n=201) contained *Ae. aegypti* larvae, with 33% and 4% positive for *Ae. notoscriptus* and *Culex quinquefasciatus*, respectively. Twenty-four (12%) of the containers were positive for both *Ae. aegypti* and *Ae. notoscriptus*. Garden items and rubbish accounted for 52% and 48%, respectively, of the *Ae. aegypti* breeding containers. Of these, pot plant bases were the most common (35%), followed by miscellaneous rubbish (24%), containers used to strike plant cuttings (9%), buckets (8%), plastic ice cream containers (8%), garden ornaments (6%), tyres (4%), and tarpaulins (4%). Bromeliads (ornamental outdoor plants with broad based leaves adapted to hold water) accounted for only 3% of *Ae. aegypti* positive containers.

Another entomological variable, the Premise Condition Index (PCI), was also assessed. The PCI is a score (from 3 to 9) assigned to properties based on the relative condition of the house and yard, and on the degree of shade. A high score is assigned to a property with a dilapidated house, an untidy yard and much tree shade[3]. The PCIs for 237 properties in the expanded survey area were determined using data collected in May 1995 (Table 4). Most of the houses were built of cement block or timber, were lowset and less than 30 years old; 90% of the properties had a PCI of <7. Nevertheless, 10% of the properties had a PCI of >6; there was a non-significant trend for breeding containers to be found on high PCI properties (p=0.17).

Discussion

The presence of *Ae. aegypti* throughout north Queensland means that the region is vulnerable to dengue transmission and potential epidemics[4]. It is of concern that the original patient, although hospitalised, was not recognised or treated as having dengue. Current recommendations suggest that the low and labile platelet count probably justified intravenous fluid therapy[4].

To the best of our knowledge, this is the first time that an imported case which subsequently lead to locally acquired cases of dengue has been recognised in north Queensland. Outbreaks of dengue occur at irregular intervals in north Queensland, with many years of no dengue reports. There is, therefore, no evidence of ongoing endemic transmission, indicating that imported cases are probably responsible for initiating outbreaks of dengue in the region. The timely recognition of, and rapid response to, imported cases is crucial if further outbreaks are to be prevented. Greater emphasis needs to be put on the prompt notification of a clinically suspected imported case of dengue.

Table 3. Breteau Index (number of containers breeding *Aedes aegypti* per 100 houses) ascertained by house to house surveys

Area surveyed	Date surveyed	Number of premises[1]	Breteau Index
Core	17-18 February	43	14
Adjacent to core	2 March	20	65
Expanded	14-15 March	95	20
Expanded	16-17 March	142	37

1. Data exclude apartment complexes, commercial buildings and caravan parks.

Table 4. Premises in the expanded survey area, by Premise Condition Index

Premise Condition Index	Number of premises	*Ae. aegypti* positive (%)	Mean number of containers with *Ae. aegypti*
3-4	59	20.3	0.27
5-6	155	26.5	0.45
7-9	23	34.8	0.57

The large number of breeding containers in a relatively densely populated urban setting in north Queensland is also of concern. The local transmission occurred during the wet season; many dry containers had become breeding sites, contributing to high numbers of *Ae. aegypti*. A reduction in the number of breeding containers was not observed during the period of transmission despite considerable publicity in the local media and an ongoing dengue advertising campaign[5]. While educational and motivational strategies are no doubt effective among segments of the community, this finding underscores the need for a combination of public health approaches including legislative and policy initiatives[6]. However experience elsewhere in dengue prevention has shown that more authoritarian approaches with, for example, legislative and punitive means, are very expensive and very difficult to sustain[7]. Furthermore, although these approaches have been successful in Singapore[8], they are unlikely to be acceptable in contemporary Australia. The ongoing strategy in north Queensland is to 'educate citizens of the community to be more responsible for their own health destiny[7]'. This 'bottom-up' approach is nevertheless recognised as being very slow and as yet of unproven benefit in many cases[7].

The intriguing question is why the local dengue transmission did not proceed further and lead to an epidemic as occurred in Townsville in 1992[9]. Certainly the mosquito population seemed sufficient to sustain an epidemic.

The control efforts in Cairns were initiated before local transmission had spread beyond 100 metres and consequently surveys could be focused and areas resurveyed, maximising the elimination of breeding containers. This contrasts with the situation in Townsville in 1992, where the epidemic was already widespread before being recognised, requiring survey of a much greater area[9].

Most of the houses examined were lowset, relatively tidy (mean PCI = 5.18) and screened. Although this clearly did not prevent all transmission (three of the cases lived in lowset, screened houses), it may have minimised human and mosquito contact, and therefore the subsequent spread of dengue. Again this contrasts with the Townsville situation, where dengue was concentrated in older suburbs with many highset, unscreened 'Queenslander' houses[9]. Screens on household doors and windows have been found to be associated with protection against dengue elsewhere. An epidemiological study conducted during an epidemic in Taiwan suggested that nearly 63% of dengue infection could be prevented if people lived in adequately screened houses[10].

No doubt other mechanisms played a role in limiting the outbreak. There is evidence that there is variation among strains of the same serotype of dengue virus, with some strains apparently associated with a milder illness and lower levels of viraemia[11]. All three recognised locally acquired cases had mild illness. They may have had low levels of viraemia that were unlikely to infect many mosquitoes with, therefore, a low probability of further transmission.

In conclusion several lessons have been learnt from this episode:

i) the importance of rapid notification of suspected imported cases of dengue;

ii) more emphasis needs to be put on the appropriate management of patients ill with dengue;

iii) pot plant bases and miscellaneous rubbish are the most important breeding containers of *Ae. aegypti*;

iv) screening of houses is probably an important protective measure against dengue infection.

These lessons will contribute to ongoing initiatives aimed at minimising the risk of epidemics of dengue in north Queensland.

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TWO CASES OF MURINE TYPHUS IN ALBANY, WESTERN AUSTRALIA

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Introduction

Albany lies on the south coast of Western Australia approximately 400 road kilometres from Perth. The population of the town and shire numbers about 30,000. In 1994 three cases of murine typhus occurred in Albany. There had been one case of murine typhus recognised in Albany prior to this, about 30 years ago. Typhus is normally diagnosed between one and five times per five years in Western Australia but only murine typhus is endemic. Murine typhus is caused by *Rickettsia typhi* and its vector is the rat flea. Infection is maintained in nature by a rat-flea-rat cycle where rats are the reservoir and experience inapparent infection. Human infection may occur following a flea bite or inhalation of dried infective flea faeces. There is no direct transmission from person to person[1].

The three cases of murine typhus in Albany which occurred in 1994 were unexpected. Action was taken at the time to alert the population to the potential problem of disease transmission associated with rats, and to arrange for the baiting and trapping of rats. After July 1994 there were no further cases and it appeared the outbreak had ended.

Two more cases of murine typhus were recognised in January and March 1995. Details of these two cases are reported.

Case 1

A 52 year old woman was admitted to the regional hospital from her general practitioner's rooms in late January 1995 with a ten day history of episodic fever, night sweats and general malaise. There was no other relevant history and specifically there was no history of headache, vomiting or rash. On examination the patient was febrile (temperature 39.8°C) but there were no localising signs and specifically no rash, lymphadenopathy, hepatosplenomegaly or chest signs. Although the patient had returned from residence in the Middle East 12 months previously there was no history of recent travel.

The differential diagnosis at the time of admission included viraemia, malaria, leptospirosis, toxoplasmosis, infectious mononucleosis and hepatitis. Typhus was also included in the differential diagnosis due to the three previous cases in the region in 1994. Doxycycline 100mg twice daily was commenced at the time of admission.

Serological tests for hepatitis A, Ross River virus, toxoplasmosis and leptospirosis were negative. There was no evidence of malaria on thick and thin films. There was no growth from blood cultures or midstream urine. A chest X-ray and abdominal ultrasound were normal.

Although the white cell count was normal, the patient was lymphopaenic (1.0×10^9/L; normal range 1.5-3.5). There were no other abnormalities in the full blood picture. There were, however, marked abnormalities in the liver function tests. The alkaline phosphatase was 353 U/L (normal range 35-135), the alanine aminotransferase was 164 U/L (0-31) and the gamma glutamyltransferase was 155 U/L (5-40). The bilirubin was normal and urea and electrolytes were not tested.

The patient's fever settled in 72 hours and she was discharged four days after admission to continue doxycycline 100mg twice daily for a total of seven days. Murine typhus was the presumptive diagnosis at the time of discharge, given the clinical picture and the response to doxycycline. The presumptive diagnosis was confirmed by serology (Table 1).

A history of rat exposure was obtained by the environmental health officer on follow-up. The patient lived in a semi-rural property with a resident rat population and in her work with a nursing service had contact with rodents during home visits.

Case 2

A 19 year old fit young man was seen at the emergency department of the regional hospital in mid-March 1995. He had been ill for ten days after having come home from football training with an episode of vomiting. He was seen three days after the onset of symptoms by his general practitioner who diagnosed a viral illness and

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Table 1. Rickettsial serology results of two patients with murine typhus

		Immunofluorescent antibody test (IFAT)[1]			Weil-Felix[2]		
	Date	*R. typhi* (murine typhus)	*R. conorii* (spotted fever)	*R. tsutsugamushi* (scrub typhus)	OX19	OX2	OXK
Case 1	24.1.95	2048	128	<64	1280	80	80
	14.2.95	2048	128	<64	1280	160	80
Case 2	13.3.95	1024	64	<64	2560	1280	80

1. IFAT titres >64 suggest current or past infection. A four-fold rise in titre between acute and convalescent sera indicates acute infection. Single high titres are suggestive of acute infection.
2. Weil-Felix titres of <80 are reported as negative.

prescribed no treatment. Two days later he was seen by another general practitioner who suspected glandular fever.

The significant features of the history at the time of presentation to the regional hospital were of an illness lasting ten days and getting worse. There was episodic fever with night sweats. The vomiting had continued through the course of the illness, but its frequency had decreased so that it occurred usually only once or twice in each 24 hour period, and more commonly in the early hours of the morning. The patient was anorexic and had lost 6kg in weight. He complained of an occipital headache of three days' duration. There were no respiratory symptoms, diarrhoea or history of a rash. There was no photophobia and no history of altered mental state. He had not travelled outside Australia and had not been exposed to any person with a gastrointestinal illness.

On examination the patient was febrile (temperature 38.9°C) and looked unwell. There were no localising signs, in particular no chest signs, lymphadenopathy or hepatosplenomegaly. There was, however, a coarse macular brown-red rash predominantly on the trunk, which had not previously been noticed. Given the clinical picture and the experience with the cases of murine typhus in the previous year, murine typhus was considered in the differential diagnosis and a history of rat exposure was sought.

On admission to hospital the patient was hyponatraemic (sodium 128mmol/L) and had mildly abnormal liver function tests (alanine aminotransferase 65 U/L; normal range 0-31). There was lymphopaenia (1.4x 10^9/L; normal range 1.5-3.5) and the ESR was slightly elevated (22 mm/hr; normal range 1-15) but there were no other abnormalities of the full blood picture. Chest X-ray, urine examination and stool cultures were not requested. No organisms were cultured from blood. Serological results for leptospirosis were negative.

Doxycycline 100mg orally was commenced twice per day. Intravenous fluid replacement was commenced and broad spectrum antibiotics (ceftriaxone and penicillin) were started to cover other illnesses included in the differential diagnosis (Q fever, leptospirosis and brucellosis). During the course of admission the patient continued to be febrile, with temperatures up to 40°C in the first 24 hours, but settled within 72 hours.

Murine typhus was confirmed by serology (Table 1) 48 hours after admission and the patient was discharged to continue doxycycline 100mg twice daily for a further seven days.

There were rats seen in the woodheap in the backyard of the home of the case and about eight days prior to the onset of symptoms the patient had had to retrieve a cricket ball from deep within the woodheap.

Discussion

Typhus is not a nationally notifiable disease[2] but the Western Australian notifiable disease database records 1332 cases of murine typhus with 50 deaths between 1927 and 1952[3]. In the last 40 years there have only been 99 cases of all forms of typhus notified in Western Australia, including imported cases of scrub typhus and spotted fever as well as endemic murine typhus (Health Department of Western Australia, notifiable diseases database). It is impossible to differentiate between types of typhus in the Western Australian database and the background incidence of murine typhus is unknown. In 1993 only two cases of typhus (scrub and African tick) were notified in Western Australia; in 1994 four cases of murine typhus were reported, three from Albany. Clearly the five cases of murine typhus which have occurred in Albany in a ten month period between June 1994 and March 1995 comprise an unexpectedly high incidence of the disease in this area.

There are three main groups of typhus found in Australia, murine typhus, scrub typhus and spotted fever, with only murine typhus thought to be endemic in Western Australia. Scrub typhus occurs in north Queensland and in Lichfield Park in the Northern Territory. One case has been described in the Kimberley region of Western Australia. Scrub typhus is caused by *R. tsutugamushi* and its vector is the trombiculid mite. Spotted fever groups, which include Queensland tick typhus, Flinders Island spotted fever and East Gippsland spotted fever, occur in their named locations. Cases of spotted fever are also imported into Western Australia[4]. This group is caused by several *Rickettsia* species all of which are believed to be tick-borne.

In a review of 96 patients admitted to Royal Perth Hospital between 1944 and 1953 the most common

Table 2. Likely results from laboratory investigations in a patient with murine typhus[1]

Test	Results
Haemoglobin	Mild anaemia with haemoglobin 9-11 g/dL in the second week of infection in some patients
White cell count	Lymphopaenia early in the course of the illness followed by polymorphonucelar leucocytosis later in the illness
Platelets	Thrombocytopaenia usually in those patients who are also anaemic
Liver function tests	Various transient increases in bilirubin, alkaline phosphatase, alanine aminotransferase, gamma glutamyltranferase and a transient decrease in serum albumin
Urea and electrolytes	Hyponatraemia and rises in urea and creatinine associated with prolonged vomiting and dehydration
CSF	No change
Blood culture	No growth
Urine culture	No growth
Stool culture	No growth
Chest X-ray	Scattered patchy changes in minority of patients with chest signs

1. Based on references 3 and 5.

symptom of murine typhus was fever, which was always present and has an abrupt onset[3]. The fever was usually accompanied by anorexia and lethargy, and often by headache and nausea or vomiting. Other symptoms were cough, constipation, drowsiness and diarrhoea. In untreated typhus the characteristic fever lasts up to three weeks. If usually settles within 48-72 hours of starting appropriate antibiotic therapy.

An important clinical sign of murine typhus is a rash, which is papular and found predominantly on the trunk and occurs in more than 70% of cases[3]. The rash of typhus does not appear until the fifth to eighth day of the illness and lasts about three days. Scattered chest crepitations, hepatosplenomegaly and lymphadenopathy occur in a minority of cases. Often the clinical picture is of a patient with a high episodic fever, malaise and anorexia with no localising signs. A range of results to routine laboratory investigations may be seen (Table 2).

Because of the variety of symptoms associated with murine typhus, the differential diagnosis may include pyrexia of unknown origin, viraemia, pneumonia, malaria, infectious mononucleosis, Ross River virus infection, Barmah Forest virus infection, influenza, measles, typhoid and paratyphoid fever, gastroenteritis, infectious hepatitis and meningitis. If a typhus is suspected, a history of rat exposure should be sought, although in a previous review a history of rat exposure was obtained in only 50% of cases[3].

It appears that typhus is endemic in the rat population in the Albany region. Awareness of the potential problem amongst people who may be exposed to rats at home or work and control of rats are the only measures that can be taken to prevent the occurrence of this illness. If prevention fails, diagnosis of murine typhus is important as this disease is treatable and has been associated with fatalities in older people, although many cases resolve without specific treatment. Inclusion of typhus on the national notifiable diseases database would provide a national picture of typhus occurrence in Australia and may aid identification of clusters of cases from which public health action can be taken.

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BARMAH FOREST VIRUS DISEASE IN GIPPSLAND, VICTORIA

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Background

Arthropod-borne diseases are a significant problem all over the world, including Australia, and arboviral diseases have accounted for at least ten per cent of notifiable disease reports in recent years in this country[1]. Arboviral diseases are particularly interesting epidemiologically. They are dependant on specific combintaions of vertebrate hosts, which usually act as virus amplifiers, and vector mosquitoes for survival. For some arboviral diseases the vertebrate-vector cycles are well characterised, for example *Culex annulirostris* and heron and domestic fowl are involved in Murray Valley encephalitis and Kunjin virus cycles and *Aedes vigilax* and marsupials and domestic vertebrates are involved in Ross River virus cycling[2,3]. However, the vertebrate and vector reservoirs of some arboviruses are not yet fully understood, as is the case for Barmah Forest virus.

Barmah Forest virus (BFV) was first isolated from mosquitoes in 1974, and is classed as a alphavirus. BFV has only been shown to cause pathogenic infection in humans since as recently as 1988[4,5,6]. Very little is known about this disease as in the past BFV infections were possibly assumed to be unconfirmed Ross River virus disease and the clinical signs and symptoms were assumed to be similar.

There were 60 notifications of Barmah Forest virus disease made to Health and Community Services, Victoria during 1993 and 1994, from two distinct geographical areas. The first of these was known BFV territory on the Murray River; the second was in Gippsland where this disease had been previously unknown.

We undertook a survey in May 1994 to identify patterns of signs, symptoms, sequelae and risk factors specifically associated with Barmah Forest virus disease in Gippsland, Victoria.

Methods

We selected all new notifications of Barmah Forest virus infection for residents of the Gippsland area between December 1993 and April 1994. Only laboratory confirmed cases were included and cases concurrently notified with Ross River virus infection were excluded. Some problems may exist with serological confirmation of BFV infection. False positive results can occur and the length of time which IgM persists is unknown. Without detailed serological studies it was not possible to determine whether persons coincidentally notified with Ross River virus infection had dual or subsequent infections or false positive results.

The individuals were sent a questionnaire and reply paid envelope by post with a plain language statement explaining the purpose of the questionnaire.

The questionnaire was for self completion, with some closed questions and several open ended questions. We sought information on a limited range of demographic variables, exposure to and protection from mosquitoes and previous residence and holiday locations. We asked the participants to describe their house and garden, as well as seeking information about the location of nearby bodies of standing water. In addition we asked about previous experience of a number of arboviral diseases, including Ross River virus infection, Australian encephalitis, dengue, Kunjin virus infection, and Japanese encephalitis. Finally we sought information about signs and symptoms experienced both at the time the illness was first recognised and at the time of completion of the questionnaire, two or more months subsequently. Questions relating to clinical presentation were drawn from descriptions of other arboviral diseases.

Table 1. Persons with Barmah Forest virus disease surveyed compared with all notifications of Ross River virus disease and Barmah Forest virus disease, December 1993 to April 1994, by age group

Age group (years)	Notified cases				Survey respondents	
	Ross River virus infection		Barmah Forest virus infection			
	Number	Per cent	Number	Per cent	Number	Per cent
0-15	1	2	0	0	0	0
16-19	3	6	2	8	1	8
20-29	5	10	6	23	3	23
30-39	8	16	3	12	2	15
40-49	9	18	6	23	1	8
50-59	10	20	4	15	1	8
60+	15	29	5	19	5	38
Total	51	100	26	100	13	100

Results

Eighteen people fulfilled the case definition and thirteen of the eighteen questionnaires sent out were returned without reminder (72%). Three cases had onset of illness in December, seven in January, one in February and two in March.

Respondents were four men and nine women, with an overall mean age of 46 years. The mean age for women (47 years, range 16-80) and for men (45 years, range 29-62) was not significantly different (p = 0.91). This compared to an overall mean of 42 years for all Victorian notifications of Ross River virus infection and Barmah Forest virus infection (mean age 43 years for females and 40 years for males) (Table 1).

The respondents all lived in Gippsland with only five reporting that they had moved house during the previous five years; only one person had lived outside Gippsland in the past five years.

Ten respondents identified bodies of standing water near their homes. Such sources included dams, garden ponds and swimming pools. Information regarding protective behaviours to avoid contact with mosquitoes was reported by 12 respondents and included such measures as insect screens, staying indoors at night, use of long sleeved clothing and use of insecticides. Eleven respondents lived in screened houses and nine used insect repellent as protection against mosquitos. The respondents were as likely to live in new houses as old, and the majority said that their gardens were neat and suburban.

The respondents were an active group with 12 of the 13 enjoying a wide range of outdoor activities. Fishing or gardening were specifically nominated by 10 persons.

Of the 12 who responded to the question on recent holiday destinations, one had been on holiday near the Barmah Forest and the Murray River. Two respondents had spent their holidays on the south coast of New South Wales. All other respondents had spent their holidays on the Gippsland coast or in large towns between South Australia and New South Wales, and one person had been overseas. The minimum time between return from holiday and onset of illness was 18 days.

Twelve people responded to the question on previous arboviral diseases. Of these, three had previously had Ross River virus disease.

The most common symptoms described by respondents at the time of infection were fatigue, sweats, arthralgia and myalgia (Table 2). Headaches and giddiness were also common. At the time of completion of the questionnaire almost all respondents still described fatigue, and some described difficulty concentrating, irritability, swollen or inflamed joints, myalgia and other symptoms.

Table 2. Signs and symptoms associated with Barmah Forest virus infection at onset of illness and at questionnaire completion

Signs and symptoms	At onset of illness (number of cases)	At questionnaire completion (number of cases)
Fever	3	0
Headache	9	0
Giddiness	7	1
Blurred vision	4	3
Swollen/inflamed joints	12	8
Myalgia	12	9
Nausea	6	0
Diarrhoea	1	0
Non-vesicular rash	5	0
Chills	5	0
Sweats	11	0
Fatigue/weakness	13	12
Dysuria	1	0
Urinary frequency	2	0
Swollen glands	1	0
Lung/breathing problems	4	1
Confusion	5	0
Difficulty concentrating/irritability	0	11
Tinnitus	0	1
Weight loss	0	1

Discussion

Comments such as 'Metung is a mosquito invaded area', and 'if the mosquitoes didn't get you the March flies would' from our respondents indicate that insect life in Gippsland is hard to avoid.

In our respondents, BFV disease was probably locally acquired, due to the time interval between return from holiday and the onset of illness. Three cases had however travelled to other areas with known BFV transmission, including (this year) the south coast of New South Wales[7], and detailed serological results which could confirm recent infection were not available.

The age range of these respondents did not include any person under the age of 15 years, although children are presumably bitten by the same mosquito populations. It is possible that children are infected asymptomatically with Barmah Forest virus.

Barmah Forest virus disease is clearly a disease that causes a distressing range of signs, similar to those reported for other arboviral

infections[8,9,10,11], symptoms and sequelae, lasting for at least some months after infection. In particular fatigue, arthralgia, myalgia and sweats were commonly reported. The range of signs and symptoms reported by our respondents excluded a few seen in other arboviral diseases such as abdominal pain, vomiting or a rash with blisters. The more disruptive sequelae in this group of persons included arthralgia and myalgia, fatigue, weakness and difficulty in concentration (a point voluntarily made by a number of respondents) continuing for months after infection.

This survey indicates the need for further investigation of Barmah Forest virus infection and its long term effects. There appears to be poor public awareness of mosquito-borne illnesses in the more temperate areas of Australia, and while many persons are aware of mosquito-borne illness in tropical areas, this survey indicates that arboviral diseases can cause significant effects as far south as Victoria. Public awareness of these illnesses and their prevention could reduce the incidence of arboviral diseases and their economic consequences.

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OVERSEAS BRIEFS

In the last two weeks, the following information has been supplied by the World Health Organization (WHO), the South Pacific Epidemiological and Health Information Service and the Program for Monitoring Emerging Diseases.

Ebola virus outbreak in Zaire

The WHO has indicated that the Ebola haemorrhagic fever epidemic in Zaire may be declared to be over by September. As At 4 July, no new cases had been identified since June 20; active searching for cases is still continuing to determine whether any further transmission is occurring. A total of 296 cases has been identified, with 233 known to have died.

The Ebola virus is the same as that which caused an outbreak in Zaire in 1976, but the pattern of this year's epidemic was markedly different; it consisted of a series of waves of cases, whereas there was only one major wave of cases in 1976. This reflects the differing routes of transmission thought to have been associated with the two epidemics. In 1976, transmission had largely been through contaminated needles and syringes, while this year, transmission is thought to have occurred largely from person to person through contact with blood or other body fluids.

The WHO is implementing a plan of action for Ebola in Zaire for the remainder of this year. It has as its priorities containment of the epidemic, better understanding of the Ebola virus epidemiology and clinical manifestations, overall administrative, technical and scientific coordination of the international team in Kikwit and the strengthening of Zaire's national responses to potentially epidemic diseases.

Dengue in the South Pacific

The South Pacific Epidemiological and Health information Service has reported on dengue activity in the South Pacific this year. In New Caledonia, 1297 cases were reported between 2 January and 16 May, with all those confirmed (874) identified as dengue 3. About 60% of cases were reported form the Southern Province and 40% from the Northern Province. There were 573 suspected cases reported from Palau between 1 January and 5 May. Dengue had been confirmed in a small number of cases, and the epidemic appeared to have been waning. The Cook Islands reported 493 cases between 19 February and 16 May, with 24 confirmed as

dengue 3. Ninety-five per cent of the cases had been on Rarotonga, with some more recent spread to Mauke and Penrhyn. Five confirmed cases of dengue 3 were reported from Wallis and Futuna by 16 May, four indigenous. French Polynesia has had endemic dengue since the last epidemic in 1989. It had reported 208 suspected and 47 confirmed dengue 3 cases by the end of February, normal for the time of year. Reports of no cases were received from Niue, Northern Mariana Islands, Solomon Islands, Nauru, Papua New Guinea and Tuvalu.

Influenza update

Most influenza isolates in New Zealand this year have been influenza B. Small local outbreaks in most parts of the country in May, affecting all age groups over the age of one year.

Influenza A was reported from February to May in Rio de Janeiro in Brazil. Most cases were in children in local outbreaks. Chile reported influenza A in children in an outbreak in Valparaiso in May.

Encephalopathy in India

Preliminary laboratory and epidemiological data have now ruled out Japanese encephalitis or any other viral involvement in the outbreak of suspected Japanese encephalitis in Bihar State in India. The outbreak appeared to be over by the end of June when there was onset of rains, ending a period of extreme heat. Investigations are continuing.

Cholera update

Two cases of cholera were reported from the Russian Federation in June. They occurred in Moscow and the Russian health authorities are conducting intensive epidemiological investigations into them. Twenty-five cases were reported from the Ukraine in June, in the Nikolaev Region.

Cholera cases have been reported since the beginning of the year from Angola, Argentina, Belize, Bolivia, Brazil, Bukino Faso, Burundi, Cambodia, Cameroon, Cape Verde, Colombia, Costa Rica, El Salvador, Ghana, Guinea, Guinea Bissau, Honduras, India, Kenya, Laos, Liberia, Mali, Mexico, Nicaragua, Peru, Philippines, Russian Federation, Sierra Leone, Singapore, Somalia, Togo, Uganda, Ukraine and in Rwandan refugee camps in Tanzania and Zaire.

CDI NOTICE TO READERS

CDI reader survey

Last fortnight, a reader survey form was incuded with *CDI*. If you have not already done so, please complete and return it by **31 July 1995**. Details of who reads and uses *CDI*, and your views on what *CDI* publishes now and what it could publish in the future will ensure that *CDI* continues to make a useful contribution to national communicable disease information needs.

If you are in Australia, please use the reply-paid envelope which was included with the survey. If you are overseas, please fax your completed form to +61 6 289 7791, or post it, preferably by air mail, to the address on the front of *CDI*.

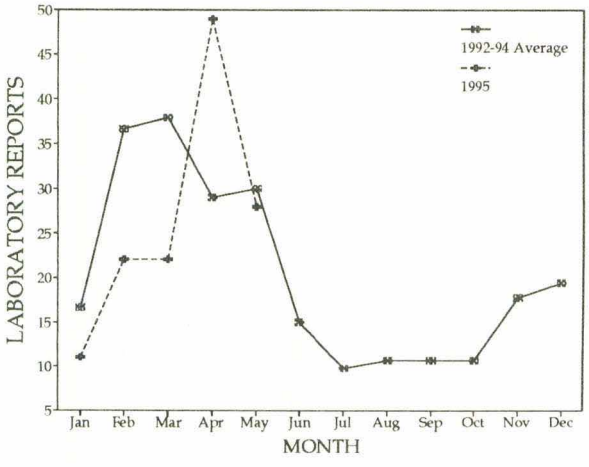
COMMUNICABLE DISEASES SURVEILLANCE

Virology and Serology Reporting Scheme

There were 941 reports received in the *CDI* Virology and Serology Reporting Scheme this fortnight (Tables 6, 7 and 8).

- **Measles** was reported for 3 patients this period, all diagnosed by IgM detection. The number of reports received remains low.
- Eight reports of **rubella** were received this fortnight for 2 females (both in the 15 to 44 year age group) and 6 males, all in the age range 11 to 42 years. The number of reports received hs continued to decline in recent months.
- Positive **hepatitis B** serology was reported for 35 patients this fortnight including 18 males and 14 females (3 sex not stated). Twenty patients were in the 25 to 44 year age group and 7 in the 15 to 24 year age group. Included were 2 injecting drug users.
- Twenty reports of positive **hepatitis C** serology were received this period. Included were 11 males and 9 females. Seventeen reports were for the 25 to 44 year age group. Included were 5 injecting drug users and one pregnant female.
- One report of **Barmah Forest virus** was received this period. The number of reports has fallen after peaking in April (Figure 1).

Figure 1. Barmah Forest virus laboratory reports, 1992 to 1994 average and 1995, by month of specimen collection



- **Flavivirus** (unspecified) was reported for 2 patients this fortnight including a 29 year old male who had recently returned from South-East Asia.
- Twenty-nine reports of **adenovirus** were received this fortnight all but 2 of which were for patients under the age of 5 years. Diagnosis was by virus isolation (21), antigen detection (7) and fourfold rise in titre (one). Included were adenovirus **types 1**(one), **2** (one) and **5** (two).
- **Herpes simplex virus type 1** was reported for 55 patients this fortnight. Diagnosis was by virus isolation (48), antigen detection (6) and IgM detection(one). Included was virus isolation from 48 year old male with suspected herpes encephalitis.
- Thirty-nine reports of **herpes simplex virus type 2** were received, diagnosed by virus isolation (38) and antigen detection (one). This virus was isolated from liver and lung specimens collected at autopsy from a fetus which had died *in utero* and from the 19 year old mother of the fetus who had herpetic encephalopathy.
- Thirty-three reports of **cytomegalovirus** were received this period, for 20 males and 13 females, 11 of whom were under the age of one year. Diagnosis was by virus isolation (22), antigen detection (4), nucleic acid detection (one) and IgM detection (6). Included was virus isolation from postmortem heart, lung and trachea specimens from a 5 month old female who had died of SIDS. This virus was also reported for a 12 year old liver transplant recipient
- **Epstein-Barr virus** was reported for 16 patients this fortnight. Included were 5 males and 11 females, 5 of whom were in the 5 to 14 year age group. Diagnosis was by IgM detection in all cases.
- Thirty-two reports of **untyped enterovirus** were received this period, for 19 males and 13 females, 21 of whom were under the age of one year. Diagnosis was by virus isolation (29), nucleic acid detection (2) and fourfold rise in titre (one). Included was virus isolation from the brain tissue of a 5 month old male who was reported to have had died of SIDS.
- **Rhinovirus** was reported for 23 patients this period. Included were 14 males and 9 females, 18 of whom were under the age of 5 years.
- **Influenza A** was reported for 56 patients this fortnight including 9 reports of subtype H_1N_1. Diagnosis was by virus isolation (23, specimen collection dates from late May to early July), antigen detection (14), fourfold rise in titre (3), IgM detection (one), and single high titre (15). Included were 28 males and 28 females, 34 of whom were under the age of 15 years. Reports were received from the New South Wales (24), Queensland (5), Victoria (25) and Western Australia (2). Included was a 6 year old female who had had a respiratory arrest, a 7 year old female with cystic fibrosis and a 29 year old pregnant female (29 weeks' gestation with twins) with a diagnosis of atypical pneumonia. A total of 385 reports has been received for the year to date of which 37 were H_1N_1 subtypes and 5 H_3N_2 subtypes. More adults were affected compared to influenza B and the parainfluenza virus types 2 and 3 (Figure 2).
- Sixteen reports of **influenza B** were received this period for 10 males and 6 females. Diagnosis was by virus isolation (13, specimen collection dates from late May to late June), antigen detection (2),and single high titre (one). Reports were received from New South Wales (9), Queensland (one) and Victoria (6). A total of 73 reports has been received so far this year, for 39 males and 33 females, 20 of whom were in the 25 to 44 year age group.

Figure 2. Laboratory reports of influenza A and B and parainfluenza types 2 and 3, 1995, by age group

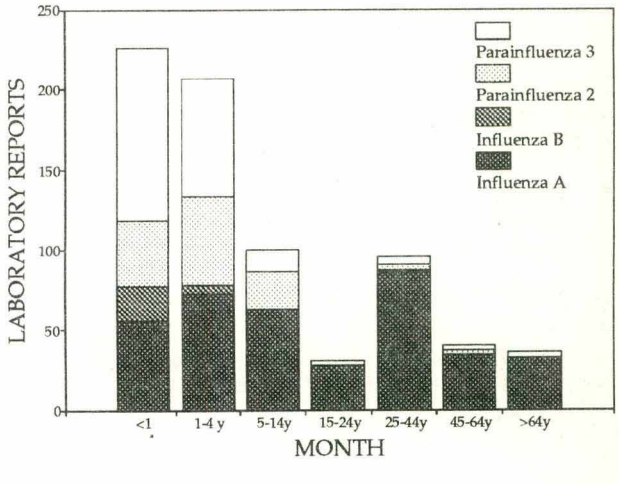


Figure 3. Respiratory syncytial virus laboratory reports, 1994 to 1995, by State or Territory and month of specimen collection

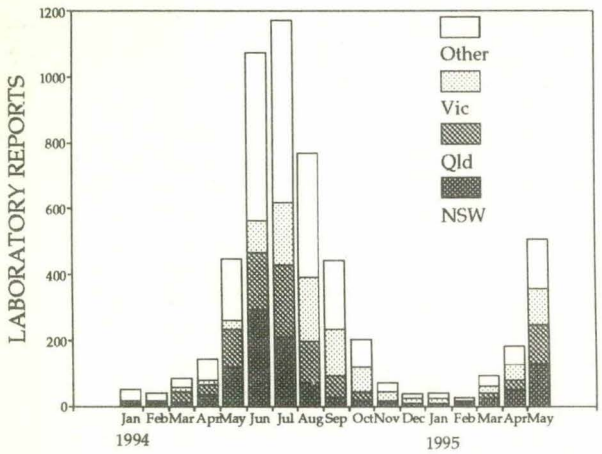
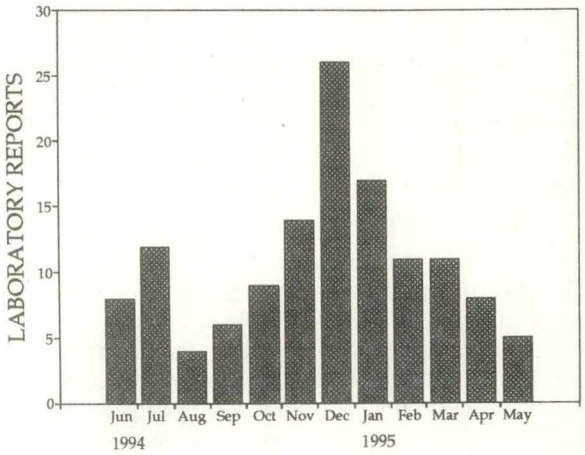


Figure 4. *Chlamydia psittaci* laboratory reports, June 1994 to May 1995, by month of specimen collection



- Ten reports of **parainfluenza virus type 2** were received this period, 9 for patients under the age of 5 years. Method of diagnosis included virus isolation (7) and antigen detection (3).
- **Parainfluenza virus type 3** was reported for 26 patients this fortnight, 16 for patients under the age of one year. Diagnosis was by virus isolation (14) and antigen detection (12). Included was a 6 month old male with croup from whom adenovirus was also isolated and a one year old male with a diagnosis of bronchiolitis.
- Three hundred and ninety-one reports of **respiratory syncytial virus** were received this fortnight, 268 for patients under one year of age and 99 in the one to 4 year age group. Method of diagnosis included virus isolation (98), antigen detection (292) and single high titre (one). Included was a 6 month old female with suspected pertussis. The number of reports is average for the time of year (Figure 3).
- **Rotavirus** was reported for 51 patients this period including 34 males and 17 females. Forty-eight cases were 4 years of age or under. The number of reports received remains below average for the time of year.
- *Chlamydia psittaci* was reported for 5 patients this period including 2 males and 3 females, all in the 15 to 64 year age group. Diagnosis was by fourfold rise in titre (2), IgM detection (20 and single high titre (one). The number of reports has declined in recent months after peaking last December (Figure 4).
- Positive **syphilis** serology was reported for 25 patients this period including 19 males and 6 females, 15 in the 25 to 44 year age group.

Australian Sentinel Practice Research Network

Data for week 26 (ending 2 July) and week 27 (ending 9 July) are included in this issue of *CDI* (Table 1). There were 8017 consultations reported for week 26 and 7749 for week 21. The influenza reporting rate was about the same this fortnight as last fortnight. High rates were reported from New South Wales, South Australia and Western Australia and few reports were received from Victoria, the Australian Capital Territory, Tasmania and the Northern Territory. Reports of measles continue to be rare.

Table 1. Australian Sentinel Practice Research Network, weeks 26 and 27 1995

Condition	Week 26, to 2 July 1995		Week 27, to 9 July 1995	
	Reports	Rate per 1000 encounters	Reports	Rate per 1000 encounters
Influenza	198	24.7	208	26.8
Rubella	4	0.5	7	0.9
Measles	0	0	1	0.1
Chickenpox	11	1.4	14	1.8
Pertussis	3	0.4	2	0.3
Gastroenteritis	90	11.2	106	13.7

Australian encephalitis: Sentinel Chicken Surveillance Programme serological results, May and June 1995

AK Broom[1], *JS Mackenzie*[2], *L Melville*[3], *DW Smith*[4], *PI Whelan*[5]

Sentinel chicken serology was carried out for 20 of the 22 flocks in Western Australia in March and April 1995. there were again a number of seroconversions in the flocks located in the Kimberley, Pilbara and Gascoyne regions. The location, specific antibodies detected and the month the seroconversion occurred is shown in Table 2.

Antibodies to Murray Valley encephalitis (MVE) and Kunjin viruses and were detected in the sentinel chicken flocks, showing that both of these viruses were active in the north of Western Australia during May and June. The Health Department of Western Australia issued public health warnings of increased flavivirus activity in these regions.

Eight flocks of sentinel chickens from the Northern Territory were tested in May and there were 2 new seroconversions to Kunjin virus in the Smith Point flock.

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4. PathCentre, Perth.
5. Medical Entomology Branch, Department of Health and Community Services, Darwin, Northern Territory.

Table 2. Seroconversions to flaviviruses in sentinel chicken flocks in Western Australia, May and June 1995

		May		June	
		Positives	Antibody[1]	Positives	Antibody[1]
Kimberley	Kalumburu	Not bled		6	1 MVE 1 KUN 2 MVE/KUN 2 FLAVI
	Wyndham	2	2 FLAVI	0	
	Kununurra	1	1 KUN	0	
	Fitzroy Crossing	2	2 MVE	Not bled	
	Derby	11	6 KUN 3 MVE/KUN 2 FLAVI	1	1 KUN
	Broome	8	1 MVE 3 KUN 4 FLAVI	2	FLAVI (specific antibody not yet determined)
Pilbara	Harding Dam	13	10 KUN 1 MVE 2 MVE/KUN	0	
	Marble Bar	3	1 MVE 2 KUN	1	1 KUN
	Pannawonica	Not bled		4	1 MVE 3 KUN
	Paraburdoo	5	1 MVE 3 KUN 1 FLAVI	Not bled	
	Onslow	5	3 KUN 1 MVE/KUN 1 FLAVI	0	
	Exmouth	5	5 KUN	0	
	Carnarvon	2	2 KUN	0	

1. MVE - antibodies to Murray Valley encephalitis virus.
KUN - antibodies to Kunjin virus.
MVE/KUN - antibodies to Murray Valley encephalitis and Kunjin viruses.
FLAVI - antibodies to a flavivirus but probably not Murray Valley encephalitis virus or Kunjin virus.

National Influenza Surveillance 1995

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

Overall the rate of influenza reporting has remained stable this fortnight.

Sentinel general practitioner surveillance (Figure 5)

- The **Australian Sentinel Practice Research Network** reported 24.7 and 26.8 reports per 1000 encounters for the weeks ending 2 and 9 July respectively, similar to the figures reported last fortnight. Whilst the rate of reporting for influenza-like illness rose slightly in New South Wales this period, rates in other States and Territories fell slightly (Victoria and Western Australia) or remained stable.
- **New South Wales** sentinel general practitioners reported rates of 37.3 and 31.4 per 1000 consultations for the weeks ending 25 June and 2 July respectively. The consultation rate reported by this scheme fell slightly this fortnight.
- **The Australian Capital Territory Sentinel General Practitioner Scheme** reported a consultation rates for influenza-like illness of 13 and 17 per 1000 encounters for the weeks ending 9 and16 July respectively.

Absenteeism surveillance (Figure 6)

- **Australia Post** reported national absenteeism rates of 2.5% and 2.7% for the weeks ending 9 and16 July respectively which is similar to the rates reported in previous recent weeks. Whilst the rate for New South Wales fell slightly that for Victoria remained consistently higher than other States whilst the rates in Queensland and Western Australia rose slightly.
- **New South Wales Schools Absenteeism Surveillance** and the **Australian Capital Territory Schools Absenteeism Surveillance** had no data available due to school holidays.

Laboratory surveillance

- **Influenza A** was reported for 56 patients this fortnight including were 9 reports of subtype H_1N_1. Diagnosis was by virus isolation (23, specimen collection dates from late May to early July), antigen detection (14), fourfold rise in titre (3), IgM detection (one), and single high titre (15). Included were 28 males and 28 females, 34 of whom were under the age of 15 years. Reports were received from the New South Wales (24), Queensland (5), Victoria (25) and Western Australia (2). Included was a 6 year old female who had had a respiratory arrest, a 7 year old female with cystic fibrosis and a 29 year old pregnant female (29 weeks gestation with twins) with a diagnosis of atypical pneumonia. A total of 385 reports has been received for the year to date of which 37 were H_1N_1 subtypes and 5 H_3N_2 subtypes. The number of reports received has fallen slightly in recent weeks (Figure 7).
- Sixteen reports of **influenza B** were received this period for 10 males and 6 females. Diagnosis was by virus isolation (13, specimen collection dates from late May to late June), antigen detection (2) and single high titre (one). Reports were received from New South Wales (9), Queensland (one) and Victoria (6). A total of 73 reports has been received so far this year for 39 males and 33 females, 20 of whom were in the 25 to 44 year age group. The number of reports remains low (Figure 8).

Deaths surveillance

- **South Australia deaths surveillance** reported death rates of 1.6 and 1.7 per 10,000 population for

Figure 5. Sentinel general practitioner influenza reports per 1000 encounters, 1995, by week

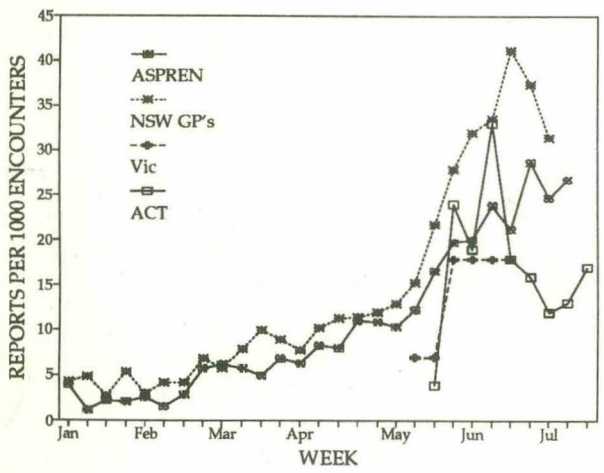


Figure 6. Absenteeism reports, 1995, by week and scheme

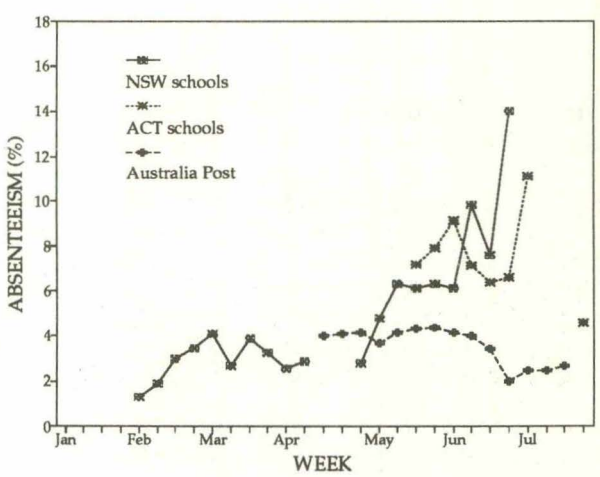


Figure 7. Influenza A laboratory reports, 1995, by method of diagnosis and week of specimen collection

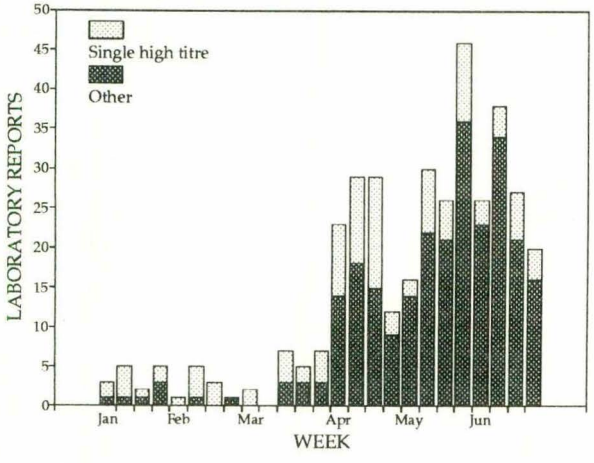
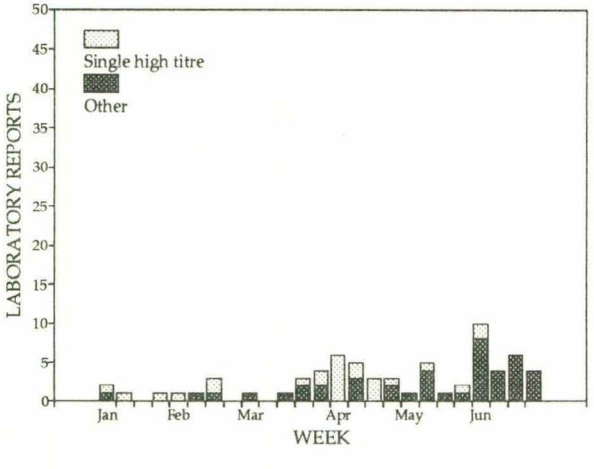


Figure 8. Influenza B laboratory reports, 1995, by method of diagnosis and week of specimen collection



the weeks ending 9 and 16 July respectively. The death rate continues to fluctuate with no apparent trend.

Surveillance of Serious Adverse Events Following Vaccination

The Serious Adverse Events Following Vaccination Surveillance Scheme is a national surveillance scheme which monitors the serious adverse events which occur rarely following vaccination. Acceptance of a report does not imply a causal relationship between the administration of the vaccine and the medical outcome or that the report has been verified as to the accuracy of its contents. It is estimated that 250,000 doses of vaccines are administered to Australian children under the age of 6 years every month.

There were 3 reports of serious adverse events following vaccination for the reporting period 11 June to 8 July 1995. Reports were received from the Australian Capital Territory (one), the Northern Territory (one) and Queensland (one). Reports were not received from Tasmania or Victoria. New South Wales, South Australia and Western Australia have not yet commenced reporting.

One of the three reports was of a hypotonic/hyporesponsive episode following the first dose of DTP vaccine and one was of fever and possible convulsions following the second dose of DTP, Hib, and oral polio vaccines and the third dose of hepatitis B vaccine. The third report was of ataxia, neck stiffness, vomiting and hand and arm swelling following administration of hepatitis B vaccine in an adult. None of these cases was hospitalised.

All cases had recovered from the event at the time the initial report was received.

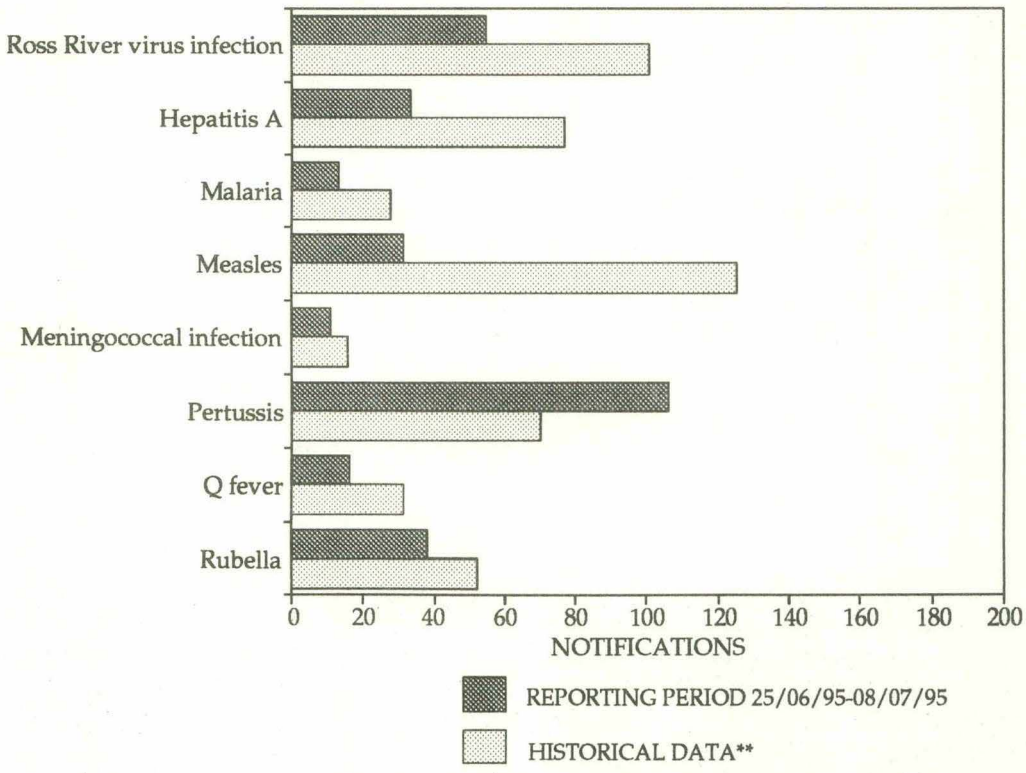
National Notifiable Diseases Surveillance System 25 June 1995 to 8 July 1995

There were 1888 notifications received in the period (Figure 9 and Tables 3, 4 and 5).

- There were 55 cases of **Ross River virus infection**; 25 cases were male and 30 cases were female. The cases were aged between the 20-24 and the 70-74 years age groups.
- There were 353 notifications of **campylobacteriosis** received; 196 cases were male, 153 cases were female, and the sex of 4 cases was unrecorded. The cases were aged between the 0-4 and the 85-89 years age groups.
- There were 105 cases of **gonococcal infection** reported; 72 cases were male, 32 case were female, and the sex of one case was unrecorded. The cases were aged between the 0-4 and the 70-74 years age groups with 68% of cases in the 15-29 years age group.
- There was one case of ***Haemophilus influenzae* type b infection** reported in a 47 year old female.
- Thirty-three cases of **hepatitis A** were reported; 16 cases were male and 17 cases were female. Recorded ages were between the 0-4 and the 70-74 years age groups. There have been fewer hepatitis A notifications so far this year than for the same period in recent years.
- Ten notifications of **hepatitis B** were received; 8 cases were male and 2 cases were female. Recorded ages were between the 15-19 and the 55-59 years age groups.
- There was one notification of **hydatid infection** in a female in the 55-59 years age group.
- There were 3 notifications of **legionellosis**; one case was male, one case was female and the sex of one was unrecorded. Recorded ages were in the 70-79 years age group.

- Two notifications of **leptospirosis** were received; in a 23 year old female and a 29 year old male.
- Thirteen cases of **malaria** were reported; 7 cases were male and 6 cases were female. Recorded ages were between the 10-14 and the 50-54 years age groups.
- There were 31 notifications of **measles**; 15 cases were male and 16 cases were female. Recorded ages were between the 0-4 and the 30-34 years age groups with 20 cases aged less than nine years. There was one apparent cluster of 2 cases in the same postcode area in New South Wales.
- Eleven cases of **meningococcal infection** were reported; 10 cases were male and one case was female. The cases were aged between the 0-4 and the 70-74 years age group with 6 cases aged less than 24 years.
- There were 106 cases of **pertussis** reported for the period; 45 cases were male, 58 cases were female and the sex was unrecorded for three cases. Recorded ages were between the 0-4 and the 75-79 years age groups with 60% of cases aged less than 14 years. There were 11 apparent clusters of between 2 and 6 cases each in the same postcode area. Apparent clusters were in New South Wales (5), Queensland (5) and Western Australia (one)
- Sixteen cases of **Q fever** were received; 13 cases were male, 2 cases were female and the sex was unrecorded for one case. Recorded ages were between the 10-14 and the 65-69 years age groups.
- There were 38 notifications of **rubella**; 24 cases were male and 14 cases were female. Recorded ages were between the 0-4 and the 70-74 years age groups with 13 cases reported for males in the 15-24 years age group.
- There were 128 cases of **salmonellosis** reported; 61 cases were male, 62 cases were female, and the sex of 5 cases was not reported. The cases were aged between the 0-4 and the 80-84 years age groups with 45% of cases in the 0-4 years age group.
- Fifty cases of **syphilis** were reported; 23 cases were male, 26 cases were female, and the sex of one case was unrecorded. The cases were aged between the 0-4 and the 80-84 years age groups.
- There were 26 notifications of **tuberculosis**; 13 cases were male and 13 cases were female. The cases were aged between the 0-4 and the 90-94 years age groups.
- Eight cases of **yersiniosis** were reported; 5 cases were male and 3 cases were female. Recorded cases were between the 0-4 and the 35-39 years age groups.

Figure 9. Selected National Notifiable Diseases Surveillance System reports, and historical data[1]



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

Table 3. Notifications of diseases preventable by vaccines recommended by the NHMRC for routine childhood immunisation, received by State and Territory health authorities in the period 25 June to 8 July 1995

DISEASES	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	TOTALS FOR AUSTRALIA[1]			
									This period 1995	This period 1994	Year to date 1995	Year to date 1994
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0
Haemophilus influenzae b infection	0	0	0	0	0	1	0	0	1	10	44	114
Measles	0	15	0	5	1	3	5	2	31	190	875	1907
Mumps	3	0	0	NN	0	0	0	0	3	2	34	12
Pertussis	1	37	4	42	2	3	12	5	106	144	2209	2873
Poliomyelitis	0	0	0	0	0	0	0	0	0	0	0	0
Rubella	0	4	0	10	1	4	17	2	38	38	1090	816
Tetanus	0	0	0	0	0	0	1	0	1	0	3	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.

NN Not Notifiable.

Table 4. Notifications of other diseases[1] received by State and Territory health authorities in the period 25 June to 8 July 1995

DISEASES	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	TOTALS FOR AUSTRALIA[2]			
									This period 1995	This period 1994	Year to date 1995	Year to date 1994
Arbovirus infection												
Ross River virus infection	0	1	2	48	0	-	1	3	55	55	2119	3588
Dengue	0	0	0	0	0	-	0	0	0	0	14	12
NEC[3]	0	7	0	12	0	1	1	0	21	23	630	435
Campylobacteriosis[4]	7	-	14	53	127	26	91	35	353	413	5354	5018
Chlamydial infection (NEC)[5]	0	NN	10	82	11	14	47	18	182	263	3294	3333
Donovanosis	0	NN	0	1	NN	0	0	0	1	2	48	58
Gonococcal infection[6]	0	11	18	42	0	0	14	20	105	112	1545	1595
Hepatitis A	0	11	1	12	1	0	2	6	33	96	869	1071
Hepatitis B	0	3	0	1	3	0	2	1	10	20	179	180
Hepatitis C incident	-	0	0	-	0	-	-	-	0	1	49	8
Hepatitis C unspecified	14		19	79		0	454	44	610	400	4583	4721
Hepatitis (NEC)	0	0	0	2	0	0	2	NN	4	1	23	23
Legionellosis	0	3	0	0	0	0	0	0	3	11	111	120
Leptospirosis	0	0	0	1	0	0	1	0	2	1	61	88
Listeriosis	0	0	0	0	0	0	0	0	0	1	38	17
Malaria	0	0	0	7	1	0	5	0	13	17	353	401
Meningococcal infection	0	5	1	0	0	0	3	2	11	19	175	158
Ornithosis	0	NN	0	1	0	0	3	0	4	4	72	55
Q fever	0	10	0	3	2	0	1	0	16	43	233	373
Salmonellosis (NEC)	9	15	7	35	19	5	23	15	128	186	3895	3488
Shigellosis[4]	0	-	4	8	6	0	2	5	25	22	454	438
Syphilis	0	24	7	10	0	0	7	2	50	128	1175	1359
Tuberculosis	0	13	2	1	2	0	4	4	26	60	540	604
Typhoid[7]	0	0	0	0	0	0	0	0	0	1	23	24
Yersiniosis (NEC)[4]	0	-	0	4	4	0	0	0	8	18	202	262

1. For HIV and AIDS, see Tables 2 and 3 *CDI* 1995;19:351-352. For rarely notified diseases, see Table 5.
2. Totals comprise data from all States and Territories. Cumulative figures are subject to retrospective revision so there may be discrepancies between the number of new notifications and the increment in the cumulative figure from the previous period.
3. Tas: includes Ross River virus and dengue.
4. 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. NSW, Vic: includes paratyphoid.

NN Not Notifiable.

NEC Not Elsewhere Classified.

\- Elsewhere Classified.

Table 5. Notifications of rare[1] diseases received by State and Territory health authorities in the period 25 June to 8 July 1995

DISEASES	Total this period	Reporting States or Territories	Year to date 1995
Botulism	0		0
Brucellosis	1	Qld	17
Chancroid	0		2
Cholera	0		1
Hydatid infection	1	NSW	16
Leprosy	0		4
Lymphogranuloma venereum	0		1
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 6. Virology and serology laboratory reports by State or Territory[1] for the reporting period 29 June to 12 July 1995, 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	Tas	Vic	WA			
MEASLES, MUMPS, RUBELLA									
Measles virus		2			1		3	18.5	254
Mumps virus		1					1	3.3	45
Rubella virus		6			2		8	20.2	517
HEPATITIS VIRUSES									
Hepatitis A virus		1					1	19.5	269
Hepatitis B virus		19	6	1	9		35	94.5	1,301
Hepatitis C virus		1		13	6		20	221.0	3,191
ARBOVIRUSES									
Barmah Forest virus		1					1	10.5	173
Flavivirus (unspecified)					2		2	6.5	29
ADENOVIRUSES									
Adenovirus type 1					1		1	3.5	19
Adenovirus type 3					1		1	9.0	40
Adenovirus type 5					2		2	1.5	3
Adenovirus not typed/pending		8	8	1	6	2	25	46.8	492
HERPES VIRUSES									
Herpes simplex virus type 1		3	12	4	36		55	186.2	2,718
Herpes simplex virus type 2		1	11	4	23		39	211.2	2,747
Herpes simplex not typed/pending		6			1	1	8	29.0	273
Cytomegalovirus		10	3	1	13	6	33	70.3	837
Varicella-zoster virus		1			4	1	6	40.0	615
Epstein-Barr virus		15			1		16	62.2	1,089

Table 6. Virology and serology laboratory reports by State or Territory[1] for the reporting period 29 June to 12 July 1995, 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	Tas	Vic	WA			
OTHER DNA VIRUSES									
Parvovirus					1		1	5.0	73
PICORNA VIRUS FAMILY									
Coxsackievirus B3		1					1	1.0	26
Coxsackievirus B4		1					1	.2	1
Echovirus type 6					1		1	1.3	32
Echovirus type 9		1					1	.5	6
Echovirus type 14		1					1	2.0	3
Echovirus type 22		1			1		2	.3	5
Echovirus type 30					1		1	3.7	42
Poliovirus type 3 (uncharacterised)		1					1	1.7	6
Rhinovirus (all types)		4			19		23	31.2	373
Enterovirus type 71 (BCR)					2		2	.0	21
Enterovirus not typed/pending		5	21		6		32	39.2	551
ORTHO/PARAMYXOVIRUSES									
Influenza A virus		24	5		16	2	47	40.2	368
Influenza A virus H_1N_1					9		9	.0	37
Influenza B virus		9	1		6		16	17.8	77
Parainfluenza virus type 1					1		1	24.2	20
Parainfluenza virus type 2			6	1	3		10	6.2	134
Parainfluenza virus type 3			10		11	5	26	19.0	321
Parainfluenza virus typing pending					1	1	2	5.3	16
Respiratory syncytial virus	1	112	90	12	156	20	391	406.8	1,466
OTHER RNA VIRUSES									
Rotavirus		5		5	25	16	51	123.7	523
OTHER									
Chlamydia trachomatis not typed		3		6	2		11	104.5	1,351
Chlamydia psittaci					5		5	2.8	88
Chlamydia species		1					1	.5	37
Mycoplasma pneumoniae		1			1		2	54.5	185
Coxiella burnetii (Q fever)					1		1	20.2	122
Rickettsia australis			1				1	.3	5
Streptococcus group A					1		1	15.7	348
Yersinia enterocolitica		6					6	.3	35
Bordetella pertussis		1		1	7		9	12.3	418
Treponema pallidum		24			1		25	18.8	337
Toxoplasma gondii		2					2	4.0	90
TOTAL	1	278	174	49	385	54	941	2,016.8	21,729

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 7. Virology and serology laboratory reports by clinical information for the reporting period 29 June to 12 July 1995

	Encephalitis	Meningitis	Other CNS	Congenital	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	Muscle/joint	Genital	Other/unknown	Total
MEASLES, MUMPS, RUBELLA													
Measles virus												3	3
Mumps virus												1	1
Rubella virus												8	8
HEPATITIS VIRUSES													
Hepatitis A virus							1						1
Hepatitis B virus							10					25	35
Hepatitis C virus							4			1		15	20
ARBOVIRUSES													
Barmah Forest virus												1	1
Flavivirus (unspecified)												2	2
ADENOVIRUSES													
Adenovirus type 1						1							1
Adenovirus type 3					1								1
Adenovirus type 5					2								2
Adenovirus not typed/pending			1		15	7						2	25
HERPES VIRUSES													
Herpes simplex virus type 1		1			7			30	3		9	5	55
Herpes simplex virus type 2	1				1			21	1		14	1	39
Herpes simplex not typed/pending								5			2	1	8
Cytomegalovirus	1	1		1	12			2	1			15	33
Varicella-zoster virus								5				1	6
Epstein-Barr virus												16	16
OTHER DNA VIRUSES													
Parvovirus										1			1
PICORNA VIRUS FAMILY													
Coxsackievirus B3					1								1
Coxsackievirus B4												1	1
Echovirus type 6					1								1
Echovirus type 9					1								1
Echovirus type 14												1	1
Echovirus type 22			1		1								2
Echovirus type 30		1											1
Poliovirus type 3 (uncharacterised)								1					1
Rhinovirus (all types)					19							4	23
Enterovirus type 71 (BCR)								2					2
Enterovirus not typed/pending		3			17	6						6	32

Table 7. Virology and serology laboratory reports by clinical information for the reporting period 29 June to 29 July 1995, continued

	Encephalitis	Meningitis	Other CNS	Congenital	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	Muscle/joint	Genital	Other/unknown	Total
ORTHO/PARAMYXOVIRUSES													
Influenza A virus			1		26							20	47
Influenza A virus H_1N_1					9								9
Influenza B virus					11							5	16
Parainfluenza virus type 1					1								1
Parainfluenza virus type 2					10								10
Parainfluenza virus type 3					24							2	26
Parainfluenza virus typing pending					2								2
Respiratory syncytial virus			1		358	1			1			30	391
OTHER RNA VIRUSES													
Rotavirus						49						2	51
OTHER													
Chlamydia trachomatis not typed									2		8	1	11
Chlamydia psittaci					3							2	5
Chlamydia species												1	1
Mycoplasma pneumoniae					1							1	2
Coxiella burnetii (Q fever)					1								1
Rickettsia australis												1	1
Streptococcus group A												1	1
Yersinia enterocolitica												6	6
Bordetella pertussis					8							1	9
Treponema pallidum												25	25
Toxoplasma gondii												2	2
TOTAL	2	6	4	1	532	64	15	66	8	2	33	208	941

Table 8. Virology and serology laboratory reports by contributing laboratories for the reporting period 29 June to 12 July 1995

STATE OR TERRITORY	LABORATORY	REPORTS
New South Wales	Prince Henry/Prince of Wales Hospitals, Sydney	81
	Royal Alexandra Hospital for Children, Camperdown	111
	Royal Prince Alfred Hospital, Camperdown	15
	South West Area Pathology Service, Liverpool	69
Queensland	State Health Laboratory, Brisbane	173
Tasmania	Northern Tasmanian Pathology Service, Launceston	15
	Royal Hobart Hospital, Hobart	32
Victoria	Commonwealth Serum Laboratories, Melbourne	12
	Monash Medical Centre, Melbourne	46
	Royal Children's Hospital, Melbourne	182
	Victorian Infectious Diseases Reference Laboratory, Fairfield Hospital	151
Western Australia	Princess Margaret Hospital, Perth	54
TOTAL		941