The decline of *Haemophilus influenzae* type b disease in Australia

Ana Herceg, National Centre for Disease Control, Department of Health and Family Services, MDP 6, GPO Box 9848 Canberra ACT 2601

Abstract

Between July 1993 and June 1996, there were 412 cases of invasive *Haemophilus influenzae* type b (Hib) disease reported to the Hib Case Surveillance Scheme, 71% in children under the age of five years. Meningitis was the most frequent illness reported, followed by epiglottitis, septicaemia and pneumonia. There were 18 deaths. Thirty-four cases were classified as vaccine failures. The number of vaccine failures increased over time and the total number of cases of Hib disease fell, consistent with an increase in Hib vaccine coverage. Based on an estimated vaccine coverage of 50% in April 1995, the vaccine efficacy for all vaccines in the period was estimated to be 89%. Invasive Hib is a serious illness of childhood which is being significantly reduced by the use of Hib vaccines, and has the potential to be eliminated from this country. Vaccination providers should aim to immunise all children against Hib disease on time and according to the National Health and Medical Research Council Standard Vaccination Schedule. *Comm Dis Intell* 1997;21:173-176.

Introduction

Haemophilus influenzae type b (Hib) has been a major cause of morbidity and mortality in children in Australia. Before the introduction of conjugate Hib vaccines, invasive Hib disease occurred at a rate of between 39 and 63 cases per 100,000 Australian children under the age of five years, with much higher rates being reported in the Northern Territory[1,2,3]. Around 500 cases occurred annually and there were 10 to 15 deaths per year[4].

Conjugate Hib vaccines first became available in Australia in 1992, with the introduction of the conjugate PRP-D vaccine, recommended for use in children aged 18 months or older. In 1993 another three conjugate vaccines, PRP-OMP, HbOC and PRP-T, became available for use in children under 18 months of age. Hib vaccines became free to all children under the age of five years from April 1993.

Since the introduction of conjugate Hib vaccines, the incidence of invasive Hib disease has dropped dramatically. There was a 94% reduction in cases in children under the age of five years between 1992 and 1996[5]. The total number of cases declined from 549 in 1992 to 53 in 1996.

The Hib Case Surveillance Scheme (HCSS) was used to document the decline of Hib disease for a three year period between 1993 and 1996, and to estimate Hib vaccine efficacy.

Methods

The Hib Case Surveillance Scheme was created to obtain information on cases of invasive

ISSN 0725-3141
Volume 21
Number 13
26 June 1997

Contents

Hib disease which was not available in the National Notifiable Diseases Surveillance System (NNDSS). Additional information, including type of illness, method of diagnosis, vaccination status (including date of vaccination and type of vaccine used) and outcome, was obtained by State and Territory health authorities on cases notified under their public health legislations. The HCSS commenced in January 1994, with reports backdated to 1 July 1993. Because of differences in case definitions between the NNDSS and the HCSS, and a small amount of under-reporting to the HCSS, the numbers of cases reported to each system were not identical.

All cases of invasive Hib disease reported to the Hib Case Surveillance Scheme with onset dates between 1 July 1993 and 30 June 1996 were examined to describe the decline in the disease, clinical illness and outcome, and to estimate Hib vaccine efficacy.

A case of invasive Hib disease was defined as:

- Isolation of *Haemophilus influenzae* type b from any normally sterile site,

and/or

- Identification of Hib antigen in cerebrospinal fluid, urine or joint fluid with clinical features compatible with invasive Hib disease,

and/or

- A confident diagnosis of epiglottitis by direct vision, laryngoscopy or X-ray.

The definition of a Hib vaccine failure was based on the National Health and Medical Research Council (NHMRC) Standard Vaccination Schedule[4]. A Hib vaccine failure was defined as a case of invasive Hib disease more than 21 days after administration of the most recent Hib vaccine in:

1. An infant aged less than 12 months who had received
   a. three doses of HbOC or PRP-T, or
   b. two doses of PRP-OMP, or
   c. two doses of HbOC or PRP-T where the first dose was given between 7 and 9 months of age.
2. A child aged 12 to 18 months who had received
   a. three doses of HbOC or PRP-T, or
   b. two doses of PRP-OMP where the first dose was given at 3 months or older, or
   c. two doses of HbOC or PRP-T where the first dose was given between 7 and 11 months of age, or
   d. a single dose of HbOC or PRP-T or PRP-OMP where the first dose was given at 12 months of age or older.
3. A child who had received three doses of PRP-OMP where the first dose was given at 2 months and the third dose at 12 months or older.
4. A child who received a single dose of HbOC or PRP-T or PRP-OMP at the age of 15 months or older.
5. A child who received a single dose of PRP-D at the age of 18 months or older.

All analyses were performed in Epi Info version 6[6].

Estimates of vaccination coverage were based on the Australian Bureau of Statistics 1995 immunisation survey[7]. Vaccine efficacy (VE) was estimated in Epi Info using the relationship between the percentage of cases vaccinated (PCV) and the percentage of the population vaccinated (PPV) which has been described by Orenstein *et al*[8]:

$$VE = \frac{PPV-PCV}{PPV\ (1-PCV)}$$

Results

There were 412 cases of invasive Hib disease reported to the Hib Case Surveillance Scheme with onset dates in the period 1 July 1993 to 30 June 1996. Of these, 292 cases (71%) occurred in children under the age of five years. There was a marked decline in case numbers over the period (Figure 1). There were 419 cases of Hib disease reported to the National Notifiable Disease

Figure 1. Cases of invasive Hib disease, July 1993 to June 1996, by month and age group

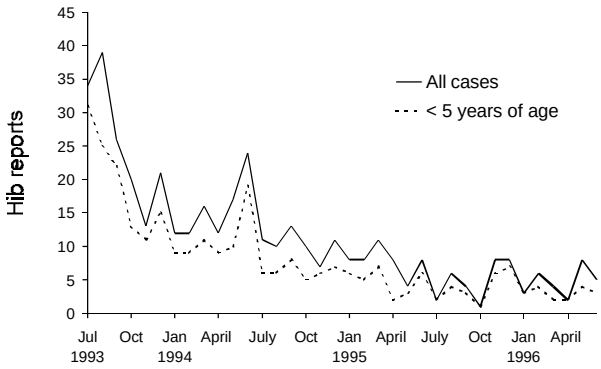


Figure 2. Cases of invasive Hib disease, July 1993 to June 1996, by type of illness

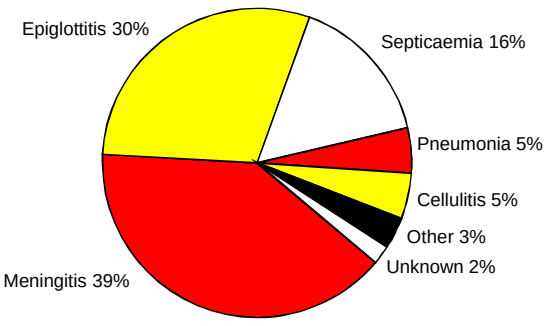


Table. Hib cases and vaccine failures in children under the age of 6 years

	Year				
	1993 (July to December)	1994	1995	1996 (January to June)	Total
Cases aged less than 6 years	126	114	63	21	324
Vaccine failures aged less than 6 years (%)	2 (2)	10 (9)	15 (24)	7 (33)	34 (10)

Surveillance System for the same period.

More males than females were reported; the male:female ratio was 1.3:1. Twenty-five cases (6%) were reported to be Aboriginal or Torres Strait Islanders. For 10% of cases Aboriginality was not reported.

Meningitis was the most frequent manifestation of invasive Hib disease, followed by epiglottitis, septicaemia and pneumonia (Figure 2). Ninety-one per cent of meningitis cases occurred in children under the age of five years.

There were 18 deaths (4%), and outcome was not reported for 21 cases (5%). Deaths occurred in 10 males and eight females; their ages ranged from four months to 97 years. Eight deaths occurred in children under the age of five years, with two in Aboriginal or Torres Strait Islander children. In those who died there were nine cases of septicaemia, six of meningitis, two of epiglottitis and one of pneumonia. Deaths in children under the age of five years declined from five in the last six months of 1993 to one in each subsequent year.

Information on vaccination status was available for all but 14 cases (3%). Ninety-three cases (23%) were reported to have received one or more doses of Hib vaccines; all were less than six years of age. Thirty-four cases were classified as vaccine failures. Vaccine failures were associated with HbOC (17 cases, 50%), PRP-OMP (5, 15%) and PRP-D (6, 18%). For six vaccine failures the type of vaccine received was not reported.

Vaccine failures occurred in more males than females; the male:female ratio was 2.4:1. Four vaccine failures occurred in Aboriginal or Torres Strait Islander children. All had been vaccinated with PRP-OMP. There were no deaths among those classified as vaccine failures.

The number of vaccine failures increased over time, while the total number of cases of Hib disease fell (Table). Based on an estimated vaccine coverage of 50% in April 1995, the vaccine efficacy for all vaccines in the period was estimated to be 89%.

Of the 59 cases who had received one or more doses of Hib vaccine but were not classified as vaccine failures, 31 had received a single dose of vaccine, 19 two doses and 6 three doses of vaccine (dose information was not reported for three cases). Forty cases were not old enough to have completed their course of vaccines, and 16 were old enough but had not completed their vaccination schedule according to the NHMRC recommendations.

Discussion

Since the introduction of conjugate Hib vaccines in Australia, the decline in the number of cases of invasive Hib disease has been dramatic. The Hib Case Surveillance Scheme also shows a corresponding decline in deaths. While the HCSS provides no information on morbidity, significant morbidity following Hib meningitis has been demonstrated[9], and will continue to occur until Hib disease is eliminated.

The Hib Case Surveillance Scheme has a number of limitations. It is likely that there is some under-reporting, as fewer cases were reported to the HCSS than to the NNDSS. Epiglottitis in particular may be under-reported because an organism is not always identified in these cases. Epiglottitis can however also be caused by other organisms and it is possible that as Hib disease becomes less common epiglottitis will be increasingly caused by other organisms. The use of epiglottitis in the case definition of invasive Hib disease should now be reviewed, and it may be necessary to verify Hib by laboratory means in these cases. Finally, incomplete reporting of information on cases, for example the number of doses and timing of vaccines, could result in some misclassification of cases in the HCSS. In particular this could result in an underestimate of the number of vaccine failures.

The spectrum of illness caused by invasive Hib disease in this study is consistent with a previous report[10], with meningitis and epiglottitis the most frequent illnesses reported. The proportion of deaths also remained constant, although the total number of deaths declined.

This study indicates that Aboriginal and Torres Strait Islander people may remain at increased risk of invasive Hib disease. Proportionally more deaths occurred in this population, and the proportion of vaccine failures was also higher than for the Australian population overall. While selective reporting of Aboriginality could have affected these results, elimination of invasive Hib disease from Aboriginal and Torres Strait Islander communities should remain a public health priority.

The decreasing number of invasive Hib cases, and the increasing number of Hib vaccine failures identified in Australia, is consistent with an increase in Hib vaccination coverage. Hib coverage has however been difficult to measure, and the best national estimate is 50% coverage in April 1995, from the Australian Bureau of Statistics[7]. A study in Sydney however showed Hib vaccine coverage to be 77% in August 1994[11]. Coverage is also likely to vary with age, with those in the younger age groups having higher rates than those in older age groups. In addition no studies have identified the proportion each type of vaccine contributes to the overall coverage, and hence estimates of vaccine efficacy for individual vaccine types cannot be produced.

Varying estimates of vaccine coverage could significantly change the estimate of vaccine efficacy in this study, and more detailed research is required to provide an accurate estimate.

The rise in the proportion of vaccine failures in Australia is consistent with the Canadian experience[12]. However, while 34 cases met the Australian case definition of a vaccine failure, a further 24 cases would meet the United Kingdom vaccine failure definition. In the United Kingdom, where PRP-T vaccine is recommended at two, three and four months of age, a vaccine failure is defined as a case occurring after at least two doses of vaccine given in the first year of life or after a single vaccination given to children at the age of 12 months or more[13]. Using this definition, Australia would have had 58 vaccine failures, or 18% of cases under the age of six years. This difference indicates that the PRP-T may be a more immunogenic vaccine than those used in Australia. All the doses of vaccine recommended by the NHMRC appear to be required to prevent a high vaccine failure rate.

The HCSS does not provide information on risk factors for vaccine failures. In Canada a number of vaccine failures have been associated with underlying medical problems[12]. Immune system defects may also be associated with vaccine failures[14]. Clinicians should consider further immunological investigation of Hib vaccine failures if underlying medical conditions are not present. In addition the NHMRC recommends an additional dose of PRP-OMP at six months for premature children who commence on this vaccine[4].

The 16 cases of invasive Hib disease which occurred in children who had not completed their course of vaccinations according to the NHMRC schedule, and many cases in unvaccinated children, were potentially preventable. Vaccination providers and parents should remain aware of the need to vaccinate children appropriately and on time against Hib.

Acknowledgements

Thanks are extended to the Communicable Diseases Network Australia for allowing the data from the Hib Case Surveillance Scheme to be used for this paper.

References

1. McIntyre PB, Leeder SR, Irwig LM. Invasive *Haemophilus influenzae* type b disease in Sydney children 1985-1987: a population based study. *Med J Aust* 1991;154:832-837.
2. McGregor AR, Bell JM, Abdool IM, Collignon PJ. Invasive *Haemophilus influenzae* infection in the Australian Capital Territory region. *Med J Aust* 1992;156:569-572.
3. Hanna JN. The epidemiology of invasive *Haemophilus influenzae* infections in children under five years of age in the Northern Territory: a three year study. *Med J Aust* 1990;152:234-240.
4. National Health and Medical Research Council. *The Australian immunisation handbook*. Sixth edition. Canberra: Australian Government Publishing Service, 1997.
5. The decline of *Haemophilus influenzae* type b. *Comm Dis Intell* 1997;21:94.
6. Dean AG, Dean JA, Coulombier D *et al*. Epi Info, Version 6: a word processing, database, and statistics program for epidemiology on microcomputers. Centers for Disease Control and Prevention, Atlanta, Georgia, USA, 1994.
7. Australian Bureau of Statistics. Children's Immunisation, Australia. April 1995; Catalogue No. 4352.0.
8. Orenstein WA, Bernier RH, Dondero TJ *et al*. Field evaluation of vaccine efficacy. *Bull WHO* 1985;63:1055-1068.
9. McIntyre P, Jepson R, Leeder SR, Irwig LM. The outcome of childhood *Haemophilus influenzae* meningitis. A population based study. *Med J Aust* 1993;159:766-772.
10. Herceg A. *Haemophilus influenzae* type b cases in Australia from 1 July 1993 to 30 June 1994 - results of the Hib Case Reporting Scheme including immunisation status and vaccine failures. *Comm Dis Intell* 1995;19:86-90.
11. McIntyre P, Chey T. The uptake of Hib vaccine in the Sydney region August 1994. A report for the NSW Health Department. Sydney: Westmead Hospital, 1994.
12. Failures after immunization with *Haemophilus influenzae* type b vaccines - 1991-1995. *Canada Comm Dis Rep* 1996;22-3:17-23.
13. Invasive *Haemophilus* infection in immunised children. *Comm Dis Environ Health in Scotland Wkly Rep* 1993;27:2.
14. Holmes SJ, Granoff DM. The biology of *Haemophilus influenzae* type b vaccination failure. *J Infect Dis* 1992; 165 (Suppl 1): S121-S123.

Hepatitis A outbreak in New South Wales

A cluster of hepatitis A infection reported to the South-Eastern Sydney Public Health Unit and the New South Wales Health Department has been linked to a Sydney restaurant. There have been 17 cases reported in the last two weeks, and all had dined at the restaurant between 11 and 18 May. Epidemiological investigations have shown that it is likely the infections were caused by frozen prawns from Burma. Of the reported cases, ten are female and seven are male, with ages ranging from seven to 48.

The prawns have not been on sale to the general public and the importer is conducting a voluntary recall. The Public Health Unit and the New South Wales Health Department staff are tracing other wholesale and distribution outlets to prevent further stocks of the implicated batch of prawns from reaching the public.

Australian encephalitis in Western Australia

Annette Broom, Department of Microbiology, University of Western Australia, QEII Medical Centre, Nedlands, Western Australia 6009

There have been two cases of Australian encephalitis due to infection with Murray Valley encephalitis (MVE) virus in Western Australia this wet season. The first was a severe case of encephalitis in a 22 year old male who contracted the disease in Carnarvon, a coastal town in the Gascoyne region of Western Australia. The patient has not recovered fully and is still in hospital in Perth. The second case was a 32 year old woman who had a mild disease and has now fully recovered. She contracted the virus in either Broome or Fitzroy Crossing in the Kimberley region of Western Australia. Both cases had dates of onset in early May, were MVE IgM positive and had a rising antibody titre to MVE virus by both haemagglutination inhibition test and enzyme linked immunosorbent assay (ELISA).

There were extremely heavy wet season rains in areas of the Kimberley, Pilbara and Gascoyne regions of Western Australia in January and February this year. Record catches (up to 35,000 per trap) of *Cx. annulirostris* mosquitoes (the major vector of MVE) were obtained at several locations in the Kimberley and Pilbara during mosquito surveillance carried out in March and April this year. MVE and Kunjin virus activity is monitored in Western Australia using sentinel chicken flocks located at most towns, two Aboriginal communities and some mine sites in the region (24 flocks at 20 locations). There was an early warning of increased MVE activity from the sentinel chicken flocks in the Kimberley and Pilbara regions in March this year and from the Gascoyne region in April. The Health Department of Western Australia has issued a number of public health warnings to residents and visitors to the north-west. These include advice on the need to avoid being bitten by mosquitoes.

Communicable Diseases Surveillance

Gonococcal infection

Gonococcal infection is a sexually transmissible bacterial disease which differs in males and females in course and severity. In males, urethral discharge and dysuria are common symptoms. The infection may be self limiting or occasionally result in a chronic carrier state. In females, an initial urethritis or cervicitis may occur followed by endometritis, salpingitis or pelvic peritonitis in about 20% of cases. Conjunctivitis occurs in newborns, but rarely in adults. Uncommon manifestations include septicaemia, endocarditis and meningitis.

Between 1917 and 1929, gonorrhoea was notifiable in some jurisdictions for varying periods of time. Between 10,000 and 12,000 cases were notified in most of those years, with annual notification rates exceeding 200 reports per 100,000 population. Gonorrhoeal 'ophthalmia neonatorum' was also notifiable, with 126 cases being reported during the 13-year period.

Gonococcal conjunctivitis in newborns was again made a notifiable disease in most jurisdictions in 1949, and during the next 20 years an average of over 50 infections were reported annually.

Other gonococcal infections became notifiable throughout Australia in 1968, and have remained so since that time. Annual notification rates of 70 to 90 cases per 100,000 population were experienced during the 1970s. A dramatic decline in the incidence of gonococcal infections in Australia was seen from reported rates above 50 per 100,000 population in the mid-1980s to 14 per 100,000 in 1990. However, the data suggest that the incidence has risen in recent years (Figure 1). This has occurred in both males and females. Changes in regulations concerning notification, mainly those introduced in the late 1980s requiring laboratories as well as medical practitioners to report, might be contributing towards this.

The male:female ratio in reported cases has declined markedly during the last six years, from 2.4:1 in 1991 and 2.6:1 in 1992 to 1.8:1 in 1996 and 1.4:1 in cases reported so far this year. The reasons for this change are not clear. The age group distribution of reported cases has changed little; persons aged 15 to 29 years have accounted for between 61% and 64% of all cases each year throughout the period (Figure 2).

Recent initiatives to aid the detection of gonococcal infection include less intrusive methods of specimen collection and improvements in diagnostic techniques, including polymerase chain reaction (PCR).

Epidemiological investigations have been enhanced by studies of isolates, including determination of serovars, auxotypes and antibiotic sensitivities.

National Notifiable Diseases Surveillance System

The NNDSS is conducted under the auspices of the Communicable Diseases Network Australia New Zealand. The system coordinates the national surveillance of more than 40 communicable diseases or disease groups endorsed by the National Health and Medical Research Council (NHMRC). Notifications of these diseases are made to State and Territory health authorities under the provisions of their respective public health legislations. De-identified core unit data are supplied fortnightly for collation, analysis and dissemination. For further information, see CDI 1997;21:5.

Reporting period 28 May to 10 June 1997

There were 2,222 notifications received for this two week period (Tables 1, 2 and 3). The numbers of reports for selected diseases have been compared with historical data for corresponding periods in the previous three years (Figure 3).

There were 89 notifications of hepatitis A this period. Of the notifications for the year to date (1,631), the majority of

Figure 1. Gonococcal infection notification rate, 1968 to 1996, by year of onset

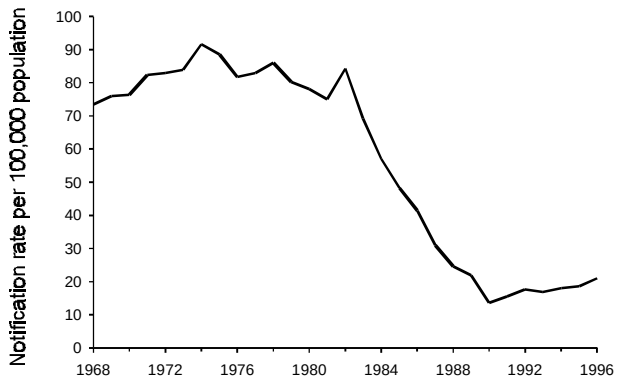


Figure 2. Gonococcal infection notifications, 1996 to 1997, by age group and sex

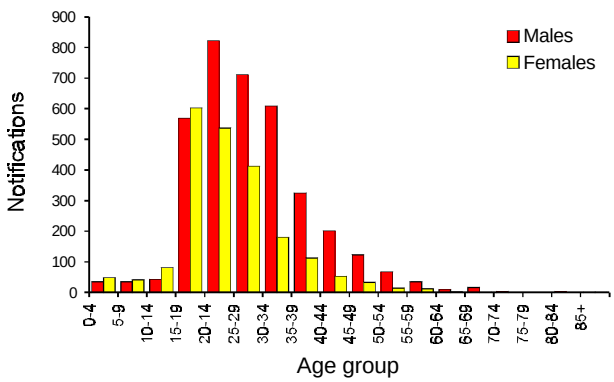


Table 1. Notifications of diseases preventable by vaccines recommended by the NHMRC for routine childhood immunisation, received by State and Territory health authorities in the period 28 May to 10 June 1997

Disease[1,2]	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1997	This period 1996	Year to date 1997	Year to date 1996
Diphtheria	0	0	1	0	0	0	0	0	1	0	1	0
Haemophilus influenzae type b	0	1	0	0	0	0	0	0	1	4	23	27
Measles	0	8	0	1	1	1	8	9	28	12	215	211
Mumps	1	0	0	NN	1	0	3	0	5	2	88	49
Pertussis	1	69	0	28	47	1	44	10	200	91	3312	1391
Rubella	1	3	1	13	4	0	9	7	38	49	639	1210
Tetanus	0	0	0	0	0	0	0	0	0	0	4	1

NN. Not Notifiable

1. No notifications of poliomyelitis have been reported since 1986.
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.

Table 2. Notifications of other diseases received by State and Territory health authoritories in the period 28 May to 10 June 1997

Disease[1,2]	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1997	This period 1996	Year to date 1997	Year to date 1996
Arbovirus Infection (NEC)[3]	0	0	4	0	0	0	0	2	6	2	99	69
Barmah Forest virus infection	0	4	-	11	0	0	1	-	17	42	434	548
Campylobacteriosis[4]	8	-	8	135	105	8	117	34	415	373	5182	5141
Chlamydial infection (NEC)[5]	0	NN	27	118	0	1	74	34	254	256	3623	3185
Dengue	0	0	0	0	0	0	0	0	0	0	189	23
Donovanosis	0	NN	1	0	NN	0	0	0	1	2	13	25
Gonococcal infection[6]	0	14	96	16	0	0	16	18	160	153	1976	1685
Hepatitis A	1	35	5	32	6	0	9	1	89	79	1635	1148
Hepatitis B incident	0	1	1	0	0	0	1	5	8	9	172	104
Hepatitis C incident	0	0	0	-	0	0	-	-	0	2	6	16
Hepatitis C unspecified	10	NN	8	95	NN	3	126	14	256	309	3984	4057
Hepatitis (NEC)	0	0	0	0	0	0	0	NN	0	1	9	11
Legionellosis	0	1	0	0	2	0	1	0	4	3	78	86
Leptospirosis	0	2	0	2	0	0	2	0	6	5	58	109
Listeriosis	0	1	0	0	0	1	1	0	3	1	44	24
Malaria	0	4	0	0	2	0	1	2	9	32	361	351
Meningococcal infection	1	6	0	3	0	0	2	3	15	7	153	114
Ornithosis	0	NN	0	0	0	0	0	0	0	1	32	40
Q Fever	0	12	0	8	1	0	0	0	21	24	255	214
Ross River virus infection	0	90	13	148	5	0	9	6	271	205	5687	6932
Salmonellosis (NEC)	0	37	17	69	14	1	37	12	187	189	4074	3085
Shigellosis[4]	0	-	3	8	2	0	3	6	22	23	424	305
Syphilis	0	17	14	4	0	0	1	0	36	51	550	661
Tuberculosis	0	9	0	0	0	0	8	3	20	29	438	503
Typhoid[7]	0	0	0	0	0	0	2	1	3	2	40	49
Yersiniosis (NEC)[4]	0	-	0	7	2	0	0	0	9	6	143	117

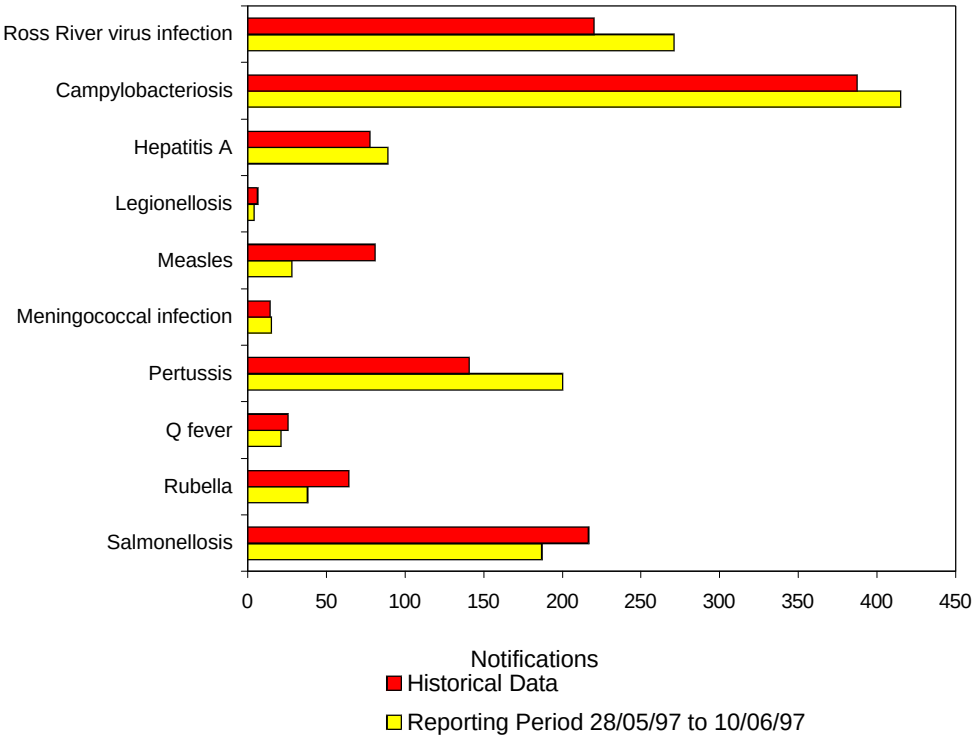
1. For HIV and AIDS, see Tables 4 and 5. For rarely notified diseases, see Table 3.
2. Totals comprise data from all States and Territories. Cumulative figures are subject to retrospective revision so there may be discrepancies between the number of new notifications and the increment in the cumulative figure from the previous period.
3. NT and WA: includes Barmah Forest virus.
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.

Figure 3. Selected National Notifiable Diseases Surveillance System reports, and historical data[1]



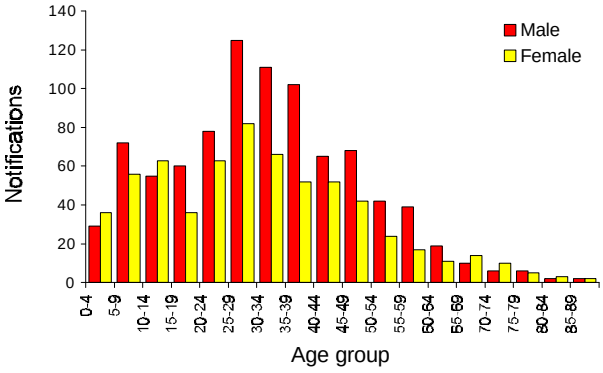
1. The historical data are the averages of the number of notifications in 9 previous 2-week reporting periods, the corresponding periods of the last 3 years and the periods immediately preceding and following those.

Table 3. Notifications of rare[1] diseases received by State and Territory health authoritories in the period 28 May to10 June 1997

Disease[2]	Total this period	Reporting States or Territories	Total notifications 1997
Brucellosis			16
Chancroid			1
Cholera			1
Hydatid infection	2	Vic	16
Leprosy			7

1. Fewer than 60 cases of each of these diseases were notified each year during the period 1988 to 1996.
2. No notifications have been received during 1997 for the following rare diseases: botulism, lymphogranuloma venereum, plague, rabies, yellow fever, or other viral haemorrhagic fevers.

Figure 4. Hepatitis A notifications, 1997, by age group and sex



cases were from New South Wales (773) and Queensland (417). The male:female ratio was 1.4:1 and the highest number of notifications was for the 25 - 39 years age group (Figure 4). Following a peak in notifications during January and February 1997, the number of reports has declined (Figure 5). The peak observed in early 1997 was due to the outbreak associated with the consumption of oysters in New South Wales. An increase in notifications was also observed in Queensland and Victoria.

Reports of Ross River virus remain at a high level, with 271 reports received in this period (Figure 6). The majority of reports were from Queensland (148) and New South Wales (90). A comparison of notifications from New South Wales, Queensland and Victoria indicates the seasonal nature of the disease.In 1996 Queensland and New South Wales recorded an unusually large outbreak. In 1997, Victoria has experienced an increase in notifications compared with the two previous years. This peak in notifications for Victoria occurred earlier than those in New South Wales and Queensland.

Figure 5. Hepatitis A notifications, 1995 to 1997, by month of onset

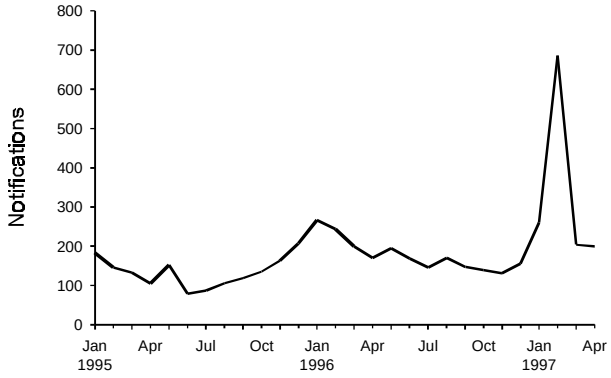


Figure 6. Ross River virus notifications, 1995 to 1997, by month of onset

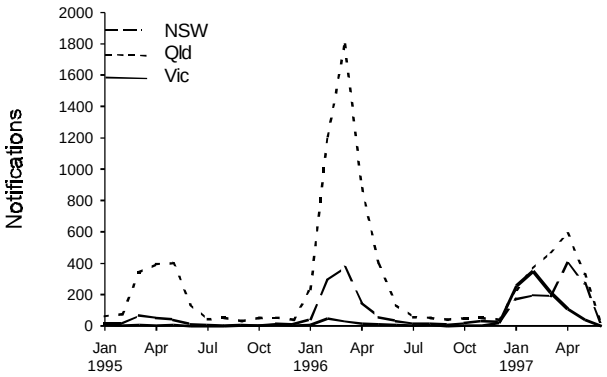


Figure 7. Sentinel general practitioner influenza consultation rates, 1997, by week and scheme

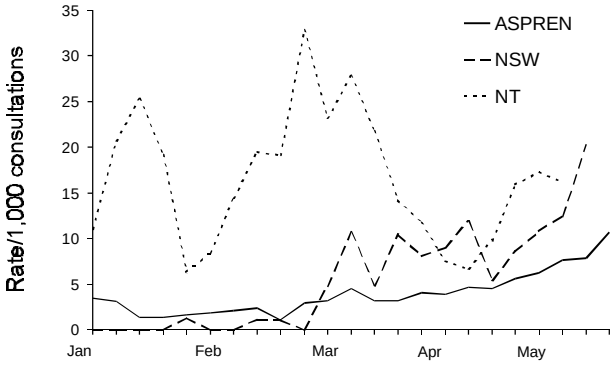
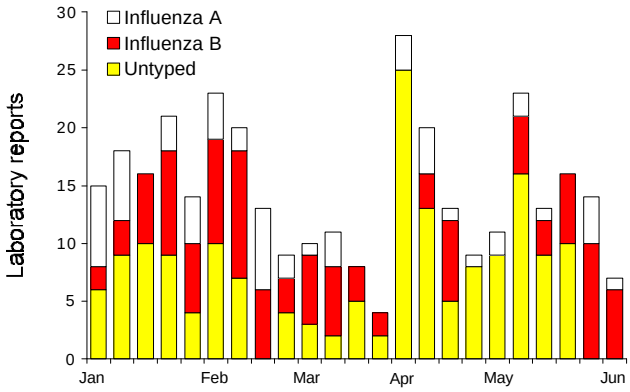


Figure 8. Laboratory reports of influenza, 1997, by type and week of specimen collection



National Influenza Surveillance, 1997

Three types of data are included in National Influenza Surveillance, 1997. These are sentinel general practitioner surveillance conducted by the Australian Sentinel Practice Research Network, Department of Human Services, Victoria, Department of Health, New South Wales and Department of Health and Community Services, Northern Territory; laboratory surveillance data from the Communicable Diseases Intelligence Virology and Serology Laboratory Reporting Scheme, LabVISE, and the World Health Organization Collaborating Centre for Influenza Reference and Research; and absenteeism surveillance conducted by Australia Post. For further information about these schemes, see CDI 1997; 21:126.

Sentinel general practitioner surveillance

The Department of Human Services Victoria recorded a rate of one consultation per 1,000 encounters in early May. The rate rose to 6 per 1,000 encounters at the end of May. The New South Wales scheme reported a sharp rise in the consultation rate this fortnight to 20 per 1,000 encounters (Figure 7). The ASPREN consultation rate for influenza-like illness rose to 10.7 per 1,000 encounters this period. No new data are available from the Northern Territory.

Laboratory surveillance

Forty-four reports of influenza virus were recorded by the LabVISE scheme this fortnight. Of these, 7 were influenza A (including one H_3N_2 strain), 24 influenza B and 13 untyped. For the year to date, 337 reports of influenza have been recorded. Of these, 18% were influenza A, 33% influenza B and 49% were untyped influenza (Figure 8). The male:female ratio was 1:1, and 18% of patients were over 65 years of age.

Absenteeism surveillance

Australia Post recorded a national absenteeism rate of 2.7% and 2.3% in the last two weeks. This has remained stable throughout the season.

Table 4. New diagnoses of HIV infection, new diagnoses of AIDS and deaths following AIDS occurring in the period 1 to 31 January 1997, by sex and State or Territory of diagnosis

										Totals for Australia			
		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1997	This period 1996	Year to date 1997	Year to date 1996
HIV diagnoses	Female	1	3	0	6	1	0	1	0	12	6	12	6
	Male	1	33	2	14	3	0	17	1	71	68	71	68
	Sex not reported	0	1	0	0	0	0	0	0	1	2	1	2
	Total[1]	2	37	2	20	4	0	18	1	84	76	84	76
AIDS diagnoses	Female	0	0	0	2	0	0	0	0	2	1	2	1
	Male	0	7	0	5	0	0	8	2	22	56	22	56
	Total[1]	0	7	0	7	0	0	8	2	24	57	24	57
AIDS deaths	Female	0	0	0	0	0	0	1	1	2	3	2	3
	Male	0	5	0	5	1	0	7	1	19	34	19	34
	Total[1]	0	5	0	5	1	0	8	2	21	37	21	37

1. Persons whose sex was reported as transsexual are included in the totals.

Table 5. Cumulative diagnoses of HIV infection, AIDS and deaths following AIDS since the introduction of HIV antibody testing to 31 January 1997, by sex and State or Territory

		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
HIV diagnoses	Female	19	480	4	105	45	4	179	76	912
	Male	177	10384	88	1724	602	78	3516	803	17372
	Sex not reported	0	2045	0	0	0	0	28	0	2073
	Total[1]	196	12923	92	1834	647	82	3732	882	20337
AIDS diagnoses	Female	7	149	0	34	19	2	56	19	286
	Male	80	4103	27	707	299	36	1456	318	7026
	Total[1]	87	4262	27	743	318	38	1519	339	7333
AIDS deaths	Female	2	106	0	27	14	2	39	13	203
	Male	52	2899	22	495	205	25	1143	230	5071
	Total[1]	54	3011	22	524	219	27	1188	244	5289

1. Persons whose sex was reported as transsexual are included in the totals.

HIV and AIDS Surveillance

National surveillance for HIV disease is coordinated by the National Centre in HIV Epidemiology and Clinical Research (NCHECR), in collaboration with State and Territory health authorities and the Commonwealth of Australia. Cases of HIV infection are notified to the National HIV Database on the first occasion of diagnosis in Australia, by either the diagnosing laboratory (ACT, New South Wales, Tasmania, Victoria) or by a combination of laboratory and doctor sources (Northern Territory, Queensland, South Australia, Western Australia). Cases of AIDS are notified through the State and Territory health authorities to the National AIDS Registry. Diagnoses of both HIV infection and AIDS are notified with the person's date of birth and name code, to minimise duplicate notifications while maintaining confidentiality.

Tabulations of diagnoses of HIV infection and AIDS are based on data available three months after the end of the reporting interval indicated, to allow for reporting delay and to incorporate newly available information. More detailed information on diagnoses of HIV infection and AIDS is published in the quarterly Australian HIV Surveillance Report, available from the National Centre in HIV Epidemiology and Clinical Research, 376 Victoria Street, Darlinghurst NSW 2010. Telephone: (02) 9332 4648 Facsimile: (02) 9332 1837.

HIV and AIDS diagnoses and deaths following AIDS reported for January 1997, as reported to 30 April 1997, are included in this issue of *CDI* (Tables 4 and 5).

Table 6. Australian Sentinel Practice Research Network reports, weeks 21, 22 and 23, 1997

Condition	*Week 21, to 25 May 1997* Reports	Rate per 1,000 encounters	*Week 22, to 1 June 1997* Reports	Rate per 1,000 encounters	*Week 23, to 8 June 1997* Reports	Rate per 1,000 encounters
Chickenpox	15	1.9	18	2.1	11	1.6
Gastroenteritis	105	13.4	91	10.8	75	10.8
HIV testing (doctor initiated)	2	0.3	2	0.2	5	0.7
HIV testing (patient initiated)	16	2.0	14	1.7	20	2.9
Influenza	60	7.6	66	7.6	74	10.7
Measles	1	0.1	1	0.1	0	0.0
Pertussis	3	0.4	2	0.2	3	0.4
Ross River virus infection	0	0.0	0	0.0	3	0.4
Rubella	1	0.1	1	0.1	1	0.1

Australian Sentinel Practice Research Network

The Australian Sentinel Practice Research Network (ASPREN) currently comprises 107 general practitioners throughout the country. Up to 9,000 consultations are reported each week, with special attention to 12 conditions chosen for sentinel surveillance. Of these, CDI reports the consultation rates for chickenpox, gastroenteritis, HIV testing (doctor initiated), HIV testing (patient initiated), influenza, measles, pertussis, Ross River virus infection and rubella. For further information, including case definitions, see CDI 1997;21:6.

Data for weeks 21, 22 and 23 ending 25 May, 1 and 8 June are included in this issue of *CDI* (Table 6). The consultation rate for chickenpox has remained slightly higher than the rates reported for March, April and early May. The consultation rate for gastroenteritis has continued at relatively low levels. Consultation rates for patient-initiated HIV testing through May and early June have remained higher than the rates experienced during April. Consultation rates for Ross River virus infection, measles, rubella and pertussis remain very low.

Sentinel Chicken Surveillance Programme

Sentinel chicken flocks are used to monitor flavivirus activity in Australia. The main viruses of concern are Murray Valley encephalitis (MVE) and Kunjin which cause the potentially fatal disease Australian encephalitis in humans. Currently 24 flocks are maintained in the north of Western Australia, ten in the Northern Territory, ten in New South Wales and ten in Victoria. The flocks in Western Australia and the Northern Territory are tested year round but those in New South Wales and Victoria are tested only from November to March, during the main risk season.

Results are coordinated by the Arbovirus Laboratory in Perth and reported bimonthly. For more information see CDI 1997;21:6

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

1. Department of Microbiology, The University of Western Australia
2. Department of Microbiology, The University of Queensland
3. Berrimah Agricultural Research Centre, Darwin
4. PathCentre, Perth
5. Department of Health and Community Services, Darwin

Sentinel chicken serology was carried out for 22 of the 24 flocks in Western Australia in May 1997. Table 7 shows the number of confirmed seroconversions to flaviviruses from the Kimberley and Pilbara regions.

In addition, there were also a number of unconfirmed positives from Derby (1) in the Kimberley and the Harding Dam (2), Marble Bar (3), Paraburdoo (1) and Tom Price (4) in the Pilbara. There have now been seroconversions to both Murray Valley encephalitis (MVE) and Kunjin viruses in 21 of the 24 chicken flocks in Western Australia.

Five of the sentinel chicken flocks from the Northern Territory were tested in May 1997. The seroconversions to MVE virus at Alice Springs were confirmed. There was also one new seroconversion to MVE at Katherine and three at Coastal Plains Research Station. A new sentinel chicken flock was established at Gove (Nhulunbuy) in north-east Arnhem Land at the end of May.

Table 7. Sentinel Chicken Surveillance Programme seroconversions, Western Australia, May 1997

	MVE	Kunjin	MVE & Kunjin	Flavivirus
Kimberley				
Kalumburu	1			
Wyndham	1			
Kununurra				1
Lombadina		2		
Pilbara				
Karratha	1		3	
Harding Dam	3		4	
Pannawonica		1		
Onslow		1		
Whaleback Mine (Newman)		3		

Table 8. Adverse events following vaccination for the period 5 March to 5 June 1997

Event	Vaccines: DTP	DTP/Hib	DTP/OPV/Hib	DTP/OPV	DTP/Hib/Hep B	MMR	CDT/OPV/Hib	Other[1]	Reporting States or Territories	Total reports for this period
Persistent screaming	10	2	4				1		NT, Qld, WA, SA, NSW	17
Hypotonic/hyporesponsive episode	4		5	1		2		1	NT, Qld, WA, SA, NSW	13
Convulsions	1	1	1		1				Qld, WA, SA	4
Anaphylaxis								1	SA	1
Encephalopathy			1						WA	1
Other	1	1	5			2			WA, SA, NSW, NT	9
TOTAL	16	4	16	1	1	4	1	2		45

1. Includes influenza vaccine and DTPa.

Serious Adverse Events Following Vaccination Surveillance Scheme

The Serious Adverse Events Following Vaccination Surveillance Scheme is a national surveillance scheme which monitors the serious adverse events that occur rarely following vaccination. More details of the scheme were published in CDI 1997:21;8.

Acceptance of a report does not imply a causal relationship between 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 every month to Australian children under the age of six years.

Results for the reporting period 5 March to 5 June 1997.

There were 45 reports of serious adverse events following vaccination for this period (Table 8). The events occurred over the last three years. Approximately one-third occurred in 1997 (16 cases). Most reports were from South Australia and Western Australia, with 14 and 12 cases respectively.

The most frequently reported event following vaccination was of persistent screaming (17 cases, 38%), followed by hypotonic/hyporesponsive episodes (13 cases, 29%). Four reports of convulsions and one report of anaphylaxis (to influenza vaccine) were received. There was one report of encephalopathy following DTP, OPV and Hib. The child had not yet recovered fully at the time of reporting.

The seven reports listed as 'other' included severe local reactions, vomiting and an urticarial rash.

Thirty-six reports of adverse events (80%) were associated with DTP either alone or in combination with other vaccines. Of these, 15 reports were associated with the first dose of DTP, and 13 with the second dose.

Sixteen cases were hospitalised (36%). Almost all of the events (97%) lasted for 24 hours or less, and all cases but one had fully recovered at the time of reporting.

LabVISE

The Virology and Serology Laboratory Reporting Scheme, LabVISE, is a sentinel reporting scheme. Twenty-one laboratories contribute data on the laboratory identification of viruses and other organisms. Data are collated and published in Communicable Diseases Intelligence each fortnight. These data should be interpreted with caution as the number and type of reports received is subject to a number of biases. For further information, see CDI 1997;21:8-9.

There were 1,082 reports received in the *CDI* Virology and Serology Laboratory Reporting Scheme this period (Tables 9 and 10).

Figure 9. Respiratory syncytial virus laboratory reports, 1995 to 1997, by month of specimen collection

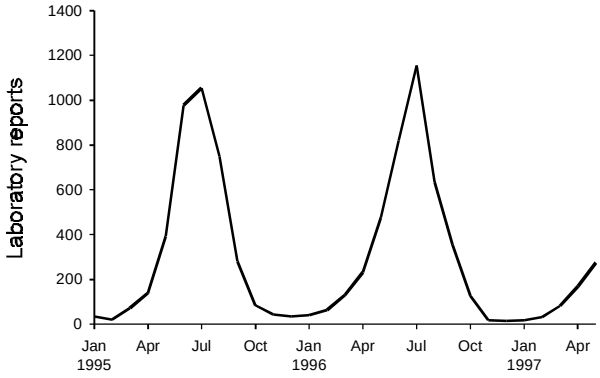


Figure 10. Rotavirus laboratory reports, 1992 to 1996 average and 1997, by month of specimen collection

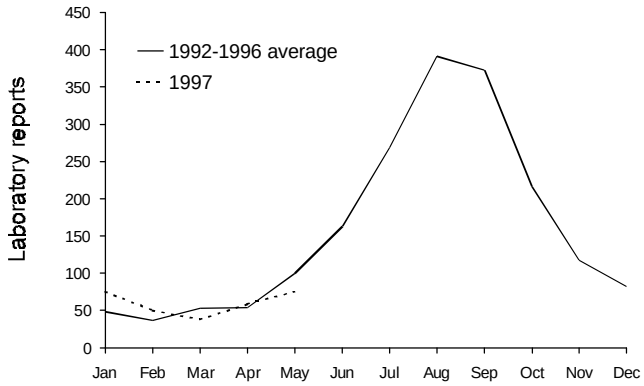
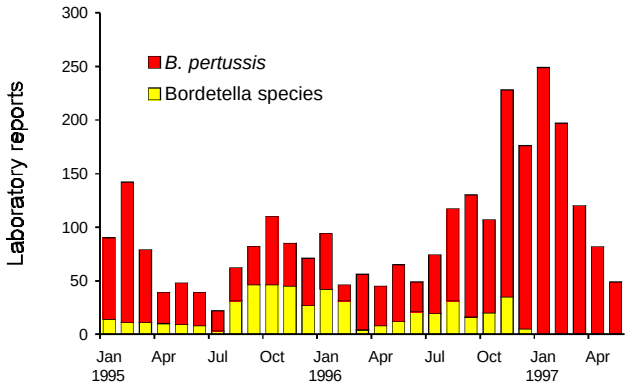


Figure 11. Pertusiss laboratory reports, 1995 to 1997, by month of specimen collection



One hundred and nineteen reports of Ross River virus were received this fortnight, 55% of which were from Queensland. Included were 65 males and 54 females; the male:female ratio was 1.2:1. Eighty-one per cent of patients were aged between 25 and 64 years. The number of reports received has fallen since March.

One hundred and forty-two reports of respiratory syncytial virus were received this period, 96% for children under the age of five years. The number of reports has risen in recent weeks, which is usual for this time of year (Figure 9).

Rotavirus was reported for 40 patients this period. Included were 17 males and 23 females. Sixty-eight per cent of reports were children in the 1 - 4 years age group. The number of reports is below average for this time of year (Figure 10).

Pertussis was reported for 28 patients this period; 14 were in the 5 - 14 years age group. The male:female ratio was 1.5:1. The number of reports has declined since January (Figure 11).

Table 9. Virology and serology laboratory reports by State or Territory[1] for the reporting period 22 May to 4 June 1997, historical data[2], and total reports for the year

	State or Territory[1]						Total this fortnight	Historical data	Total reported in *CDI* in 1997
	NSW	NT	Qld	SA	Vic	WA			
Measles, mumps, rubella									
Measles virus		1		1		3	5	2.7	31
Rubella virus	1	1	7	3		1	13	11	384
Hepatitis virus									
Hepatitis A virus	2	11	17	5	1	4	40	18.5	439
Arboviruses									
Ross River virus	3	18	66	12	1	19	119	108.3	1,818
Barmah Forest virus		6	2			5	13	13.5	170
Adenoviruses									
Adenovirus type 2				1			1	0.5	22
Adenovirus type 5				1	1		2	0.0	5
Adenovirus not typed/pending			2	6		3	11	37.5	448
Herpes viruses									
Cytomegalovirus	2		15	2	11	8	38	64	607
Varicella-zoster virus	1	2	26	13	12		54	36.8	716
Epstein-Barr virus	7	2	26	34	2	32	103	67.2	1,423

Table 9. Virology and serology laboratory reports by State or Territory[1] for the reporting period 22 May to 4 June 1997, historical data[2], and total reports for the year, continued

	State or Territory[1]						Total this fortnight	Historical data	Total reported in *CDI* in 1997
	NSW	NT	Qld	SA	Vic	WA			
Other DNA Viruses									
Papovavirus group					1		1	0.0	3
Parvovirus			3	4	8		15	6.7	200
Picornavirus family									
Coxsackievirus B2					1		1	0.2	11
Echovirus not typed/pending				1			1	0.0	2
Rhinovirus (all types)	1		7	1	3		12	26.5	292
Enterovirus not typed/pending			8				8	33.7	298
Ortho/paramyxoviruses									
Influenza A virus			1		4	1	6	40.5	168
Influenza A virus H3N2						1	1	0.8	1
Influenza B virus			7	1	5	11	24	6.2	154
Influenza virus - typing pending				13			13	0.5	182
Parainfluenza virus type 1			1				1	14	39
Parainfluenza virus type 2	1		1		1		3	10	51
Parainfluenza virus type 3			3	3	2	2	10	12.8	376
Parainfluenza virus typing pending				5			5	1	181
Respiratory syncytial virus	69		18	7	31	17	142	229.7	783
Other RNA viruses									
Rotavirus	1			24	3	12	40	56.5	457
Norwalk agent					3		3	0.5	58
Other									
Chlamydia trachomatis not typed	7	138	48	25	5	56	279	147.2	2,510
Chlamydia psittaci					1		1	2.5	41
Chlamydia species			1				1	2	18
Mycoplasma pneumoniae	21	1	18	6	5	6	57	19	865
Coxiella burnetii (Q fever)	8		20		1		29	9.3	180
Bordetella pertussis	3		8		17		28	24.7	994
Legionella pneumophila				1			1	0.2	9
Legionella species	1						1	0	9
TOTAL	128	180	305	169	119	181	1,082	1,004.30	13,945

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 10. Virology and serology laboratory reports by contributing laboratories for the reporting period 22 May to 4 June 1997

State or Territory	Laboratory	Report
New South Wales	Institute of Clinical Pathology & Medical Research, Westmead	46
	South West Area Pathology Service, Liverpool	67
Queensland	Queensland Medical Laboratory, West End	295
	State Health Laboratory, Brisbane	35
South Australia	Institute of Medical and Veterinary Science, Adelaide	168
Victoria	Microbiological Diagnostic Unit, University of Melbourne	5
	Monash Medical Centre, Melbourne	32
	Royal Children's Hospital, Melbourne	24
	Victorian Infectious Diseases Reference Laboratory, Fairfield	57
Western Australia	Princess Margaret Hospital, Perth	52
	Royal Perth Hospital	8
	Western Diagnostic Pathology	293
TOTAL		1,082

Overseas briefs

Source: World Health Organization (WHO)

Fatal myocarditis in Sarawak, Malaysia

The number of deaths in the outbreak of myocarditis increased to 26 on 17 June. Three of the deaths occurred in the second half of April, 10 during May and the remainder in June. Most children had fever for 2 to 3 days and were admitted to hospital when their condition deteriorated. The clinical picture indicated viral involvement with an enterovirus as the possible agent. Enteroviruses are mainly transmitted by the faecal-oral route and the public has been advised to maintain good personal hygiene; wash hands after defecation and before handling food, avoid sharing baby pacifiers, and avoid overcrowding. Public health measures include increased control of flies and cockroaches, and closures of nurseries, playschools, kindergartens and public swimming pools in Kuching and Sibu where most deaths have occurred. All health facilities and hospitals in the State are on alert and an observation ward has been established in Sibu Hospital. A similar facility is planned in Sarawak General Hospital in Kuching. Active case finding has been instituted among the family members of all the cases reported.

Cholera, Somalia

The cumulative number of cases of cholera reported is now 5,557 with 247 deaths (case fatality rate 4.4%). However the true number of cases is believed to be higher, since mild cases are excluded in the reports from most treatment centres. Also laboratory confirmation has not been possible in some areas due to logistical constraints and security problems. Suspected cholera outbreaks in areas of Middle Shabelle and Galgaduud Regions have been reported recently. The epidemic in Mogadishu declined steadily up to mid-May but rose again the following week. WHO continued its support to non-government organisations and local authorities, supplying oral rehydration solutions and antibiotics. Water chlorination and health education continue in local communities.

Dengue, Cuba

On 16 June 1997, the Ministry of Health reported that 826 cases of dengue (including three deaths) had occurred in the city of Santiago de Cuba, located in the southernmost part of the island. The infections were first recognised in January this year. Dengue has been confirmed by the 'Pedro Kouri' Institute of Tropical Medicine, the Pan American Health Organization/WHO Collaborating Centre for the Study of Viral Diseases. This represents the first reported cases of dengue in Cuba since 1981 when approximately 350,000 cases and 158 deaths occurred.

CDI is produced fortnightly by the National Centre for Disease Control, Department of Health and Family Services, GPO Box 9848 Canberra ACT 2601; fax: (06) 289 7791, telephone: (06) 289 1555. For subscriptions or change of address please fax (06) 269 1212 or write to PO Box 462, Fyshwick ACT 2609.

CDI is available on the *CDI* Bulletin Board System on (06) 281 6695, and via Internet on 'ftp://ftp.health.gov.au' in directory /pub/CDI and on 'http://www.health.gov.au' in /hfs/pubs/cdi/cdihtml.htm. NNDSS data are available on'http://www.health.gov.au/hfs/pubs/nndss/nndss1.htm'