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COMPARATIVE SEVERITY OF DENGUE SYMPTOMS IN OUTBREAKS IN TROPICAL QUEENSLAND

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Introduction

An epidemic of dengue serotype 2 occurred in Townsville in 1992-93, the index case having occurred in the first week of March 1992[1]. On 1 March 1993 a case of dengue occurred in Charters Towers, south-west of Townsville, and by 16 April 190 cases had been reported from the Charters Towers area to Queensland Health[2]. It is estimated that in total during 1992-93 there were over 900 serologically confirmed and 950 clinically diagnosed cases of dengue 2 in North Queensland, mainly in Townsville and Charters Towers[3].

Prior to 1992 large outbreaks of dengue had occurred in North Queensland in 1954-55[4] and then in 1981-82[5,6]. The 1954-55 epidemic was caused by dengue 3[3] and affected an estimated 15,000 people in Townsville as well as smaller numbers in other areas[4]. Dengue 1 was the causative agent in 1981-82. There were 260 serologically confirmed cases in mainland North Queensland, including 55 in Townsville and 171 in Cairns, and 190 cases on Thursday Island, either clinically or serologically diagnosed, as well as cases on other islands in the Torres Strait[6].

While for the 1981-82 outbreaks in Cairns[5] and the 1992-93 outbreak in Townsville[1] symptom frequency has been reported, prior to the present work, no such systematic analysis had been made for the Charters Towers cases. There is considerable evidence of serotype and strain variation in dengue viruses leading to differing frequency of haemorrhagic manifestations, symptomatology, and rates of spread of the virus[7,8]. There is also evidence that a complex of epidemiological and host factors, as well as viral factors, influence disease severity[9]. It follows that we might expect different epidemiological features in the Charters Towers, Townsville, and Cairns outbreaks, on the basis of different serotypes/strains, and different putative host and epidemiological factors in the different localities. Our aim in undertaking the present work was to analyse the symptomatology of patients seen at Charters Towers District Hospital infected with dengue 2, and to compare these data with those for Townsville in 1992-93 and Cairns in 1981-82.

Methods

The clinical records of notified cases of dengue from 1993 in the Charters Towers District Hospital were reviewed (217 cases). Five sets of notes could not be located. Twenty-two cases were excluded, either because appropriately timed paired sera were negative for flavivirus infection, because another infecting organism was confirmed serologically (one case each of Q fever, Ross River virus and Barmah Forest virus infection), or because the diagnosis of dengue was not suggested in the clinical notes. Thus, 190 clinical records were included in the study. Five of these patients did not have adequate clinical notes, and therefore their records could not be used for analysis of symptom frequency.

Data were recorded using a pro-forma similar to that used by Streatfield et al[10] in order that our data would be comparable to theirs. The data recorded included age and sex, results of serological testing, symptomatology, hospital admission and haematological parameters when available. The patient's name was removed to preserve patient confidentiality. In order to compare different outbreaks of dengue, data from Guard et al[5], Streatfield et al[1,10], and a personal communication from R Streatfield were used.

Results

Most cases had onset dates in March or April with a peak in the last week of March (Figure 1). The period between the index case and the peak was 36 days.

Figure 2 gives the age distribution of the dengue cases in Charters Towers and Townsville (R Streatfield, personal communication). The median age group of patients was 30-34 years and the female to male ratio was 1.60:1.00 in Charters Towers. In Townsville the median age group was 30-39 years (personal communication, R Streatfield) and the female:male ratio was 1.28:1.00[1]. In Cairns and surrounding regions the mean age of cases was 32.2 years and female:male ratio was 1.15:1.00[5].

The relative frequency of symptoms and signs for dengue 2 in Charters Towers and Townsville[1] and dengue 1 in Cairns[5] is shown in Figure 3. Diarrhoea and/or vomiting were more common in the Charters Towers and Townsville epidemics (36% and 58% respectively) than in the Cairns outbreak (14%). The frequency of haemorrhagic manifestations of greater magnitude than a positive tourniquet test was similar in all three outbreaks, being 17.8%, 21.2% and 17% respectively.

Regression analysis was performed on the frequency of fever (unspecified or <40°C), fever >40°C and arthralgia versus age for the Charters Towers data. There was no significant association in any case.

At Charters Towers Hospital 33 (17.8%) patients presented with haemorrhagic manifestations. Four patients had haematuria, eight had bleeding from skin or mucous membranes, six had bleeding gums, three epistaxis, four bleeding per vagina and three haemoptysis. Five patients presented with gastrointestinal bleeding. In one case it was recorded that the cause was

a Mallory-Weiss tear, but no underlying pathology other than dengue infection was recorded in the other four cases. Several patients had bleeding from more than one site. In three cases the site of bleeding was not recorded.

One patient fulfilled the criteria for dengue haemorrhagic fever (DHF) Grade II[2]. The presence of a high, sustained fever of acute onset and haemorrhagic manifestations, a thrombocytopenia of less than or equal to $100x10^9$/L and a rise in haematocrit of at least 20%, are the criteria for the diagnosis of DHF[11]. One other patient, a 26 year old woman with onset of symptoms on 4 April 1993, and admitted 9 May 1993 to 12 May 1993, had a documented rise in haematocrit of 19.6% and spontaneous haemorrhagic manifestations, but not an acute or sustained high fever. It is possible that this patient represented a second case of DHF in the Charters Towers dengue outbreak, and that other patients may in fact have fulfilled the criteria for DHF, had more clinical and laboratory data been available. There were no cases of dengue shock syndrome (DSS).

Two patients presented with CNS symptoms and signs in addition to a presentation compatible with classical dengue fever[12]. Neither of these patients fulfilled the criteria for DHF, although one gave a history of having had a dengue infection many years in the past.

One hundred and fifty-four patients had at least one full blood count performed. A total of 33.8% of these (27.4% of total) had a leukopenia less than $3.0x10^9$/L and 16.9% (13.7% of total) had a thrombocytopenia of less than or equal to $100x10^9$/L.

Thirty-four patients had no serological results recorded, 109 had a single result and 47 had paired serology performed. A positive test for flavivirus, untyped dengue or dengue 2 was recorded for 68 patients who had a single result; dengue virus was also cultured from the blood of two of these patients and from two patients with negative results. All but two who had paired serology performed were positive (IgG and/or IgM results); the serum samples of the remaining two were inappropriately timed. Dengue virus was cultured from the blood of six patients in total.

Regressions were performed on frequency of headache, fever and spontaneous haemorrhage versus time. There was no association between the first two symptoms and week of onset. However, there was a significant negative association between percentage of patients exhibiting spontaneous haemorrhage and week of epidemic (arcsine transformation, $F = 5.56$, $df = 1 \times 8$; $p=0.0461$). Thirty-one per cent of the 32 patients in weeks one to four had spontaneous haemorrhage, as did 15% of the 127 patients in weeks five to ten and 12% of the 26 patients who presented after week ten.

Fifty-three cases were admitted to the Charters Towers hospital (27.9%), and can be assumed to represent all patients in Charters Towers sufficiently ill to have required admission, as there were no other hospitals in the town. If these 53 cases are considered as a proportion of the total number affected in the outbreak (over 800[12]) the admission rate was 6.6%. In Cairns in 1981-

Figure 1. Cases of dengue at Charters Towers, 27 February to 25 June 1993, by week of onset

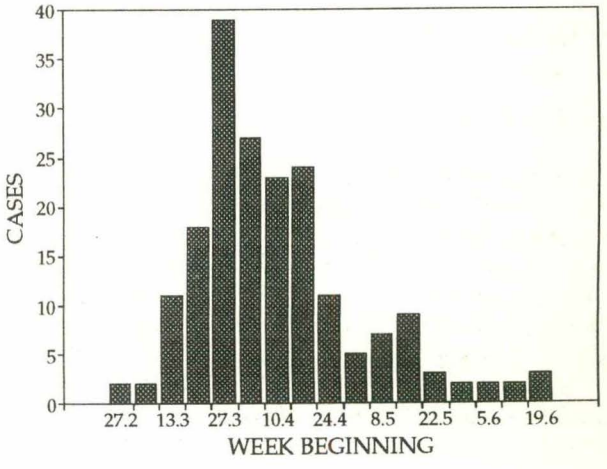


Figure 2. Cases of dengue at Charters Towers and Townsville, 1993, by age group and location

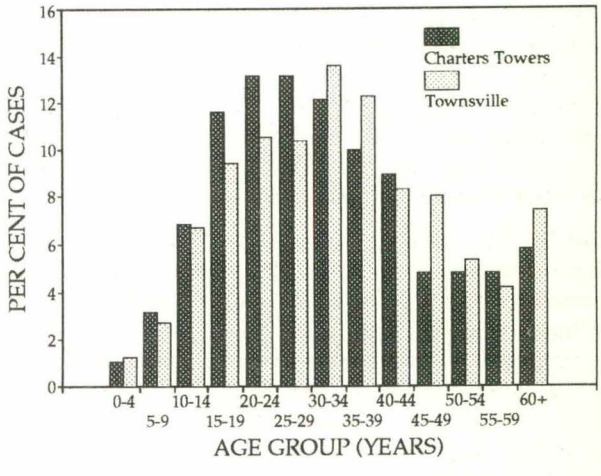
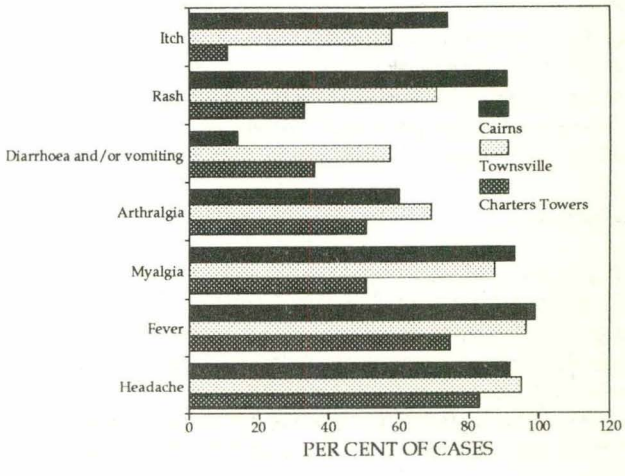


Figure 3. Percentage of cases of dengue at Charters Towers, Townsville and Cairns, with various symptoms and signs, by location



82, of 106 patients completing questionnaires, 17 (16%) required admission to hospital[5]. In Townsville, of 652 patients diagnosed clinically or serologically as having been infected with dengue 2, one is known to have required inpatient hospital treatment[1].

Discussion

The epicurve for the Charters Towers outbreak is consistent with a point source outbreak. It is thought the outbreak occurred as a result of a single viraemic individual who was exposed to *Aedes aegypti* breeding in a well in the north-west corner of Charters Towers (S Murray-Smith, C Skelly, P Weinstein, unpublished observation).

Demography

The age distributions were similar in the three outbreaks with median ages in the 30-39 years age group. However, there were relatively more females affected in Charters Towers than in the other two outbreaks.

Dengue is not endemic in Australia[3] and consequently we would expect the epidemiology of the disease to be similar to overseas areas experiencing only occasional epidemics. The median age group in the epidemic of dengue 4 in the Yucatan in Mexico was 31-40[13]. Similarly, in Fiji in 1975, the peak age of patients was 20-30 years[14,15]. By way of contrast, in areas where the viruses circulate constantly, such as Singapore and Indonesia, the peak incidence tends to be in children[16,17].

The observation that females are more commonly affected with dengue than males has frequently been made in overseas studies, for example, in Mexico and Fiji. In both these areas the female:male ratio was 1.17:1[13,14]. This observation is thought to have related to the vector ecology of *Aedes aegypti*, the only known vector of dengue in Australia. *Aedes aegypti* is highly domesticated, and generally bites indoors and during the day[18]. It is possible that in Charters Towers, females were more likely to have been indoors at the time when the vector mosquito was feeding.

Symptomatology

The frequency of diarrhoea and vomiting differed between the Charters Towers, Townsville and Cairns outbreaks. Fever and headache were common symptoms in all three outbreaks, as is commonly observed in classical dengue fever[8].

Various causes could be advanced to explain the different symptomatology reported in the three outbreaks. The first of these is that the data were collected in different ways. Our data were collected through review of case records, the Townsville data through patient interviews conducted by environmental health officers[10], and the Cairns data through questionnaires mailed directly to patients[5]. These differences may have resulted in differences in recall and/or reporting of symptoms.

Given the above, it is nonetheless worthwhile considering possible causes for the observed differences in symptoms. There is evidence that differing virulence between serotypes, and between strains within serotypes, and hence disease associations, account for the different clinical presentations observed in dengue outbreaks[7,8,19]. The higher frequency of diarrhoea and/or vomiting in the Charters Towers and Townsville epidemics relative to the Cairns outbreak may reflect differing virulence of serotypes 2 and 1, respectively. It has certainly been suggested that dengue 2 may be more pathogenic than the other dengue serotypes[19].

Individual risk factors (including age, sex, race and chronic diseases) and epidemiological factors probably contribute to the occurrence of DHF/DSS[9]. Presumably they could also account for different symptom frequency and severity between different dengue outbreaks, but they were not analysed as part of this study.

Regression analysis of fever, fever >40°C and arthralgia versus age did not reveal a significant association. Work on epidemic dengue 1 in Fiji has shown a lower incidence of severe symptoms in children than in adults[14]. Conversely, in areas of Asia where the disease is endemic, severe disease is practically limited to young children[14,20] and most cases of DHF occur in children of age 15 years or younger[8]. These observations may relate to the high levels of immunity in adults living in endemic areas[14]. While our results failed to achieve statistical significance, possibly due to small patient numbers, we would expect the situation to be comparable with overseas areas experiencing occasional epidemics and with low levels of immunity, rather than those parts of Asia where the disease is endemic.

Considerable controversy has surrounded the pathogenesis of haemorrhage in DHF. Principally this has involved the validity or otherwise of the immune enhancement theory of Halstead. This states that the presence of heterotypic antibody leads to enhanced dengue virus replication in monocytes and macrophages. Consequent production of mediators affecting haemostatic mechanisms, complement activation and vascular permeability represents the genesis of DHF/DSS. Antibodies are present either as a result of passive aquisition of IgG through the trans-placental route, or previous heterotypic dengue infection[21]. Epidemiological studies in Thailand and Cuba have suggested that the infecting sequence dengue 1 followed by dengue 2 is particularly virulent[22,23]. The alternative view, alluded to above, is that virulence varies between serotypes and strains of dengue virus[8,19,24] and that dengue 2 may be a more virulent serotype[19]. We have analysed data from Charters Towers, and failed to find any association between antecedent dengue infection and the rate of spontaneous haemorrhage (D Harley, S Murray-Smith, P Weinstein, unpublished observations).

In the present study we are dealing with three outbreaks, two (Charters Towers and Townsville) caused by the same serotype of dengue virus. Any patients in Charters Towers or Townsville suffering a secondary dengue infection are likely to have been infected previously with dengue 1, the causative agent for the

previous major outbreak of dengue infection in North Queensland[3]. The third outbreak, that occurring mainly in Cairns in 1981-82, was caused by dengue 1, presumably with a smaller proportion of the patients having heterotypic antibody circulating, the previous major epidemic having occurred in 1954-55[4]. It is noteworthy, in light of the above discussion, that the Charters Towers and Townsville outbreaks, and the Cairns outbreak should have such a similar observed frequency of spontaneous haemorrhage, while being caused by different serotypes and in the presence, presumably, of differing relative frequencies of primary versus secondary infection. In reference to the latter point, however, a study in Fiji failed to demonstrate a difference in frequency of haemorrhage between primary and secondary dengue 1 infections[14].

Viral virulence through time

Kouri et al[22], in their study of the Cuban epidemic of dengue 2 in 1981, observed increasing virulence through the time course of the epidemic, measured both as an increasing case fatality rate, and an increasing severity index (calculated using the ratio of cases of dengue haemorrhagic fever and dengue shock syndrome to total number of infections). They relate this observation to increasing virulence with repeated viral passaging. Increasing symptom severity over time has, however, not been observed universally in epidemiological studies carried out overseas, for example in Puerto Rico[25].

There was not a significant correlation between the fever and headache and week of the Charters Towers epidemic, but there was a statistically significant negative correlation between increasing week of onset and rates of spontaneous haemorrhage. While our conclusions are weakened by small sample size, they conflict with observations made in Townsville[26] on the outbreak caused by the same serotype, and presumably the same strain, as that occurring in Charters Towers. Rigau-Perez et al[25] demonstrated no change in severity over a three and a half year period in Puerto Rico. They criticised studies purporting to show increasing virulence, specifically suggesting that improved diagnosis and reporting through the time course of the epidemic may explain findings such as those of Streatfield et al[26], and point to experimental work on the stability of Ross River virus[27] with passaging as providing theoretical support for their observations. It may be that the time course was too short, and the number of persons infected too small for viral virulence to change in Charters Towers. The apparent decrease in frequency of haemorrhage with time may, in fact, represent an ascertainment error, with relative under-reporting of haemorrhagic manifestations by hospital medical officers as the epidemic progressed.

Admission rates

The frequency of diarrhoea and vomiting in Charters Towers was higher than in Cairns, yet admission rates were higher in Cairns than in Charters Towers. Haemorrhagic manifestations had a roughly equal frequency in Charters Towers and Cairns and thus bore no relation to admission rates. While we have not attempted to calculate any form of severity index, given that it is reasonable to assume those patients most likely to be admitted are those with severe vomiting or diarrhoea, haemorrhagic manifestations, DHF/DSS or cerebral dengue, the observed symptom frequencies did not appear to mirror admission rates. The above discussion would suggest that explanations for the differential admission rates must be sought in factors other than purely clinical decisions regarding admission, for example, under reporting of symptoms in some situations or differing admission practices.

Conclusion

Worldwide, arboviral diseases are re-emerging as a public health problem, particularly in the tropics[28]. In North Queensland in 1995 we saw the first recorded cases of locally transmitted Japanese encephalitis in Australia[29] and the introduction and local transmission of dengue in Cairns[30]. It remains to be seen whether dengue will re-emerge in epidemic form in the near future, but it is to be hoped that the disease can be contained, as in Cairns recently[30], rather than causing outbreaks as in Charters Towers and Townsville in 1992-93.

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CDI editorial comment

The National Notifiable Diseases Surveillance System received 999 reports of dengue from Queensland with onset dates in 1992 or 1993. In 1992, there were 340 notifications, 319 from the Northern Statistical Division which includes the Townsville area. Most cases had onset in May (120), June (109) or August (75). In 1993, there were 659 notifications; 610 were from the Northern Statistical Division, including over 300 from the Townsville area and over 150 from the Charters Towers area. There were also 21 cases reported from the Far North Statistical Division which includes Cairns, and 18 from the North-West Statistical Division. One hundred and twenty-one had onset in March, 290 in April and 155 in May.

There were 421 reports for males and 577 reports for females (one not stated) for the two seasons and a male:female ratio of 1.00:1.37. Most (591) were in the 20 to 44 year age group, with the largest number of notifications reported for the 30 to 34 year age group (56 males and 86 females).

There were only 17 notifications of dengue for Australia for 1994 (provisional total), including three from Queensland. This year so far, there have been 21 notifications. Nine, including three thought to have been locally acquired[1], have been from Queensland.

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DENGUE IMPORTED FROM PAPUA NEW GUINEA

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Introduction

Dengue 3 activity has recently been reported from several South Pacific nations including the Cook Islands, New Caledonia, Wallis and Futuna and French Polynesia[1,2]. We wish to report two recent cases of confirmed dengue infection that were acquired in Papua New Guinea (PNG).

Case 1

In late March an 11 year old Caucasian girl who lives in PNG developed a febrile illness with headache as the predominant symptom. She had neither joint or muscular pains nor a rash; a full blood count done in PNG showed leukopaenia and thrombocytopaenia.

In early April she saw a physician in north Queensland for review of her abnormal haematology profile. Dengue serology was requested; enzyme immunoassay (EIA) demonstrated flavivirus IgM antibody. Dengue 3 IgM antibody was subsequently detected by haemagglutination inhibition assay (HAI) performed on serum fractions separated by ultracentrifugation (UC).

The girl was a resident in Lae, PNG and had not travelled away from Lae in the twelve days (presumed incubation period) prior to the onset of her symptoms. She may have been viraemic for two days after arrival in Australia but fortunately she resided in north Queensland in dwellings that were screened and contained.

Case 2

In late June, a 47 year old Caucasian male, who was residing in PNG at the time, developed a febrile illness with headaches and generalised body aches and pains as the predominant symptoms. He felt as though he had been 'beaten all over' and also acknowledged that he had had a 'vile' sense of taste; he did not develop a rash. He consulted a physician in north Queensland two days after becoming ill; EIA demonstrated flavivirus IgM, and dengue 2 IgM was identified by UC-HAI.

The patient had been living in Port Moresby, PNG, during the twelve days prior to onset of symptoms. He was presumably viraemic for up to ten days after arriving in Australia, but an entomological survey around his place of residence in north Queensland revealed that only two of 60 premises surveyed were breeding *Aedes aegypti*, the only known dengue vector in Australia.

Comment

These case reports provide unequivocal evidence that at least two serotypes of dengue viruses have been circulating in urban settings in PNG in recent months. This must be of concern as sequential infections caused by different dengue serotypes have been strongly associated with severe dengue infections in several epidemic situations[3].

It is also of concern to north Queensland, where *Ae. aegypti* is a common peridomestic mosquito, and from where many local residents travel to PNG for work and recreation. Importation of dengue viruses from abroad could therefore lead to epidemic disease in the region[4]. Dengue should be considered among the 'exotic' differential diagnoses (along with malaria and typhoid) in a febrile patient recently arrived in Australia from Papua New Guinea.

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CHOLERA ACQUIRED IN INDONESIA

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The Eastern Sydney Public Health Unit was notified on Friday 28 July 1995 that a patient had been admitted to the Prince Henry Hospital with cholera. *Vibrio cholerae* O1, biotype El Tor, serogroup Ogawa was isolated from a stool culture.

The patient was a 34 year old woman who had been on a three week holiday in Indonesia. The patient and her husband had visited the islands of Jakarta, Bali and Lombok. They stayed in five star accommodation and ate in either the hotel restaurants or in tourist type restaurants.

The woman developed watery diarrhoea on 23 July, whilst on the island of Lombok. She left Indonesia by plane the following day, returning to Australia on the morning of 25 July. She continued to suffer from moderate to severe diarrhoea and consulted her general practitioner the following day. A stool specimen was collected and sent to a private laboratory. The next day her condition worsened with the onset of vomiting. She presented to Accident and Emergency at Prince Henry Hospital and was admitted on 28 July with a provisional diagnosis of cholera. The diagnosis was confirmed later that day. She was treated with intravenous fluids and doxycycline.

The patient's husband remains well and unaffected. Both he and one other contact were offered antibiotic prophylaxis.

CDI editorial comment

There have been four cases of cholera reported to the National Notifiable Diseases Surveillance System for the year so far. All have been females in the 35 to 49 year age group. There were two cases for whom Bali was reported as the probable place of acquisition, in addition to the case reported above. The fourth case had travelled to Kuwait and Pakistan and was thought to have acquired her infection in Kuwait.

There were three cases of cholera notified in 1994 (provisional total), six in 1993, three in 1992 and none in 1991.

HUMAN HYDATID SURVEILLANCE IN AUSTRALIA

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Introduction

Surveillance data can be used to monitor the epidemiology of communicable diseases, providing information on disease occurrence and risk factors for disease acquisition. The information gained can be used for a number of purposes including public health intervention and the evaluation of the effectiveness of disease control programs.

This paper reviews the epidemiology of hydatid infection in Australia by examining information from currently operating national surveillance systems and proposes possible future directions for our surveillance.

Historical data

The National Notifiable Diseases Surveillance System and its predecessors have monitored hydatid infection notifications since 1926, when it first became notifiable in Victoria and there were 20 notifications recorded[1] (Figure 1). From the 1920s to the 1950s, by which time hydatid infection was notifiable in most States and Territories, the notification rate remained at about one case per 100,000 population per year. This rate began to decline from the mid-1950s and continued to fall until the 1980s, when a rate of about 0.1 per 100,000 population per year was recorded. The notification rate has increased slightly over the last few years, and was 0.31 cases per 100,000 population in 1994 (56 notifications, provisional data).

Most States and Territories have reported a decline in notifications since the 1960s (Table). The decrease in

Figure 1. Hydatid infection notifications per 100,000 population, 1926 to 1994, by year

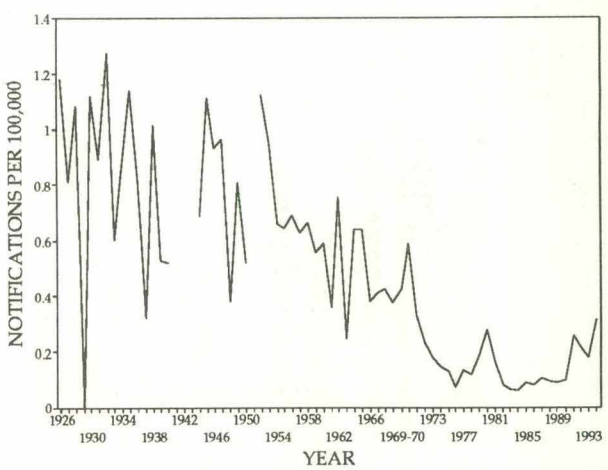


Table. Hydatid infection notifications, 1960 to 1994, by State or Territory and decade

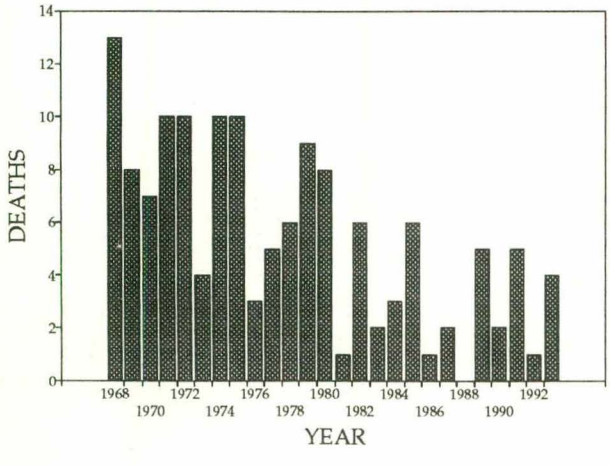
	1960s	1970s	1980s	1990s[2]
ACT	5	10	18	3
NSW	87[1]	99	74	37
NT	4	0	0	1
Qld	14	9	18	77
SA	5	32	25	6
Tas	169	52	22	8
Vic	147	40	7	43
WA	13	4	6	11
Total	444	246	170	186

1. Only notifiable in New South Wales since 1965-1966.
2. To 31 December 1994; 1994 data are provisional

the number of notifications was most marked in Tasmania which introduced an hydatid eradication program in the late 1960s. There were between eight and 30 notifications each year in Tasmania in the 1950s and 1960s but there have been fewer than four notifications per year from Tasmania since 1980. Victoria also had a marked decline, from about 20 notifications each year in the early 1960s, to fewer than 10 cases each year during the 1970s and the 1980s. It has reported increased notifications in the 1990s.

The Australian Capital Territory had a peak of 15 notifications from 1979 to 1982 but has reported only three cases since 1990. New South Wales also had a peak in notifications from 1979 to 1982 and then fewer than 10 cases each year until 1994, when there were twenty cases reported. Queensland has reported more notifications in the 1990s than previously, and the Northern Territory reported its first notification since 1966-67 in 1994.

Figure 2. Hydatid infection deaths, 1968 to 1993, by year



Australian Bureau of Statistics' mortality data

The Australian Bureau of Statistics collects information on primary cause of death, as recorded on the death certificate. Information on age and sex are also reported. A review of deaths due to hydatid infection recorded by the Australian Bureau of Statistics since 1968 shows an average of eight deaths per year between 1968 and 1979 (Figure 2). In the 1980s and 1990s there has been an average of three deaths recorded per year. There were no deaths recorded for 1988[2].

The majority of deaths were recorded for the elderly, with the highest number of deaths for males recorded for the 60-79 years age group and the highest number of deaths for females recorded in the over 85 years age group (Figure 3). In the last five years, there has only been one death recorded for a person aged less than 60 years.

Current surveillance activities

National Notifiable Diseases Surveillance System

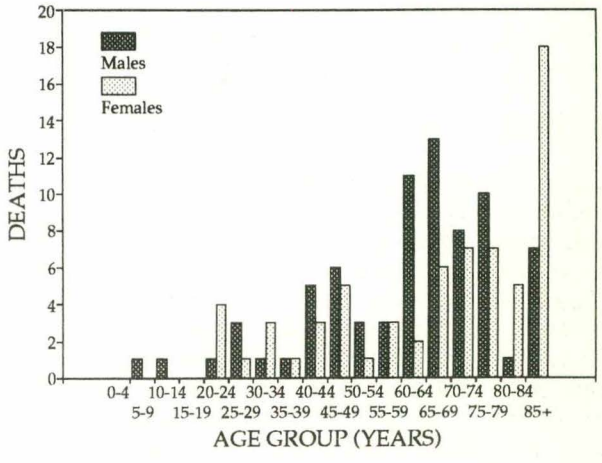
The National Notifiable Diseases Surveillance System (NNDSS) was reviewed in 1991 under the auspices of the Communicable Diseases Network Australia and New Zealand. State and Territory data are reported fortnightly to the Department of Human Services and Health using a minimum dataset of nine fields. The dataset includes field for disease code, age, sex, date of onset, date of report, and postcode of residence.

The National Health and Medical Research Council (NHMRC) endorsed a standard case definition for national surveillance in 1994:

- positive serological test for infection with *Echinococcus granulosus* in a patient with clinical, radiological, or sonographic evidence of hydatid disease

  OR

Figure 3. Hydatid infections deaths, 1968 to 1993, by age group and sex



- identification of *Echinococcus granulosus* in a cyst, fluid, or sputum

  OR

- immunoelectrophoresis demonstrating arc 5 or three or more other arcs[3].

This definition does not allow for the distinction between incident and prevalent cases. It is possible the NNDSS therefore includes a mixture of both new infections, newly diagnosed infections of long standing and recurrences of disease.

The review of the NNDSS in 1991 improved the case ascertainment for most notifiable diseases[4] and this, and changes in State and Territory notification arrangements over the last decade have may have been responsible for the increases in the numbers of cases of hydatid infection reported in recent years.

There were 170 cases of recorded by the NNDSS between January 1991 and December 1994. There were 87 reports for males and 79 reports for females with the sex of four cases unrecorded (male:female ratio 1.00:0.95). The cases were aged between the 0-4 and the 95-99 years age groups, with five cases reported in children aged less than 15 years. The highest sex and age group specific rates of notification were recorded in the 50-54 years age group for both males and females (Figure 4).

Notifications were received from all States and Territories with the majority of reports received from Queensland, New South Wales and Victoria. Reported postcodes were in both rural and metropolitan Statistical Divisions. Highest notification rates and numbers of notifications were reported for the Queensland Statistical Divisions of Moreton, Darling Downs and

Figure 4. Hydatid infection notifications, 1991 to 1994, by age group and sex

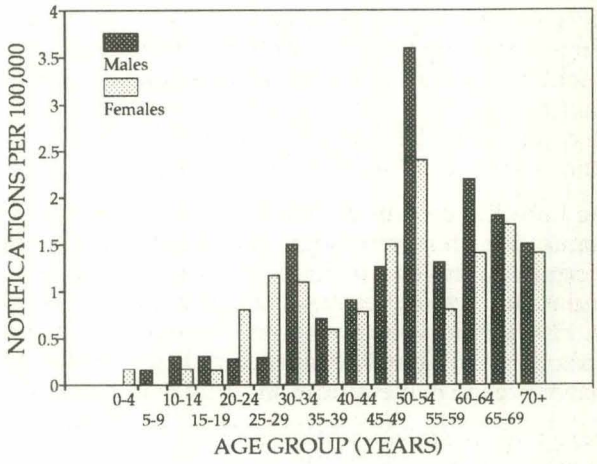
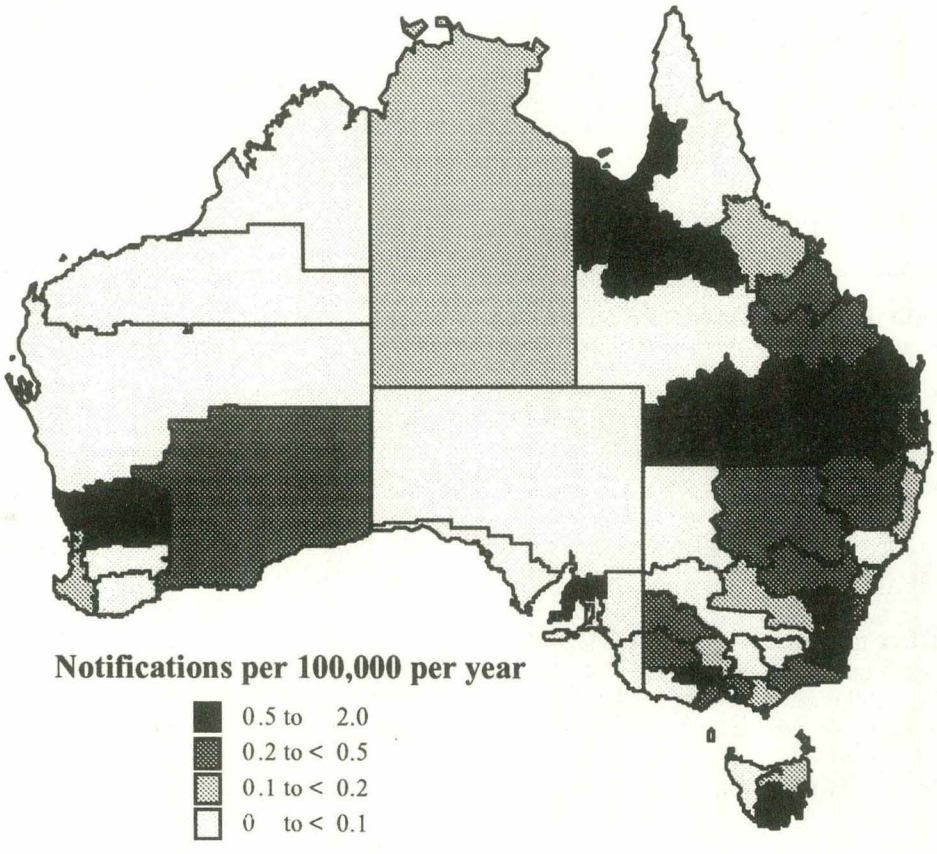


Figure 5. Hydatid notifications per 100,000 per year, 1991 to 1994, by Statistical Division of residence



Brisbane, and the Southern-Eastern Statistical Division in New South Wales (Figure 5).

The lack of specific incident data and information on risk factors associated with transmission limit the effectiveness of the NNDSS to inform disease control programs. However, the facts that the rate of notification remains low and that there are few notifications for persons aged less than 20 years indicate that the rate of transmission remains low.

Communicable Diseases Intelligence Virology and Serology Reporting Scheme

The *Communicable Diseases Intelligence* Virology and Serology Reporting Scheme (LabVISE) collates data from 21 sentinel laboratories from all States and Territories. *Echinococcus granulosus* reports have been collected by the contributing laboratories since 1986 and four laboratories have contributed reports in the last three years.

The LabVISE system collects a more comprehensive range of information than that collected by the NNDSS. Information collected includes age, sex and postcode of the patient, date of specimen collection, clinical diagnosis, risk factors, outcome, source tissue, method of antibody or antigen detection, organism detected, any further organism identification and free text comment.

There have been 38 reports received since 1992, from Queensland, New South Wales and Victoria. Twenty-two cases were male and 16 cases were female with a single case recorded for a male in the 0-4 years age group. The majority of cases were in the 25-64 years age group.

Laboratory-based surveillance of hydatid infection in Australia could be improved if the LabVISE system were utilised to a greater extent. If the limited number of laboratories which undertake hydatid serology contributed positive diagnoses to the Scheme, it could compile a comprehensive dataset on laboratory diagnosed cases, including information on diagnostic methods used, clinical nature of the infection and risk factors. The Scheme does not operate as a register, but is able to identify duplicate reports on the basis of name code and date of birth of the reported patients, and may be able to distinguish between newly acquired and other cases. The data would be published regularly in *Communicable Diseases Intelligence* and would be available to interested persons, on approval of the contributing laboratories.

Conclusion

In recent years, the hydatid infection notification rate has been low, and most notifications have been for older persons. Whilst it appears that few new infections are occurring, timely and cost effective surveillance should be continued to enable appropriate public health responses to any future changes in incidence or risk factors for the disease. The NNDSS collects limited information that can inform public health control of the disease, however, LabVISE has the capacity to collect more detailed information which could contribute to enhanced understanding of hydatid disease in Australia.

References

1. Hall R. Notifiable diseases surveillance, 1917-1991. *Comm Dis Intell* 1993;**17**:226-236.
2. Australian Bureau of Statistics. *Mortality tabulations 1968 to 1993.* Canberra: Australian Bureau of Statistics, 1979 to 1994.
3. National Health and Medical Research Council. *Surveillance case definitions.* Canberra: National Health and Medical Research Council, 1994.
4. Anura P, Hall R. Annual report of the National Notifiable Diseases Surveillance System, 1991. *Comm Dis Intell* 1992;**16**:334-346.

OVERSEAS BRIEFS

In the last two weeks, the following information has been supplied by the World Health Organization (WHO), the Program for Monitoring Emerging Diseases and published sources as indicated.

Interruption of measles transmission in England and Wales

All children aged five to 16 years in England and Wales were offered a combined measles and rubella vaccine during November 1994 and coverage of 92% was achieved. Serological surveillance for measles was supplemented following the vaccination campaign with tests for IgM in saliva of notified cases.

Notifications of measles have continued to fall since the campaign and serological and salivary testing has confirmed only 35 cases since the beginning of 1995 (to May). Only two of these were in the age group covered by the vaccination campaign: one was an imported case and the other was a child whose parents did not consent to the vaccination. In March and April 1995, only four cases were confirmed. Three had recently arrived in the country and the fourth was an unvaccinated 15 month old male who had not travelled; his contacts were being investigated.

The vaccination campaign has interrupted measles transmission in schoolchildren and may also have stopped circulation of the virus throughout the population[1].

Measles elimination progress in the Americas

The Pan American Health Organization plans to eliminate measles in the Americas by the year 2000. Last year, the Americas recorded 23,000 cases but there have been only 2247 to August this year, reported from 14 countries (25 countries have reported no measles cases this year). Interruption of measles transmission may have been achieved in Cuba, where a massive vaccination campaign conducted in 1987 achieved 97% coverage in children aged one to 14 years.

Since 1987, 93% of children aged one to 14 years have been vaccinated against measles in the Americas in routine and special vaccination campaigns and mop-up campaigns of re-vaccination in areas with low coverage. The continuing target is 95% vaccination coverage, follow-up of campaigns for young children, increased surveillance of fevers and rashes and immediate reactions to outbreaks.

Ebola haemorrhagic fever in Zaire

The last identified case of Ebola haemorrhagic fever was admitted to hospital in Kikwit, Zaire on 24 June 1995 and was discharged on 14 July 1995. As of 24 August, twice the maximum incubation period (42 days) had elapsed without any new reported cases. The outbreak has therefore been declared over.

A total of 315 cases with 244 deaths (77%) occurred in the outbreak, all acquired in the Bandundu Region. One hundred and sixty-six cases were female and 149 male; 123 female (74%) and 121 male (81%) patients died. The cases ranged in age from three days to 71 years (median 35 years). Twenty-six cases were less than 17 years old and 13 were over 60 years old. Median age among survivors was 29 years and among fatal cases 35 years. Of the 286 cases with known occupation, 75 (26%) were nurses or students.

Yellow fever in Peru

The outbreak of yellow fever in Peru this year has included 440 cases (incidence rate of 1.87 per 100,000) and 169 deaths (38.4% of cases). The peak in cases occurred in May; only one case was reported in the week ending 9 July. The Amazonas, Ancash and Pasco Departments have been declared infected, with 61, 3 and 30 cases respectively. Cases have also occurred in Huanuco (77), Junin (153), Madre de Dios (seven), Puno (46), San Martin (56) and Ucayali (7) Departments.

Brucellosis in Malta

Two cases of *Brucella melitensis* have been reported in England in persons who had recently visited Malta, where an outbreak of the disease has been identified since March 1995[2]. The Department of Public Health in Malta reported 135 cases (one death) between 1 January and 26 July this year, compared with 21 cases notified between 1992 and 1994. The outbreak was linked to consumption of a soft cheese made from unpasteurised milk from sheep and goats. A public health warning was issued in Malta about the cheese, which was withdrawn and destroyed, and herds associated with the outbreak were identified and slaughtered.

(*Brucella melitensis* does not occur in Australian livestock but has been reported occasionally in travellers[3]. It is usually associated with goats.)

Dengue in Malaysia

There were 3322 cases of dengue reported in Malaysia from 1 January to 12 August this year, an increase of 66% over the same period in 1994. Of the 3322 cases, 205 were dengue haemorrhagic fever and 22 were fatal. Most cases were reported in Selangor (805 cases and eight deaths), Johor (634 cases and two deaths) and the Federal Territory (569 cases and three deaths). The predominant serotype has been serotype 2 this year, in contrast with the situation in the period 1992 to 1994 in which serotype 3 predominated.

Influenza update

Chile reported influenza activity between April and July due to influenza A (some identified as H_3N_2) and influenza B, with outbreaks in the general population in July. Argentina also reported outbreaks due to influenza A (some identified as H_3N_2) during June and July. South Africa reported isolates of both influenza A H_1N_1 and influenza H_3N_2 and in June and July. New Zealand had an increase in influenza activity in July; influenza B continued to predominate but the proportion of influenza A H_3N_2 increased.

Cholera update

A cholera outbreak has been reported from Afghanistan. A total of 19903 cases of acute diarrhoea / suspected cholera and 624 deaths have been reported from 10 provinces in the country since June. A number of cases have been confirmed, some in Kabul. The situation is most serious in the remote Badakhstan province where one case has been confirmed and there have been over 250 deaths reported. An outbreak of cholera has been confirmed in Moldova, with 63 cases and two deaths reported between 19 June and 7 August.

Cholera cases have been reported since April from Angola, Bukino Faso, Burundi, Cameroon, Cape Verde (over 2000 cases between 26 June and 31 July), Costa Rica, Cote d'Ivoire, Ecuador, El Salvador, Ghana, Guinea (1782 cases between 19 and 28 July), India, Japan, Kenya, Laos, Liberia, Mali, Mexico, Moldova, Nigeria, Peru, Romania, the Russian Federation, Sierra Leone (2448 cases between 30 June and 18 July), Singapore, Tanzania, Togo, Uganda, Ukraine and Zaire.

References

1. Measles in 1995 - transmission interrupted in schoolchildren. *CDR Weekly* 1995;5:99.

2. Brucellosis associated with unpasteurised milk products abroad. *CDR Weekly* 1995;5:151.

3. Everett RE. Brucella melitensis in humans. *Comm Dis Intell* 1993;17:407-408.

CDI NOTICE TO READERS

An outbreak of *Salmonella* gastroenteritis in the Australian Capital Territory, February-March 1995 - addendum

An addendum is required for the article *An outbreak of Salmonella gastroenteritis in the Australian Capital Territory, February-March 1995* published in *CDI* 1995;**19**:392-395. Those acknowledged should have included Leon Tetlow at Barrett and Smith Pathology, John deVry at Moran's Pathology and the Microbiology Department at Macquarie Pathology.

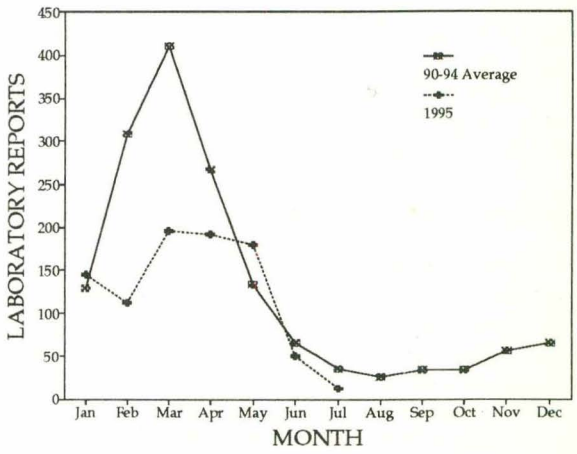
COMMUNICABLE DISEASES SURVEILLANCE

Virology and Serology Reporting Scheme

There were 2871 reports received in the *CDI* Virology and Serology Reporting Scheme this fortnight (Tables 7, 8 and 9).

- **Rubella** was reported for 25 patients this period including 4 females in the 15 to 44 year age group. The number of reports received in recent months remains low.
- **Hepatitis A** was reported for 23 patients this period for 16 males and 7 females, 19 of whom were in the 15 to 64 year age range. Included were 3 apparent clusters in the same postcode regions of Sydney, Brisbane and the Wide Bay-Burnett Statistical Division of Queensland.
- Positive **hepatitis B** serology was reported for 153 patients this fortnight, including 76 males and 73 females (4 sex not stated). A total of 111 were in the 15 to 44 year age range. Included were 3 pregnant females and one injecting drug user.
- Four hundred and forty-two reports of positive **hepatitis C** serology were received this period. Included were 46 injecting drug users, 5 pregnant females and a 31 year old renal transplant recipient. Two hundred and sixty-nine cases were male and 163 female (10 sex not stated). Three hundred and thirty-four reports (76%) were for the 25 to 44 year age group.
- Positive **hepatitis E** serology was reported for a 26 year old Western Australian male.
- Twenty-one reports of **Ross River virus** were received this period from Queensland (10), the Northern Territory (3), Western Australia (7) and South Australia (one). Diagnosis was by IgM detection (20) and fourfold rise in titre (one). The number of reports has fallen to below average for the time of year (Figure 1).
- **Barmah Forest virus** was reported for 7 patients this period, all from Queensland. The number of reports has fallen in recent months after peaking in April.
- **Herpes simplex virus type 1** was reported for 265 patients this fortnight. Diagnosis was by virus isolation (257), antigen detection (5), IgM detection (2) and single high titre (one). Included was a 2 year old female with peri-orbital cellulitis.
- Three hundred and sixteen reports of **herpes simplex virus type 2** were received, diagnosed by virus isolation (307) and antigen detection (9).
- Sixty-five reports of **cytomegalovirus** were received this period. Diagnosis was by virus isolation (31), antigen detection (2), nucleic acid detection (2), IgM detection (28) and fourfold rise in titre (2). Included was nucleic acid detection in the CSF of a 44 year old male with dementia. Infection with this virus was also diagnosed for a 75 year old female with abnormal LFTs post-operatively. Also included were 3 HIV positive patients and 3 transplant recipients.

Figure 1. Ross River virus laboratory reports, 1990 to 1994 average and 1995, by month of specimen collection



- **Varicella-zoster virus** was reported for 74 patients this period including 30 males and 44 females, 38 (51%) of whom were in the15 to 44 year age group. Diagnosis was by virus isolation (23), antigen detection (30), IgM detection (20) and single high titre (one).
- Seventy-four reports of **Epstein-Barr virus** were received this period diagnosed by IgM detection (136) and single high titre (2). Included were 68 males and 70 females, 81 (60%) of whom were in the 15 to 24 year age group.
- **Parvovirus** was reported for 13 patients this period, including 11 females (7 of childbearing age) and 2 males.
- **Coxsackievirus type B2** was isolated from the CSF of a one month old female with pyrexia.
- Thirty-four reports of **untyped enterovirus** were received this period. Included was virus isolation from the nasopharynx of a one month old male with congenital heart disease.
- **Rhinovirus** was reported for 24 patients 16 of whom were under the age of 5 years. The number of reports is low compared to the same period last year (Figure 2).
- **Influenza A** was reported for 95 patients this fortnight including 14 reports of subtype H_1N_1. Diagnosis was by virus isolation (16), antigen detection (8), fourfold rise in titre (6), and single high titre (65). Reports were received from New South Wales (34), Queensland (29), South Australia (5), Victoria (6) and Western Australia (21). A total of 638 reports has been received for the year to date. Eighty isolates were identified as being H_1N_1 subtypes and 6 as H_3N_2 subtypes. The number of reports received for the month of July was low compared to that received last year (Figure 3). Patients over 5 years of age more commonly reported influenza A than influenza B this period (Figure 4).
- Seventy-eight reports of **influenza B** were received this fortnight. Diagnosis was by virus isolation (22), antigen detection (9), fourfold rise in titre (3) and single high titre (44). Reports were received from the Australian Capital Territory (one), New South Wales (40), Queensland (22), South Australia (5), Victoria (9) and Western Australia (one). Included was a 5 day old male with hydrops fetalis. A total of 198 reports has been received so far this year for 100 males and 95 females. The number of reports rose in July (Figure 3). This fortnight influenza B was reported more frequently than influenza A for the under 5 year age group (Figure 4).
- The number of reports of **parainfluenza virus type 3** remains high, 43 being received this period. Twenty-eight reports (65%) were for infants under 12 months of age. This virus was isolated from a lung specimen from a 30 year old male with pneumonia who died and from a 3 day old septic female with a generalised rash. Diagnosis was by virus isolation (25) and antigen detection (18).

Figure 2. Rhinovirus laboratory reports, 1994 and 1995, by month of specimen collection

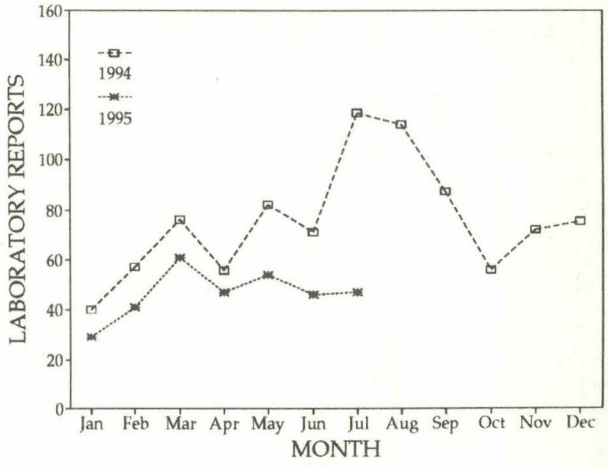


Figure 3. Influenza A and B laboratory reports, 1994 to 1995, by month of specimen collection

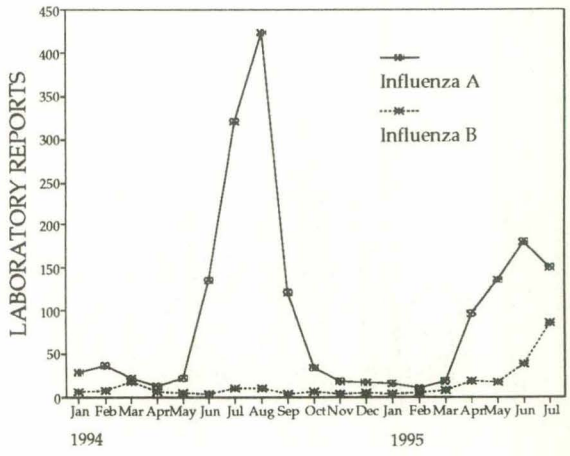


Figure 4. Influenza A and B laboratory reports for the reporting period, by age group and virus

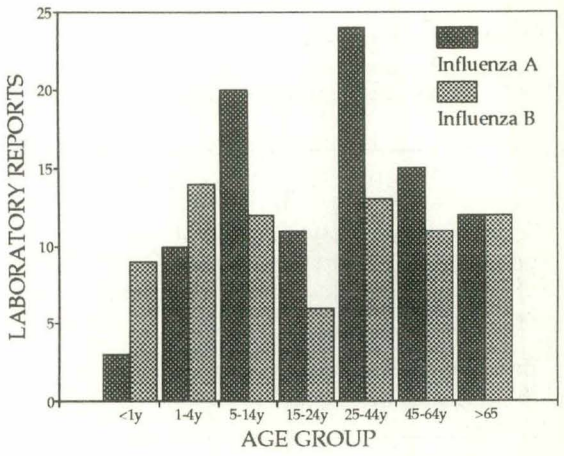


Figure 5. Rotavirus laboratory reports, 1990 to 1994 average and 1995, by month of specimen collection

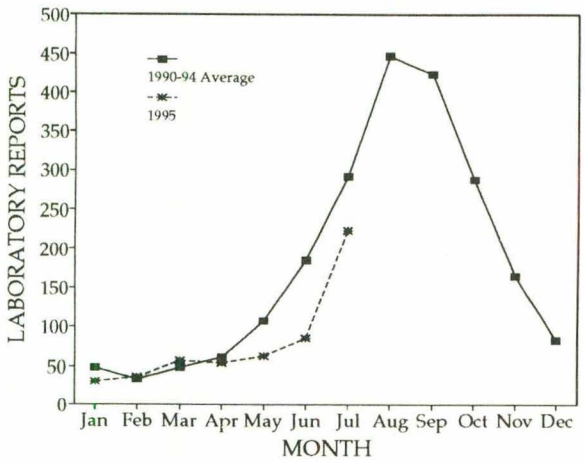
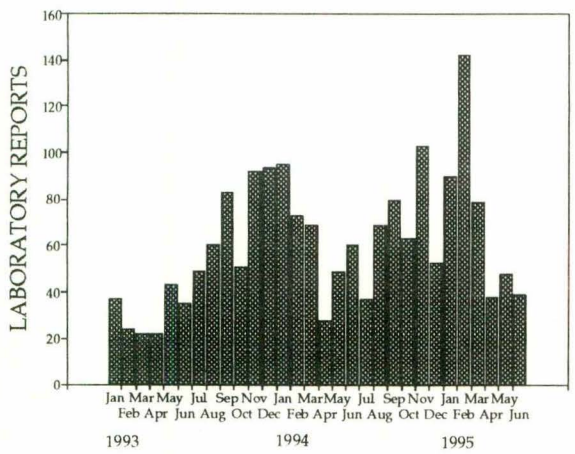
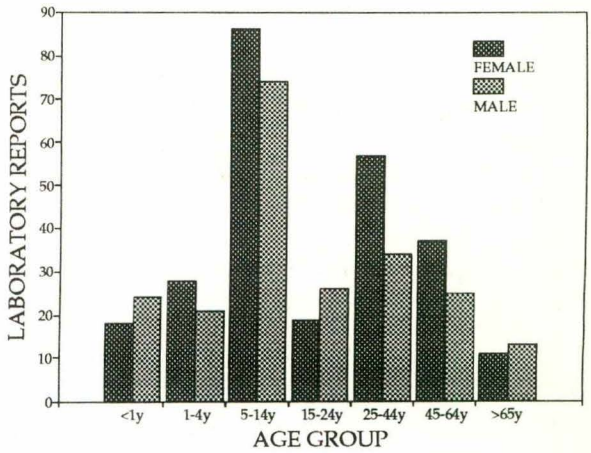


Figure 6. *Bordetella* laboratory reports, 1993 to 1995, by month of specimen collection



- Three hundred and seventy-six reports of **respiratory syncytial virus (RSV)** were received this fortnight 267 (71%) for patients under one year of age and 88 (23%) for patients in the one to 4 year age group. Method of diagnosis included virus isolation (130), antigen detection (233) and single high titre (13). Included was a 2 year old female who also had parainfluenza virus type 3 and a set of triplets.

Figure 7. *Bordetella* laboratory reports, 1995, by age group and sex



- **Rotavirus** was reported for 214 patients this period including 119 males and 92 females (male:female ratio 1.3:1). One hundred and ninety-four cases (90%) were 4 years of age or under. The number of reports rose markedly in July following below average numbers earlier in the season (Figure 5).
- Thirty-three reports of **pertussis** were received this period, 19 ***Bordetella pertussis*** and 14 ***Bordetella*** species. The number or reports remains stable (Figure 6). Of the 480 reports received for the year to date 160 (33%) were for the 5 to 14 year age group, the male:female ratio being 0.8:1.0 (Figure 7).

Australian Sentinel Practice Research Network

Data for week 32 (ending 13 August) and week 33 (ending 20 August) are included in this issue of *CDI* (Table 1). There were 8687 consultations reported for week 32 and 7265 for week 33. The influenza reporting rate was about the same this fortnight as last fortnight and the highest rates of reporting continued to be for Queensland. Reports of gastroenteritis have been more common recently than at the same time last year, and have been increasing since the beginning of June.

Table 1. Australian Sentinel Practice Research Network, weeks 32 and 33, 1995

Condition	Week 32, to 13 August 1995		Week 33, to 20 August 1995	
	Reports	Rate per 1000 encounters	Reports	Rate per 1000 encounters
Influenza	221	25.4	155	21.3
Rubella	1	0.1	0	0
Measles	0	0	0	0
Chickenpox	14	1.6	8	1.1
Pertussis	4	0.4	6	0.8
Gastroenteritis	115	13.2	113	15.6

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 declined this fortnight. Schools absenteeism rates have fallen whilst that reported by Australia Post remained stable. Sentinel practitioners consultation rates for influenza like illness have fallen for all schemes other than the Australian Capital Territory. Deaths surveillance rates remain stable. Reports of influenza B have risen this period relative to those for influenza A.

Sentinel general practitioner surveillance (Figure 8)

- The **Australian Sentinel Practice Research Network** reported a similar rate of reporting for influenza like illness this fortnight compared with last fortnight. For the weeks ending 13 and 20 August rates of 25 and 21 per 1000 encounters were reported respectively.
- The **Victorian sentinel general practitioners reporting scheme** had a consultation rate for influenza like illness of 13 per 1000 encounters this period, the same as the rate reported in the previous period.
- **New South Wales** sentinel general practitioners reported rates of 22 and 24 per 1000 consultations for the weeks ending 6 and 13 August respectively, similar to the previous two weeks.
- **The Australian Capital Territory Sentinel General Practitioner Scheme** reported a rise in the consultation rate for influenza like illness to 26 per 1000 encounters for the weeks ending 22 and 29 August.

Absenteeism surveillance (Figure 9)

- **Australia Post** reported national absenteeism rates of 2.7% and 2.8% for the weeks ending 20 and 27 August respectively, similar to rates reported in previous weeks. Absenteeism rates in individual States remained stable.
- **New South Wales Schools Absenteeism Surveillance** reported rates of 5.5% and 5.0% for the weeks ending 20 and 27 August respectively. The rate of absenteesim continues to decline.
- The **Australian Capital Territory Schools Absenteeism Surveillance** rate has fallen to 7.0 and 6.3% for the weeks ending 22 and 29 August respectively.

Laboratory surveillance (Figures 10 and 11)

- **Influenza A** was reported for 95 patients this fortnight including 14 reports of subtype H_1N_1. Diagnosis was by virus isolation (16), antigen detection (8), fourfold rise in titre (6), and single high titre (65). Reports were received from New South Wales (34), Queensland (29), South Australia (5), Victoria (6) and Western Australia (21). A total of 638 reports has been received for the year to date. Eighty isolates were identified as being H_1N_1 subtypes and 6 as H_3N_2 subtypes. The number of reports has declined in recent weeks (Figure 10).
- Seventy eight reports of **influenza B** were received this fortnight. Diagnosis was by virus isolation (22), antigen detection (9), fourfold rise in titre (3) and single high titre (44). Reports were received from the Australian Capital Territory (one), New South Wales (40), Queensland (22), South Australia (5), Victoria (9) and Western Australia (one). Included was a 5 day old male with hydrops fetalis. A total of 198 reports has been received so far this year for 100 males and 95 females. The number of reports has risen in recent weeks (Figure 11).

Figure 8. Sentinel general practitioner influenza reports per 1000 encounters, 1995, by week

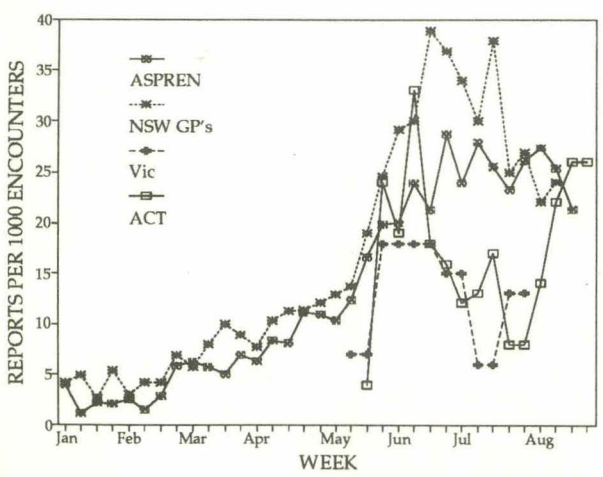


Figure 9. Absenteeism reports, 1995, by week and scheme

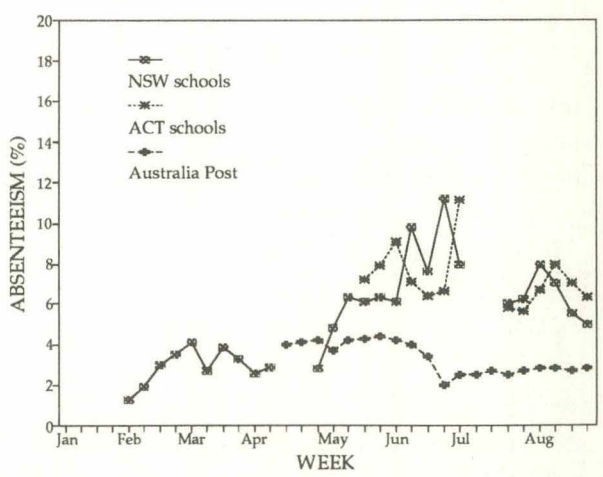


Figure 10. Influenza A laboratory reports, 1995, by method of diagnosis and week of specimen

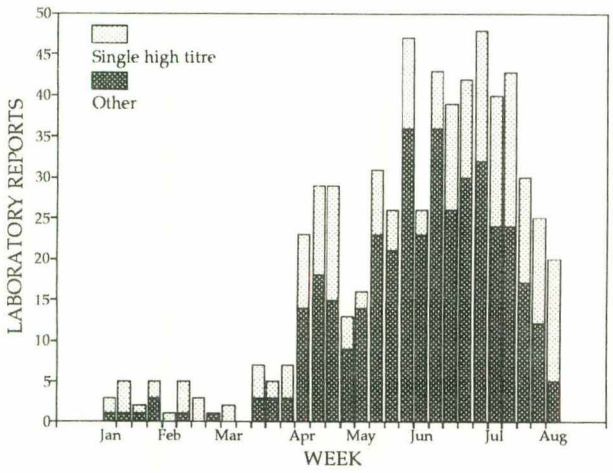
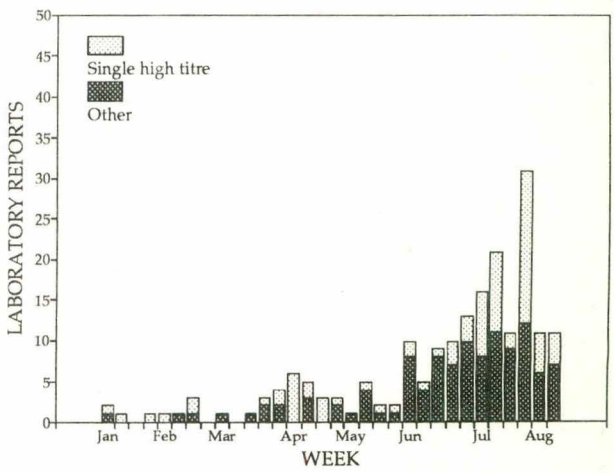


Figure 11. Influenza B laboratory reports, 1995, by method of diagnosis and week of specimen



Other surveillance

- **Victorian total deaths surveillance** reported a death rate of 1.5 per 10,000 population for the weeks ending 21 and 28 August respectively, similar to the rates reported in previous weeks.
- **South Australian deaths surveillance** rates remained stable at 1.9 and 1.7 per 10,000 population for the weeks ending 20 and 27 August respectively.
- **Victorian hospital admissions surveillance** reported admission rates for influenza and/or pneumonia of 0.7 per 100 patients for the last fortnight, a reduction on the rate reported in the previous period.

Sterile Sites Surveillance (LabDOSS)

Data for this four weekly period have been provided by 10 laboratories. There were 363 reports of significant sepsis:

New South Wales: Hunter Area Pathology Service 44; Liverpool Hospital 68; Prince of Wales, Sydney 53; Royal North Shore Hospital 66.

Tasmania: Royal Hobart Hospital 29; Northern Tasmania Pathology Service 15.
Western Australia: Sir Charles Gairdner Hospital 28.
Queensland: Nambour General Hospital 10; Sullivan, Nicholaides and Partners 35.
Australian Capital Territory: Woden Valley Hospital 15.

Table 2. LabDOSS reports of blood isolates, by organism and clinical information

Organism	Clinical information						Risk factors				Total[1]
	Bone/Joint	Lower respiratory	Endocarditis	Gastrointestinal	Urinary tract	Skin	Surgery	Immunosuppressed	IV line	Neonatal	
Enterococcus faecalis				1			1				6
Staphylococcus aureus	2	2	2		11	1	8	13	12		60[2]
Staphylococcus epidermidis		1	1	1	1	4	2	3	2	1	19
Staphylococcus coagulase negative							3	4	3		18
Streptococcus pneumoniae		25				1		5			37
Escherichia coli	1	2		11	25		7	12	1	1	69
Enterobacter cloacae					1	1	1	2			6
Klebsiella pneumoniae		1		2	1	2	2	4			11
Pseudomonas aeruginosa		1			2		1	2			10

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

Table 3. LabDOSS reports of meningitis and/or CSF isolates, by organism and age group

	<1 months	1-11 months	15-24 years	25-34 years	35-44 years	45-54 years	55-64 years	Total
Staphylococcus aureus			1				1	2
Staphylococcus epidermidis			1					1
Streptococcus Group B	2	1						3
Streptococcus pneumoniae		3					1	4
Cryptococcus neoformans					1			1
Cryptococcus neoformans var *neoformans*						1		1
Haemophilus influenzae		1		1				2
Neisseria meningitidis		1	1	1				3

Organisms reported 5 or more times from blood are detailed in Table 2. Other blood isolates not included in Table 2 were:

Gram positive: 1 *Bacillus cereus*, 1 *Corynebacterium jeikeium*, 2 *Corynebacterium* species, 1 *Enterococcus* species, 2 *Listeria monocytogenes*, 4 *Streptococcus* Group A, 2 *Streptococcus* Group B, 2 *Streptococcus* Group G, 2 *Streptococcus* 'milleri', 2 *Strepotococcus sanguis*, 2 *Streptococcus viridans* and 3 *Strepotococcus* species.

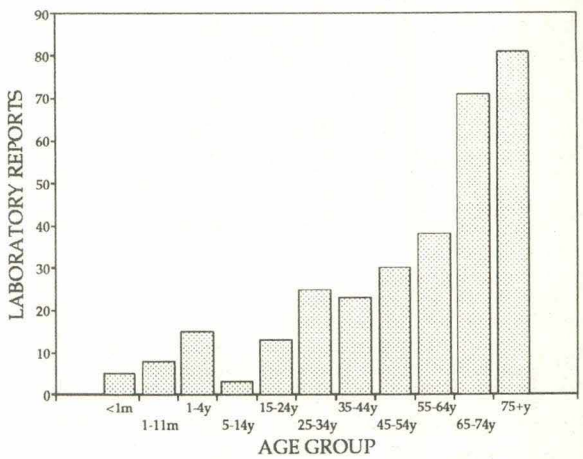
Gram negative: 3 *Acinetobacter* species, 1 *Branhamella catarrhalis*, 1 *Citrobacter freundii*, 2 *Enterobacter* species, 1 *Haemophilus influenzae* (52 year old female with a malignancy), 1 *Haemophilus parainfluenzae*, 4 *Klebsiella oxytoca*, 2 *Klebsiella* species, 3 *Morganella morganii*, 1 *Neisseria mucosa*, 1 *Pseudomonas cepacia*, 1 *Salmonella* Paratyphi (15 year old female), 3 *Salmonella* species (all with recent overseas travel) and 2 *Xanthomonas maltophilia*.

Anaerobes: 2 *Bacteroides fragilis*, 1 *Bacteroides* species, 1 *Clostridium* species and 1 *Propionibacterium* species.

Fungi: 3 *Candida albicans* and 2 *Candida* species.

There were 220 blood isolates reported for patients over the age of 44 years (Figure 12).

Figure 12. LabDOSS reports of blood isolates, by age group



Hospital acquired blood isolates

A total of 72 isolates was reported as being hospital acquired. The most commonly reported organisms were *Escherichia coli* (9), *Klebsiella pneumoniae* (6), *Staphylococcus aureus* (8, including 6 MRSA), *Staphylococcus* coagulase negative (8) and *Staphylococcus epidermidis* (6).

Meningitis and/or CSF isolate reports

There were 17 reports of meningitis and/or CSF isolates. Included was 1 *Cryptococcus neoformans* (44 year old male with HIV), 1 *Cryptococcus neoformans* var *neoformans* (47 year old male with HIV), 2 *Haemophilus influenzae* (one type b), 3 *Neisseria meningitidis* (all males in the age range 1 to 30 years; 2 serogroup B), 1 *Staphylococcus aureus* (23 year old female with neurological surgery), 1 *Staphylococcus* coagulase negative, 3 *Streptococcus* Group A (all males less than 1 year old) and 4 *Streptococcus pneumoniae* (3 less than 1 year old).

Isolates from sites other than Blood or CSF

Joint fluid: Eight reports were received this period including 6 *Staphylococcus aureus* (4 males and 2 females, age range 39 to 87 years), 1 *Staphylococcus epidermidis* and 1 *Streptococcus* Group G.

Peritoneal dialysate: A total of 9 reports was received. Eight were males in the age range 1 to 62 years. Included was 1 *Enterobacter* species, 1 *Escherichia coli*, 1 *Pseudomonas aeruginosa*, 2 *Staphylococcus aureus*, 1 *Staphylococcus* coagulase negative, 2 *Staphylococcus epidermidis* and 1 *Streptococcus* species.

Pleural fluid: Four reports of organisms isolated from pleural fluid were received this period. Three were males in the age range 63 to 80 years. Included was 1 *Bacteroides* species, 1 *Enterococcus faecalis*, 1 *Escherichia coli*, and 1 *Klebsiella pneumoniae*.

Other: 3 *Bacteroides* species, 1 *Bacteroides fragilis*, 1 *Candida species*, 1 *Enterococcus* species, 1 *Fusobacterium* species, 1 *Pseudomonas aeruginosa*, 4 *Staphylococcus*

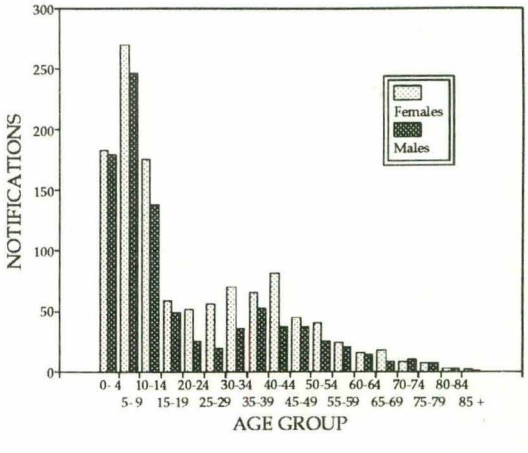
aureus, 3 *Staphylococcus* coagulase negative, and 1 *Streptococcus* 'milleri'.

National Notifiable Diseases Surveillance System, 6 to 19 August 1995

There were 1468 notifications received for the period (Figure 15 and Tables 7, 8 and 9).

- There were 12 notifications of **Ross River virus infection**; 6 cases were male and 6 were female. The cases were aged between the 20-24 and the 70-74 years age groups. Ten of the 12 cases were reported from Queensland, one from the Northern Territory, and one from central New South Wales. Dates of onset were reported as May and June (one case each), July (8 cases), and August (two cases).
- Two cases of **dengue** were reported. One case was a female in the age group 25-29 years and the other a male in the age group 45-49 years. For both cases, the recorded month of onset was August.
- One notification of **brucellosis** was received, a male in the age group 20-24 years.
- There were 371 notifications of **campylobacteriosis**; 184 cases were male, 183 cases were female, and the sex of 4 cases was not recorded. The cases were aged between the 0-4 and the 95-99 years age groups with 25% of cases being aged less than 5 years.
- A report was received of a case of **cholera**, the notification being backdated to a previous reporting period. The case is the subject of a separate report in this issue of *CDI* (page 448).
- Fifty-five notifications of **gonococcal infection** were received; 45 cases were male and 8 cases were female; the sex of two cases was not recorded. Recorded ages were between the 0-4 and the 85-89 years age groups. A single case was reported in a child aged less than one year.
- A single case of ***Haemophilus influenzae* type b infection** was reported in a female aged 3 years.
- Twenty-one cases of **hepatitis A** were reported; 14 cases were male and 7 cases were female. The cases were from most of the age groups 0-4 years to 70-74 years, with 15 cases aged less than 40 years.
- Seven cases of **hepatitis B** were reported; 5 cases were male and 2 cases were female. The cases were aged between the 10-14 and the 30-34 years age groups.
- One incident case of **hepatitis C** was reported, a female in the age group 15-19 years.
- One case of **hydatid infection** was reported, a male in the age group 65-69 years.
- Six notifications of **legionellosis** were received. All cases but one were male, and recorded ages were in age groups from 30-34 to 80-84 years.
- One case of **leptospiriosis** was reported, a male in the age group 45-49 years, and a resident of a rural Statistical Division.
- One case of **listeriosis** was reported, a female in the age group 55-59 years.
- There were 14 notifications of **malaria** received; 9 cases were male, 4 cases were female and the sex of one case was not recorded. Recorded ages were between 16 and 81 years. Onset dates were in June (3 cases), July (3) and August (8).
- Twenty-eight cases of **measles** were reported; 16 cases were male and 12 cases were female. The cases were aged between 0 and 63 years, with 6 cases reported for children aged less than two years. There was one apparent cluster of 4 cases in the same postcode area in New South Wales.
- There were 16 cases of **meningococcal infection** reported; 9 cases were male and 7 cases were female. The cases were aged between the 0-4 and the 65-69 years age groups. There were no apparent clusters.
- There were 100 notifications of **pertussis**; 44 cases were male and 56 cases were female. Recorded ages were between the 0-4 and the 80-84 years age groups with 3 cases aged less than one year, and 26 aged between 5 and 9 years. There were 13 apparent clusters of between 2 and 4 cases each in the same postcode area. Apparent clusters were in New South Wales (7), Victoria (one) and Queensland (5). The number of cases reported in 1995 is slightly less than for the same period last year (Table 4). The ages of cases this year have followed a bi-modal distribution with peaks of incidence in the 5-9 year age group and the late 30s and early 40s (Figure 13). Females have outnumbered males in all age groups below 70 years, especially in the ages from 10 to 44 years.

Figure 13. Pertussis notifications with reported onset 1 January to 16 August 1995, by age group and sex



- Fourteen notifications of **Q fever** were received; 13 cases were male and one case was female. Recorded ages were between the 15-19 and the 65-69 years age groups.
- There were 77 cases of **rubella** reported; 57 cases were male and 20 cases were female. Recorded age groups of cases were from 0-4 and 70-74 years. Nine cases were reported for females in the 15-44 years age group. However, there has been an ongoing preponderance of reported cases in males, especially adolescents and young adults. For the last 3 years, lower incidence in the winter months has been followed by peaks in the months September to December (Figure 14).
- There were 114 cases of **salmonellosis** reported; 62 cases were male, 49 cases were female, and the sex of 3 cases was not reported. The cases were aged between the 0-4 and the 85-89 years age groups, with 39% of cases aged less than 5 years.
- Thirty-six cases of **syphilis** were reported; 19 cases were male and 17 cases were female. The cases were aged between the 15-19 and the 85-89 years age groups.
- There were 24 cases of **tuberculosis** reported; 13 cases were male and 11 cases were female. The cases were aged between the 0-4 and the 70-74 years age groups. A single case was reported in a female child in the 0-4 age group. The dates of onset were reported as in the months of March, April and May (one case in each month), June (4 cases), July (5) and August (12).
- A single case of **typhoid** was reported in a female in the age group 25-29 years.
- Seven cases of **yersiniosis** were reported; 5 cases were male and 2 cases were female. The age groups of cases were 0-4 years (5 cases) to 15-19 years and 25-29 years (one case each).

Figure 14. Rubella notifications, 1991 to 1995, by month of onset

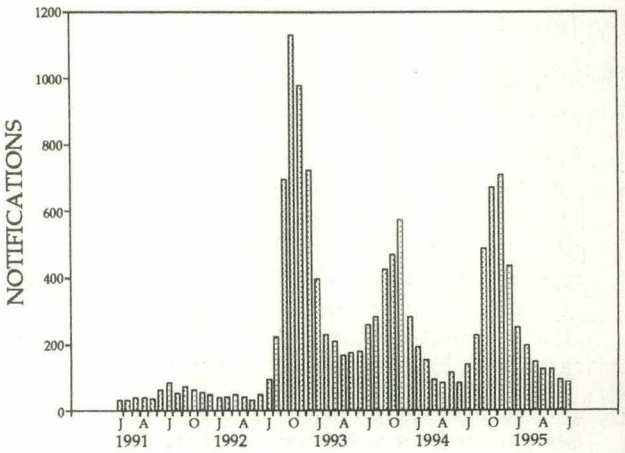
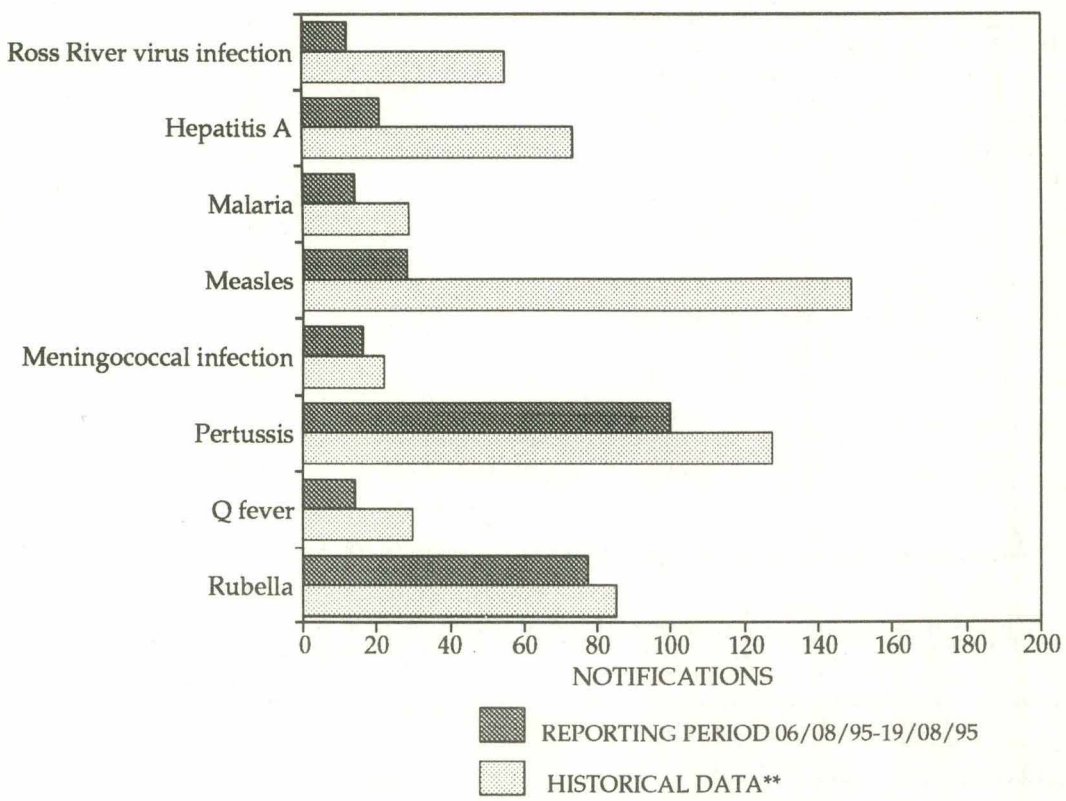


Figure 15. Selected National Notifiable Diseases Surveillance System reports, and historical data[1]



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 4. Notifications of diseases preventable by vaccines recommended by the NHMRC for routine childhood immunisation, received by State and Territory health authorities in the period 6 to 19 August 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	0	1	0	1	9	48	129
Measles	1	23	0	1	0	1	2	0	28	267	998	2517
Mumps	1	1	0	NN	0	0	0	0	2	0	42	13
Pertussis	0	44	0	27	8	4	15	2	100	164	2702	3251
Poliomyelitis	0	0	0	0	0	0	0	0	0	0	0	0
Rubella	3	20	0	7	3	9	27	8	77	73	1435	1013
Tetanus	0	0	0	0	0	0	0	0	0	1	3	8

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 5. Notifications of other diseases[1] received by State and Territory health authorities in the period 6 to 19 August 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	1	10	0	-	0	0	12	35	2262	3688
Dengue	0	1	1	0	0	-	0	0	2	0	21	13
NEC[3]	0	6	0	8	0	0	0	0	14	6	722	456
Campylobacteriosis[4]	6	-	6	29	138	45	91	56	371	361	6627	5983
Chlamydial infection (NEC)[5]	2	NN	2	30	9	12	53	16	124	334	3967	4915
Donovanosis	0	NN	1	0	NN	0	0	0	1	1	53	64
Gonococcal infection[6]	0	7	16	14	3	0	7	8	55	130	1845	2016
Hepatitis A	0	5	1	8	1	0	5	1	21	86	999	1287
Hepatitis B	0	0	0	0	0	0	5	2	7	16	227	210
Hepatitis C incident	-	1	0	-	0	-	-	-	1	4	65	15
Hepatitis C unspecified	23		9	35		1	276	37	381	395	5908	5786
Hepatitis (NEC)	0	0	0	0	0	0	0	NN	0	0	27	27
Legionellosis	0	4	0	0	0	0	1	1	6	6	129	120
Leptospirosis	0	0	0	1	0	0	0	0	1	2	84	88
Listeriosis	0	0	0	0	1	0	0	0	1	1	43	19
Malaria	0	1	4	0	5	0	3	1	14	13	424	476
Meningococcal infection	0	6	2	2	0	0	4	2	16	24	232	217
Ornithosis	0	NN	0	0	0	0	3	0	3	1	84	58
Q fever	0	8	0	1	0	0	5	0	14	34	298	462
Salmonellosis (NEC)	0	23	7	15	14	2	37	16	114	129	4357	3747
Shigellosis[4]	0	-	8	4	2	0	0	2	16	17	549	504
Syphilis	0	20	2	2	0	0	12	0	36	113	1400	1669
Tuberculosis	0	11	0	3	0	0	10	0	24	38	696	653
Typhoid[7]	0	0	0	0	1	0	0	0	1	2	29	29
Yersiniosis (NEC)[4]	0	-	0	2	3	1	1	0	7	9	238	291

1. For HIV and AIDS, see Tables 2 and 3 *CDI* 1995;19:405-406. For rarely notified diseases, see Table 6.
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 6. Notifications of rare[1] diseases received by State and Territory health authorities in the period 6 to 19 August 1995

DISEASES	Total this period	Reporting States or Territories	Year to date 1995
Botulism	0		0
Brucellosis	1	Qld	22
Chancroid	0		2
Cholera	0		4
Hydatid infection	1	Vic	23
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 7. Virology and serology laboratory reports by State or Territory[1] for the reporting period 10 to 23 August 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	NT	Qld	SA	Tas	Vic	WA			
MEASLES, MUMPS, RUBELLA											
Measles virus		1		2			1		4	22.2	262
Mumps virus		1		2					3	4.3	52
Rubella virus		2	1	9	2	1	1	9	25	23.3	551
HEPATITIS VIRUSES											
Hepatitis A virus		6		13			2	2	23	13.2	311
Hepatitis B virus	1	27	2	53	4		16	50	153	84.0	1,655
Hepatitis C virus	11	19	7	117	58	13	6	211	442	210.2	4,008
Hepatitis D virus							1		1	.8	13
Hepatitis E virus								1	1	.5	8
ARBOVIRUSES											
Ross River virus			3	10	1			7	21	13.0	993
Barmah Forest virus			1	5				1	7	2.3	195
Dengue not typed			1					2	3	2.3	12
ADENOVIRUSES											
Adenovirus type 1							1		1	2.5	22
Adenovirus type 3							1		1	4.5	42
Adenovirus not typed/pending		6		9	12	1	3	9	40	52.7	602
HERPES VIRUSES											
Herpes simplex virus type 1	2	13	2	101	26	3	49	69	265	150.7	3,328
Herpes simplex virus type 2		16	3	145	14	4	38	96	316	174.8	3,469
Herpes simplex not typed/pending	9	8		6			1	1	25	24.3	337
Cytomegalovirus		11		21	6	2	14	11	65	79.2	1,029
Varicella-zoster virus		2	3	37	3		8	21	74	35.5	754
Epstein-Barr virus	1	15	1	71	13	1	11	25	138	45.8	1,361
OTHER DNA VIRUSES											
Parvovirus			1	1	1		1	9	13	4.0	89

Table 7. Virology and serology laboratory reports by State or Territory[1] for the reporting period 10 to 23 August 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	NT	Qld	SA	Tas	Vic	WA			
PICORNA VIRUS FAMILY											
Coxsackievirus B2							1		1	.0	7
Echovirus type 9		1					1		2	.5	8
Poliovirus type 1 (uncharacterised)							1		1	1.2	14
Poliovirus type 2 (uncharacterised)							1		1	.8	3
Poliovirus type 3 (uncharacterised)		1							1	1.0	7
Rhinovirus (all types)		6		1	1		16		24	40.8	442
Enterovirus type 71 (BCR)							2		2	.0	29
Enterovirus not typed/pending		6	1	6	1		6	14	34	37.3	628
ORTHO/PARAMYXOVIRUSES											
Influenza A virus		24		25	5		6	20	80	84.0	578
Influenza A virus H_1N_1		10		4					14	.0	80
Influenza A virus H_3N_2								1	1	10.2	6
Influenza B virus	1	40		22	5		9	1	78	32.5	202
Parainfluenza virus type 2				3			1		4	5.7	168
Parainfluenza virus type 3	6	3		9	3		14	8	43	20.0	448
Parainfluenza virus typing pending						1	4		5	3.3	27
Respiratory syncytial virus	11	48		48	51	34	56	128	376	339.7	3,127
OTHER RNA VIRUSES											
HIV-1				4			2	5	11	1.7	68
Rotavirus	46	58			13	7	59	31	214	193.0	953
Norwalk agent							1		1	.5	10
OTHER											
Chlamydia trachomatis not typed	3	8	5	94	14		2	67	193	88.5	1,738
Chlamydia psittaci							2	1	3	2.8	102
Chlamydia species					1				1	.8	40
Mycoplasma pneumoniae		3		6	1		1	3	14	62.5	219
Coxiella burnetii (Q fever)					1		1		2	17.7	140
Rickettsia australis			1	2					3	.2	8
Rickettsia tsutsugamushi				2			1		3	.0	4
Rickettsia spp - other								1	1	.2	7
Streptococcus group A		6	7	23			2		38	10.0	417
Salmonella typhi		1							1	.0	2
Yersinia enterocolitica		2					2		4	1.5	41
Brucella species		1							1	.3	8
Bordetella pertussis		1	1				4	13	19	21.3	448
Bordetella species		3		11					14	9.2	100
Legionella pneumophila		4							4	.0	5
Legionella species								2	2	.3	25
Leptospira species		1							1	.5	18
Treponema pallidum		28	3	2				2	35	23.5	411
Toxoplasma gondii		1		1					2	2.3	105
Schistosoma species					1		4	9	14	.0	72
Strongyloides stercoralis		1							1	.0	11
TOTAL	91	384	43	865	237	67	353	831	2,871	1,964.0	29,827

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 8. Virology and serology laboratory reports by clinical information for the reporting period 10 to 23 August 1995

	Meningitis	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	Muscle/joint	Genital	Other/unknown	Total
MEASLES, MUMPS, RUBELLA										
Measles virus					1				3	4
Mumps virus									3	3
Rubella virus					5				20	25
HEPATITIS VIRUSES										
Hepatitis A virus				8					15	23
Hepatitis B virus			1	24				4	124	153
Hepatitis C virus				60					382	442
Hepatitis D virus									1	1
Hepatitis E virus									1	1
ARBOVIRUSES										
Ross River virus							6		15	21
Barmah Forest virus							2		5	7
Dengue not typed									3	3
ADENOVIRUSES										
Adenovirus type 1					1					1
Adenovirus type 3						1				1
Adenovirus not typed/pending	1	15	17		2	2			3	40
HERPES VIRUSES										
Herpes simplex virus type 1		14			132	8		100	11	265
Herpes simplex virus type 2					97			211	8	316
Herpes simplex not typed/pending		2			9			5	9	25
Cytomegalovirus		21		2	1	2			39	65
Varicella-zoster virus					59				15	74
Epstein-Barr virus		12		4	2				120	138
OTHER DNA VIRUSES										
Parvovirus					2				11	13
PICORNA VIRUS FAMILY										
Coxsackievirus B2									1	1
Echovirus type 9	1	1								2
Poliovirus type 1 (uncharacterised)		1								1
Poliovirus type 2 (uncharacterised)			1							1
Poliovirus type 3 (uncharacterised)			1							1
Rhinovirus (all types)		16							8	24
Enterovirus type 71 (BCR)		1			1					2
Enterovirus not typed/pending	2	9	2		3				17	34

Table 8. Virology and serology laboratory reports by clinical information for the reporting period 10 to 23 August 1995, continued

	Meningitis	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	Muscle/joint	Genital	Other/unknown	Total
ORTHO/PARAMYXOVIRUSES										
Influenza A virus		24							56	80
Influenza A virus H_1N_1		4							10	14
Influenza A virus H_3N_2									1	1
Influenza B virus		29			1				48	78
Parainfluenza virus type 2		4								4
Parainfluenza virus type 3		40			1		1		1	43
Parainfluenza virus typing pending		4							1	5
Respiratory syncytial virus		354			2				20	376
OTHER RNA VIRUSES										
HIV-1									11	11
Rotavirus		1	205					1	7	214
Norwalk agent			1							1
OTHER										
Chlamydia trachomatis not typed		1			2	3		156	31	193
Chlamydia psittaci		3								3
Chlamydia species		1								1
Mycoplasma pneumoniae		8							6	14
Coxiella burnetii (Q fever)									2	2
Rickettsia australis									3	3
Rickettsia tsutsugamushi									3	3
Rickettsia spp - other									1	1
Streptococcus group A		4			4		4		26	38
Salmonella typhi									1	1
Yersinia enterocolitica					1				3	4
Brucella species									1	1
Bordetella pertussis		18							1	19
Bordetella species		12							2	14
Legionella pneumophila									4	4
Legionella species									2	2
Leptospira species									1	1
Treponema pallidum							1	3	31	35
Toxoplasma gondii									2	2
Schistosoma species		1							13	14
Strongyloides stercoralis									1	1
TOTAL	4	600	228	98	326	16	14	480	1104	2871

Table 9. Virology and serology laboratory reports by contributing laboratories for the reporting period 10 to 23 August 1995

STATE OR TERRITORY	LABORATORY	REPORTS
Australian Capital Territory	Woden Valley Hospital, Canberra	93
New South Wales	Prince Henry / Prince of Wales Hospitals, Sydney	157
	Royal Alexandra Hospital for Children, Camperdown	44
	Royal North Shore Hospital, St Leonards	26
	Royal Prince Alfred Hospital, Camperdown	7
	South West Area Pathology Service, Liverpool	98
Queensland	Queensland Medical Laboratory, West End	805
	State Health Laboratory, Brisbane	141
South Australia	Institute of Medical and Veterinary Science, Adelaide	232
Tasmania	Northern Tasmanian Pathology Service, Launceston	30
	Royal Hobart Hospital, Hobart	36
Victoria	Microbiological Diagnostic Unit, University of Melbourne	1
	Monash Medical Centre, Melbourne	33
	Royal Children's Hospital, Melbourne	123
	Unipath Laboratories	19
	Victorian Infectious Diseases Reference Laboratory, Fairfiel	183
Western Australia	Princess Margaret Hospital, Perth	146
TOTAL		2871