Tuberculosis notifications in Australia, 1996

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Abstract

Since the implementation of the National Mycobacterial Surveillance System (NMSS) in 1991, the epidemiology and trends of tuberculosis in Australia have been described in a series of annual reports. This article presents an analysis of the data for tuberculosis notifications for 1996. A total of 1,037 notifications of tuberculosis were received for the year 1996, and the crude rates of new and relapsed disease were reported at 5.37 per 100,000 and 0.29 per 100,000 respectively. Rates of tuberculosis have remained stable over the last decade and the majority of notifications and highest rates of disease continue to occur in the overseas-born population. *Commun Dis Intell* 1998;22:173-183.

Introduction

At the inception of the National Mycobacterial Surveillance System (NMSS) in 1991, the global epidemic of tuberculosis was well under way. From 1984 through to 1991, this was evidenced by a 19% increase in case notifications in the African region and even more alarming increases in rates for the Southeast Asian and Western Pacific Regions of 26.6% and 27.9% respectively.[1] At the same time as these global trends were emerging there was a several year lapse in the national reporting of clinical tuberculosis in Australia. The Australian Mycobacterium Reference Laboratory Network (MRLN) provided important demographic information on laboratory isolates from 1986 onwards. In 1991 a retrospective analysis of state based clinical data from 1986 to 1990 filled an important gap in national tuberculosis surveillance.[2,3,4]

Since 1991 the NMSS, under the auspices of the Communicable Diseases Network Australia New Zealand (CDNANZ), has provided the framework for the reporting and analysis of national tuberculosis data. This has enabled an annual audit of the adequacy of tuberculosis control within Australia, and has also answered an international call to vigilance. This comes at a time when one-third of the global community are infected with *M. tuberculosis*, more people worldwide are dying of the disease than at any other time this century, and the HIV pandemic and evolving multi-drug resistance together are

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Table 1. Notifications of new and relapsed cases of tuberculosis and rates per 100,000 population, Australia, 1986 to 1996, by year

Year	New cases		Relapsed cases		Total cases	
	Number	Rate	Number	Rate	Number	Rate
1986	863	5.39	43	0.27	906	5.66
1987	868	5.34	39	0.24	907	5.58
1988	925	5.60	29	0.18	954	5.77
1989	902	5.36	50	0.30	952	5.66
1990	979	5.74	37	0.22	1,016	5.95
1991	903	5.22	47	0.27	950	5.50
1992	983	5.62	28	0.16	1,011	5.78
1993	944	5.35	47	0.27	991	5.61
1994	996	5.58	61	0.34	1,057	5.93
1995	988	5.47	50	0.28	1,038	5.75
1996	983	5.34	54	0.29	1,037	5.67

Table 2. Notifications of new and relapsed cases of tuberculosis and rates per 100,000 population, Australia, 1996, by State and Territory

	New cases		Relapsed cases		Total cases	
	Number	Rate	Number	Rate	Number	Rate
Australian Capital Territory	16	5.19	1	0.32	17	5.52
New South Wales	406	6.54	24	0.39	430	6.95
Northern Territory	30	16.49	1	0.55	31	17.04
Queensland	109	3.26	14	0.42	123	3.68
South Australia	34	2.31	1	0.07	35	2.37
Tasmania	7	1.47	2	0.42	9	1.90
Victoria	307	6.73	7	0.15	314	6.88
Western Australia	74	4.19	4	0.23	78	4.42
TOTAL	983	5.37	54	0.29	1,037	5.66

challenging conventional treatment strategies and altering the dynamics of infection and disease.[5]

Methods

The 1996 notification data for tuberculosis, collected by State and Territory health authorities, were referred to the NMSS in computerised de-indentified format. All States and Territories, except for New South Wales*, forwarded the data in a standardised format. Collation and analysis were undertaken using Epi Info version 6.04.

A core data set is shared with the National Notifiable Diseases Surveillance System (NNDSS). Variables

* New South Wales data, which were in a non standard format, required additional interpretation at the National Centre for Disease Control, before inclusion in the national collation.

Contents, ***continued***

reported in the core set include: a unique identifier for each notification, disease code, postcode of residence, date of birth, sex, dates of disease onset and report, indigenous status, and confirmation status of the report. The disease code variable serves to differentiate *Mycobacterium tuberculosis* complex (MTBC) from atypical mycobacterial infections. A supplementary data set includes information about: ethnicity, country of birth, length of residence in Australia for overseas-born persons, species of the pathogen, principal site of disease, methods of diagnosis, antimicrobial therapy initiated at the time of notification, past Bacille Calmette Guerin (BCG) vaccination, HIV status and classification of tuberculosis as new or relapsed disease.

The case definitions for tuberculosis are those which have been in place since 1986:

Tuberculosis (new case)

- a case which has been confirmed by the identification of *Mycobacterium tuberculosis* (or *M. africanum* or *M. bovis*) by culture

  or

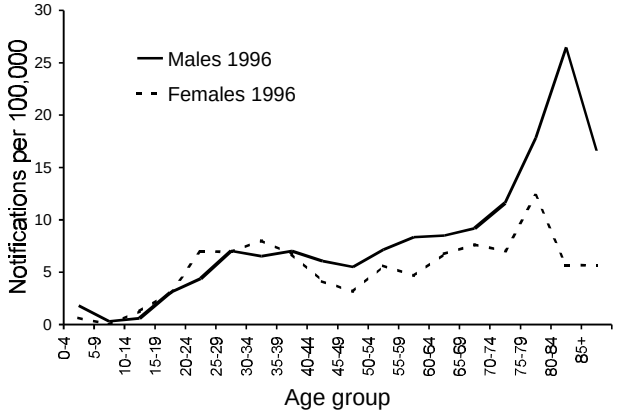
- a case which has been diagnosed to be active clinically and which has been accepted as such by the State or Territory Director of Tuberculosis.

Tuberculosis (relapse)

- a case of active tuberculosis diagnosed again (bacteriologically, radiologically or clinically) having been considered inactive or quiescent following previous full treatment (as deemed appropriate by the State or Territory Director of Tuberculosis).

Mortality data for tuberculosis, and denominator population data for the calculation of rates, were obtained from the Australian Bureau of Statistics (ABS). Denominator data for age and sex were based on 1996 census data. Resident population by indigenous status and country of birth were based on estimates of the relevant population sizes as at 30 June 1996. The *Australian Bureau of Statistics Standard Classification of Countries for Social Statistics*[6] was used to classify and group country of birth data.

Figure 1. Notifications of new cases of tuberculosis by age group and sex, Australia, 1996



Results

Notification rates - new and relapsed cases

A total of 1,037 notifications of tuberculosis were received for 1996, of which 983 (94.7%) were new cases and 54 (5.3%) relapsed cases. Victoria and New South Wales accounted for a combined total of 744 cases, or 72% of all tuberculosis reported nationally. Crude notification rates for new and relapsed disease were 5.37 per 100,000 and 0.29 per 100,000 respectively. These rates are consistent with those observed in the Australian population over the last decade (Table 1). States which reported notifications for new disease of less than 5 per 100,000 were Tasmania, South Australia, Western Australia and Queensland (Table 2).

Age and sex

The sex of all cases of notified tuberculosis was reported for 1996; information on age was available in over 99% of cases with age data missing for only three females (Table 3). Of all new notifications of disease, 528 (53.7%) were reported in males and 455 (46.3%) in females giving a male:female ratio of 1.16:1 and rates of 5.80 per 100,000 and 4.94 per 100,000 respectively. For relapsed disease, females accounted for 29 (53.7%) cases and males for 25 (46.3%). The male predominance of new disease is more marked over the age of 50 years (Figure 1). In the current reporting year 16 new cases of tuberculosis were notified in children under the age of five years with a corresponding rate of 1.23 per 100,000.

Principal sites of disease

A principal site of disease was designated in 1,007 reports (97%) (Table 4). Pulmonary disease accounted for 662 (63.8 %) of both new and relapsed cases of disease and lymphatic disease was observed in 170 (16.4%). Overall 56% of pulmonary disease was reported in males and 63% of lymphatic disease in females. Two-thirds of lymphatic disease in females was observed in persons less than 40 years of age.

BCG status

BCG status was reported for 871 (84%) of all notifications, of which 202 (23%) had a positive history of BCG vaccination. Twenty-four per cent of cases of pleural disease, 19% of cases of pulmonary disease, 8% of cases of miliary tuberculosis, and none of the 13 cases of meningeal disease, recorded a positive history of BCG vaccination.

Methods of diagnosis

In the majority of tuberculosis cases, more than one method was used to assist in the diagnosis. A positive culture result was reported in 571 cases (55%). Of new cases, a positive result was reported in 552 (56%) and, of relapsed cases, a positive result was reported in 19 (35%) (Table 5). A negative culture result was recorded in 144 (14%) and culture results were unreported in 322 (31%). Of the 466 cases that had a negative or unreported culture result, 171 (37%) had positive microscopy or histology or both. In cases where the principal site of disease was pulmonary, a positive culture result was reported in 317 (48%) and a positive microscopy result in 195 (29%).

Table 3. Notifications of new cases of tuberculosis and rates per 100,000 population, Australia, 1996, by age group and sex

	Males		Females		Total	
Age group (years)	Number	Rate	Number	Rate	Number	Rate
0-4	12	1.80	4	0.63	16	1.23
5-9	2	0.30	0	0.00	2	0.15
10-14	4	0.60	8	1.25	12	0.92
15-19	20	3.05	19	3.05	39	3.05
20-24	31	4.37	48	6.98	79	5.66
25-29	50	7.04	49	6.93	99	6.98
30-34	46	6.38	58	8.02	104	7.20
35-39	52	7.16	49	6.72	101	6.94
40-44	41	6.06	28	4.12	69	5.09
45-49	35	5.35	20	3.13	55	4.25
50-54	39	7.54	28	5.63	67	6.60
55-59	33	7.86	19	4.66	52	6.28
60-64	30	8.48	24	6.73	54	7.60
65-69	31	9.19	27	7.61	58	8.38
70-74	32	11.59	23	7.03	55	9.12
75-79	32	17.82	30	12.31	62	14.64
80-84	28	26.46	10	5.66	38	13.45
85+	10	16.58	8	5.65	18	8.92
Unknown	0	na	3	na	3	na
TOTAL	528	5.80	455	4.94	983	5.37

na = not applicable

Pathogen

Of culture-positive cases, 7 were *Mycobacterium bovis* and 564 were *Mycobacterium tuberculosis.*

Antimicrobial therapy

Drug therapy at the time of notification was reported in 876 (84%) cases (Table 6). In all cases of relapsed disease, a drug regimen was reported at the time of notification. Of those cases for whom drug therapy was reported, 668 (76%) were commenced on a four-drug regimen with isoniazid (H), rifampicin (R), pyrazinamide (Z) and ethambutol (E). In a total of 10 cases, including one case of relapsed disease, more than four drugs were used as initial therapy. Regimens containing H and R were used in 98% of cases. In relapsed cases of disease a five-drug regimen was used in only one case, a four-drug regimen in 41 cases (76%) a three-drug combination in 9 cases (16%) and a two-drug combination in two cases. There was one case for whom R was listed as the only drug treatment. This case had been transferred in from another State on multiple drug therapy, and died not long after from miliary

Table 4. Notifications of new and relapsed cases of tuberculosis, Australia, 1996, by site of disease

Site	New cases	Relapsed cases	Total cases	% of total
Pulmonary	629	33	662	63.8
Pleural	38	4	42	4.1
Lymphatic	162	8	170	16.4
Bone/Joint	25	1	26	2.5
Genitourinary	37	3	40	3.9
Miliary	10	1	11	1.1
Meningeal	13	0	13	1.3
Peritoneal	15	3	18	1.7
Others	23	1	24	2.2
Unknown	31	0	31	3.0
TOTAL	983	54	1,037	100.0

Table 5. Method of diagnosis used in new and relapsed cases of tuberculosis,[1] Australia, 1996

	New	% all new cases	Relapsed	% all relapsed cases
Culture	552	56.2	19	35.2
Microscopy	284	28.9	19	35.2
Histology	182	18.5	8	14.8
Tuberculin test	128	13.0	1	1.9
Radiology	381	38.8	13	24.1
Clinical	299	30.4	18	33.3
Others	1	0.1	1	1.9

1. More than one diagnostic technique was reported in some cases

Table 6. Initial drug regimen at time of notification of tuberculosis, Australia, 1996

	New cases	Relapsed cases	Total
6 drug combination			
H + R + Z + E + eth + pro	1	0	1
H + R + Z + E + amik + cipro	1	0	1
H + R + Z + E + cip + clarithro	1	0	1
5 drug combination			
H + R + Z + E + str	2	1	3
H + R + Z + E + capreo	1	0	1
H + R + Z + E + cipro	1	0	1
H + R+ E + str + pro	1	0	1
4 drug combination			
H + R + Z + E	628	40	668
H + Z + E + str	0	1	1
3 drug combination			
Z + str + pro	0	1	1
H + R + Z	129	6	135
H + R + E	28	2	31
H + Z + E	6	1	7
R + E + cyc	1	0	1
R + Z + E	2	0	2
H + R + str	2	0	2
2 drug combination			
H + R	14	2	16
E + str	1	0	1
H + E	1	0	1
Single drug			
R	1	0	1
TOTAL	816	54	876

H = isoniazid; R = rifampicin; Z = pyrazinamide; E = ethambutol; str = streptomycin; clarithro = clarithromycin; pro = prothionamide; eth = ethionamide; cipro = ciprofloxacin; capreo = capreomycin; amik = amikacin

tuberculosis. The report of single drug treatment probably represents an omission in data entry.

HIV status

HIV status was unknown or not reported in 949 (91%) notifications. Of the 89 cases (9%) for which HIV status was reported, 13 were positive and all were notifications of new tuberculosis disease. Of these, 10 were males with a mean age of 42 years (range 29-52) and 3 females aged 79, 46 and 38 years respectively. The principal sites of disease were pulmonary (4), miliary (4), peritoneal (2), lymphatic (2) and not reported (1). The regions from which

Table 7. Total notifications of tuberculosis, Australia, 1996. Number and estimated rates per 100,000 by reported country and region of birth*

	Number	Rate	Estimated population by country of birth living in Australia	WHO notification rate for country and regions as at February 1996
Australia	240	1.7	14,080,200	
Oceania				
Fiji	4	10.3	39,000	36.3
New Zealand	10	3.4	297,500	10.0
Other	19	35.6	53,400	
Europe & the former USSR				
Cyprus	0	0.0	21,600	5.0
Germany	4	3.4	118,900	16.0
Greece	14	9.7	144,600	8.9
Hungary	1	3.9	25,400	41.0
Italy	12	4.6	258,800	10.2
Malta	0	0.0	51,800	7.2
Netherlands	2	2.1	97,300	11.8
Poland	3	4.5	66,200	43.4
UK/Ireland	32	2.6	1,207,600	10.7/17.2
USSR/Baltic States	7	14.5	48,300	40 to 60
Former Yugoslav Republics	13	7.0	186,100	36.2
Other	6	4.0	148,400	
Middle East & North Africa				
Egypt	3	7.7	38,900	6.3
Lebanon	0	0.0	83,400	32.2
Turkey	5	14.7	33,900	43.6
Other	2	3.1	64,700	
Southeast Asia				
Indonesia	42	89.6	46,900	25.5
Malaysia	11	11.4	96,100	59.4
Philippines	84	88.7	94,700	272.0
Singapore	2	4.9	40,700	59.4
Viet Nam	151	100.7	149,900	71.0
Other	30	48.0	62,500	
Northeast Asia				
China	64	61.9	103,400	30.1
Hong Kong and Macao	25	25.5	98,000	74.2
Other	15	19.5	76,800	
Southern Asia				
India	62	74.1	83,700	121.3
Sri Lanka	10	20.4	48,900	35.2
Other	17	81.3	20,900	
Northern America				
Canada	0	0.0	29,100	7.0
United States of America	0	0.0	62,900	9.3
Other	0	0.0	500	
South & Central America & the Caribbean				
Chile	0	0.0	27,800	33.3
Other	3	5.1	58,300	
Other Africa (excluding North Africa)				
South Africa	4	6.2	64,100	
Other	31	53.4	58,100	226.6
TOTALS	928		18,289,300	

* 25 cases were coded as 'other' but country of birth was not specified.

the 7 overseas-born HIV positive cases originated were Europe (1), Southeast Asia (2), Oceania (1) Africa (2) and South Asia (1). Years of residency in Australia ranged from 1 to 29 years.

Country of birth

Country of birth was reported for 953 (92%) notifications. Of these, 240 (25%) were Australian-born and 713 (75%) overseas-born. Notifications of new cases occurred in 228 Australian-born and in 670 overseas-born persons. The corresponding annual crude incidence rates were 1.7 per 100,000 Australian-born population and 15.8 per 100,000 overseas-born population. Of the 54 cases of relapsed disease, 43 (80%) were identified as overseas-born.

The countries of birth, apart from Australia, that had the highest numbers of total tuberculosis notifications were Viet Nam, the Philippines, China, India and Indonesia/ East Timor (Table 7).

The highest rates in the overseas-born were for persons born in Viet Nam (100.7 per 100,000), Indonesia (89.6), Philippines (88.7), India (74.1) and China (61.9). World Health Organization estimates of the notification rates for the countries from which these overseas-born populations originated are provided for comparison (Table 7). The tuberculosis rates for those born in Viet Nam have shown a gradual decline over the last 6 years, and no sustained increase in tuberculosis is reported in any of the high prevalence migrant groups (Figure 2).

Age specific rates of disease in the overseas-born population have shown a consistent peak in notifications for those between the ages of 20 and 40 years and in those over the age of 50 years (Figure 3). In the younger age groups females predominate and in the older age groups males predominate. In the current reporting year, new and relapsed disease combined produced male and female age specific incidence rates of around 16 per 100,000 in overseas-born children less than 5 years of age.

Pulmonary disease was most commonly described in both overseas and Australian-born cases, but a higher proportion of extra-pulmonary disease occurred in the overseas-born (Figure 4).

In 512 (72%) of the 713 overseas-born notifications, the years of residency in Australia were reported. Of these, less than one year of residency was reported in 57 cases (11.1%). This figure needs to be interpreted with caution as a value of '0' assigned to years of Australian residency could indicate that the true value of this variable was not ascertained. However, this figure has been relatively stable over the last three years at 11.2% in 1993, 10.2% in 1994,* and 10.5% in 1995. The number of years of Australian residency was 1 to less than 2 years at the time of diagnosis in 55 cases (10.5%), 2 to less than 5 years in 78 cases (15.2%), 5 to less than 10 years in 105 cases (20.5%) and equal to or greater than 10 years in 218 cases (42.6 %). In the overseas-born groups who contributed the largest number of tuberculosis notifications for the year, 25-60% of cases were diagnosed within 5 years of migration. The one exception to this was the United Kingdom/Ireland-born migrants who were more likely to be diagnosed with tuberculosis beyond 5 years of Australian residency (Figure 5).

Indigenous status

Indigenous status was reported in 939 notifications (90.4%). Sixty-four notifications of tuberculosis were reported in people of indigenous status, of which 2 were relapses and 62 were new cases of disease. Males accounted for 32 cases and females for 30 cases of new disease. The notification rate of new disease in the aboriginal population was 16.1 per 100,000. The rate in the Australian-born non-indigenous population was 1.2 per 100,000.

One-third of cases in indigenous people (21) were reported from the Northern Territory. Age specific rates of disease in the indigenous population were very high by comparison

Figure 2. Tuberculosis notification rates for new and relapsed disease in high prevalence immigrant populations, Australia, 1991-1996, by country and year

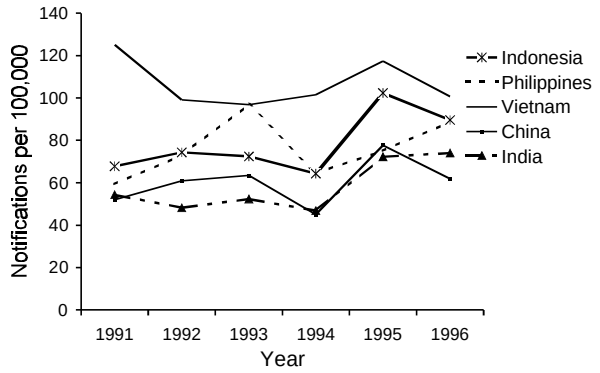
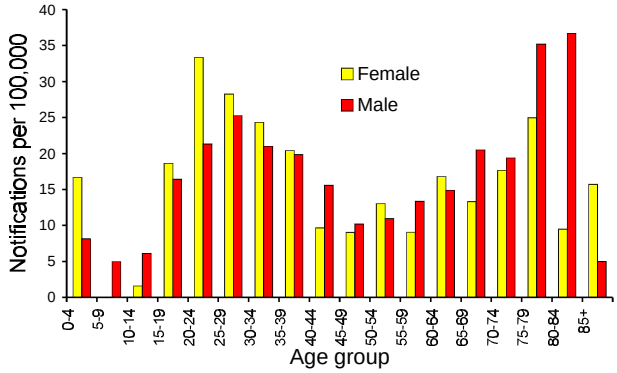


Figure 3. Tuberculosis notification rates in the overseas-born, Australia, 1996, by age group and sex



* *Communicable Diseases Intelligence* previously reported a figure of 27% for 1994. This was incorrect because of a programming error.

Figure 4. Tuberculosis notifications, site of diseaese by Australian and overseas born status, 1996

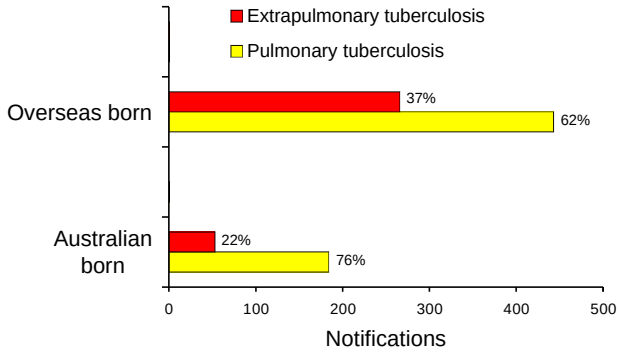


Figure 5. Percentage of tuberculosis notifications by years of Australian residency in selected overseas-born popoulationss with the highest number of notifiactions, 1996

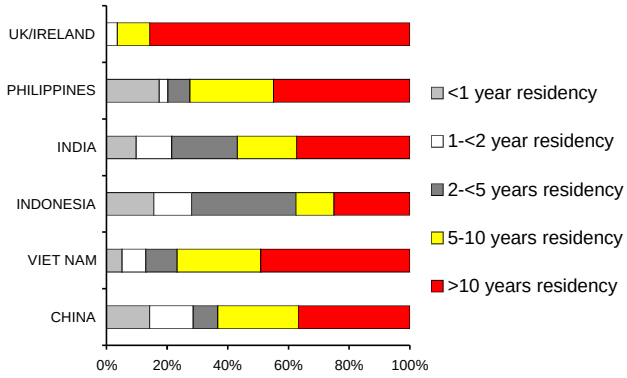


Figure 6. Tuberculoisis notification rates per 100,000 Australian indigenous population, by age group and sex, 1996

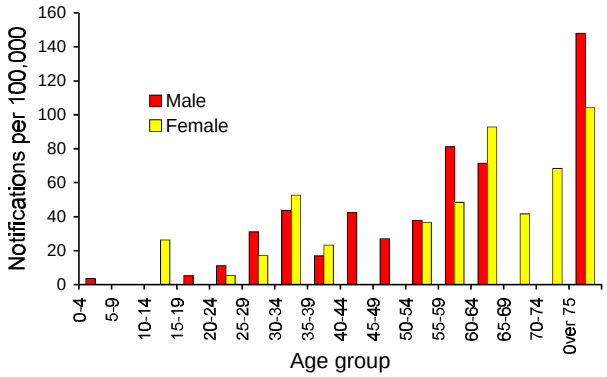
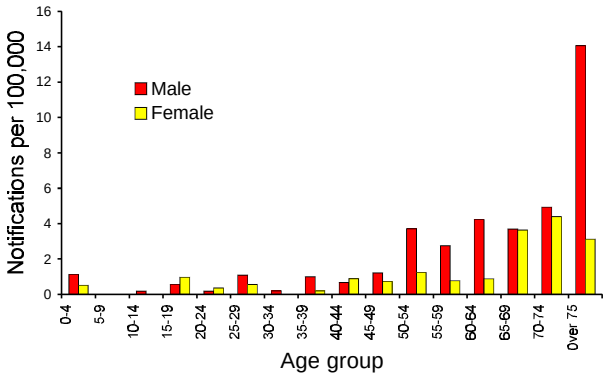


Figure 7. Tuberculosis notification rates per 100,000 Australian non-indigenous population, by age group and sex, 1996



to the non-indigenous population, and higher tuberculosis rates were also found in the younger age groups (Figures 6 and 7).

Pulmonary disease was reported in the majority of cases. In 25 of the 64 notifications, there was a positive history of BCG vaccination (39%).

Relapses

Overall the pattern of relapsed disease was similar to that observed in new cases of tuberculosis except that females exceeded males. None of the relapsed cases were reported as HIV positive and 43 (80%) were overseas-born. The principal site of disease was pulmonary in 33 cases (60%), pleural disease in 5 (9%) and extra-pulmonary in 15 (37%). One case of miliary disease was reported in a 45 year old female. In one case no site of disease was reported. Only one case of relapsed disease was started on a five-drug regimen at the time of diagnosis.

Mortality

For 1996, the Australian Bureau of Statistics reported a total of 77 deaths for which tuberculosis was the underlying cause. In 45 of these cases, death was the result of the late effects of tuberculosis and in 32 cases a specific site of disease was registered. The annual crude mortality rate for tuberculosis was 0.42 per 100,000 which is consistent with rates reported over the last decade.

A total of 17 deaths was reported for males with pulmonary disease and all were over the age of 55 years. Females accounted for 8 cases of pulmonary-related deaths and all of these were over the age of 65 years. All other adult extra-pulmonary disease was reported in females: one case each of gastro-intestinal and genitourinary disease and two cases where the site was not defined**.** The only tuberculosis death to be reported in a child was that of a 3 year old male with central nervous system involvement. Thirty-one males ranging in age from 45 years to over 85 years, and 14 females ranging in age from 55 to over 85 years, died of the late effects of tuberculosis disease.

Discussion

Over the last decade Australian tuberculosis notification rates have been reported at 5 to 6 per 100,000 population and mortality rates have been consistently reported at less than 0.5 per 100,000. The only countries which have reported similar low notification rates in recent years are Norway, Sweden and Cyprus.[7] Australian tuberculosis mortality rates compare favourably to those of other industrialised countries[1] and there has been no major demographic shift in the patterns of tuberculosis notification in recent years to implicate HIV as a significant risk factor in the Australian population. This is in contrast to the United States of America which experienced tuberculosis mortality rates in the late 1980's that were almost twice as high as those reported in Australia, and a trend towards increasing notification rates in the 25 to 44 year old cohort and in children less than 15 year of age.[8] These changes were largely driven by the occurrence of tuberculosis among groups with HIV infection. Notifications of tuberculosis in the under 5 year olds are useful as an indicator of recent transmission. The low reported rates in this age group in Australia over the past few years suggest that transmission rates in our community are low.

In a number of developed countries interesting trends have been reported over time for notification rates in males and females.[9] In developed countries where tuberculosis notifications have declined, higher rates in males have tended to occur across all age groups, with higher male: female ratios being observed with advancing age. This pattern fits with that observed in the Australian-born population. The observation that older males are more prone to tuberculosis in later life may reflect their higher rates of infection in the remote past, compared to women, or a greater predisposition to progression from infection to overt disease. It is possible that there are gender differences in risk factors, such as alcohol abuse and smoking, that promote disease progression. When tuberculosis notification rates were high in industrialised nations, notifications in females predominated in the 15 to 34 year old age groups. This pattern of disease is seen in overseas-born populations that have originated from areas of high tuberculosis prevalence. Higher rates of tuberculosis in women of reproductive age suggests that women may be at greater risk of acquiring infection or progressing to disease in the peri-adolescent period. Pregnancy as a risk factor for progression from infection to disease has not been supported by a number of studies over the last 40 years.[10]

Overseas-born individuals constitute 75% of all cases of tuberculosis in Australia as compared to 29% of cases in the United States of America, 51% of cases in Switzerland, 41% in the Netherlands and Sweden and 38% in Denmark (based on 1993 data).[1] The proportion of overseas-born cases in the United States of America increased by 6% between 1993 and 1995.[11] Although a greater proportion of tuberculosis is occurring in the overseas-born population, the rates of disease have not increased in recent years despite the fact that there has been increased migration from areas of high tuberculosis prevalence. Between 10% and 12% of overseas-born tuberculosis notifications occur in individuals who have resided in Australia for less than one year and, in those from areas of high tuberculosis prevalence, 25 to 60 % have progressed to disease within 5 years of arrival in Australia. This progression to disease in migrants from high prevalence countries within the first year of arrival has been well described in the United States of America[12] and in a recent cohort study of Vietnamese immigrants in Denmark.[13] In the latter study, less than 2% of the cohort developed tuberculosis over 16 years of follow-up, and of these almost two-thirds developed disease within one year of arrival.

Notification rates in the Australian-born population have declined from 2.82 per 100,000 in 1986 to the current levels of 1.62 per 100,000. The rates in non-indigenous Australians are even lower, at 1.22 per 100,000. Indigenous Australians have rates of tuberculosis that are 16-fold greater than the non-indigenous Australian-born population. The absolute numbers of cases in this population have increased over the last 6 years with a 20% increase in the numbers of notifications from 1995 to 1996. Rates of tuberculosis in indigenous Australians over the last 6 years need to be interpreted carefully.[14] There was a 30% increase in the number of people who identified themselves as indigenous Australians in the1996 census and therefore declining or stable rates, in the face of increasing notifications of disease, are likely to be an underestimate of the true levels of disease.

The analysis of the 1996 data has again highlighted a number of deficiencies in the current NMSS database and in the surveillance of tuberculosis in Australia. A number of variables are incompletely or inconsistently reported. The worst is HIV status, which is reported in less than 10% of cases. Comparison with MRLN data shows that between10-20% of positive cultures are not reported in the NMSS. This is important because, in the absence of data on smear status (which is not currently included in the NMSS), culture positivity is a measure of infectivity in those with active tuberculosis. No information on therapy was recorded in 16% of cases and the adequacy of drug treatment for such cases remains in doubt. BCG status is not reported in 16% but, even if fully reported, would remain of limited value for assessing vaccine efficacy in the Australian context because of the lack of information about BCG status in the non-diseased population. Inconsistent reporting is a particular problem with relapsed disease because definitions of relapse differ across jurisdictions. This limits the usefulness of the relapse rate as an outcome measure for tuberculosis control in Australia.

In 1996, as in previous years, approximately two-thirds of all disease was pulmonary. One existing deficiency in national surveillance is the lack of information on smear status of pulmonary cases at diagnosis and follow-up. Smear status is a useful method for evaluating the public health risk associated with individual cases, and follow-up smear status is a useful performance indicator for effective tuberculosis control.

The proportion of new cases commenced on standard four-drug therapy (76%) is similar to 1995. However, it is of concern that approximately 25% of new cases were receiving non-standard regimens at the time of notification. Of particular concern is the 24% of cases of relapsed disease who were recorded as receiving fewer than four drugs at the time of notification.

Studies of disease clusters using DNA fingerprinting methods have often identified an index case with positive

sputum smears and a history of poor compliance with antimicrobial therapy.[15] This underscores the importance of Directly Observed Therapy (DOTS) in tuberculosis control and in protecting communities from the emergence of acquired multi-drug resistance.[16] Currently, in Australia, the extent to which therapy is supervised is unknown at a national level.

Within the existing framework for national surveillance, no information is collected on treatment outcomes for new or relapsed cases of disease. Identification at a national level of groups who are dying, failing, defaulting or succeeding on therapy would highlight areas within the Australian tuberculosis program where control efforts could be better targeted.

Multi-drug resistance is an emerging global threat and has already been associated with outbreaks in industrialised settings such as New York City.[17] In Australia, the number of multi-drug resistant strains reported by the MRLN has increased. In 1995, only 5 (0.7%) strains resistant to both isoniazid and rifampicin were reported, but in 1996 this number increased to 15 (2%).[18,19] Drug susceptibility profiles are not systematically reported to the NMSS and information on the likely risk factors, and the risk that such cases pose to the wider community, cannot be assessed. If laboratory information on drug resistance and sensitivity profiles for MTBC isolates could be case linked to the comprehensive demographic data contained within the NMSS, a better understanding of the populations at risk of multi-drug resistance in Australia could be reached.

The Australian system of national tuberculosis surveillance is currently under evaluation within the National Centre for Disease Control. Problems with the existing case definitions and the incompleteness of data collection are two areas that need attention. Although, on currently measured performance indicators, tuberculosis in Australia is stable, improved collection of data in relation to drug susceptibility patterns, diagnostic methods, and treatment outcomes is required to evaluate, and improve, the effectiveness of the Australian tuberculosis control program in the face of the ever changing global epidemiology of this resurgent disease.

Acknowledgements

Acknowledgement is extended to Htoo Myint for assistance with data management. The members of the Communicable Diseases Network Australia New Zealand are thanked for their co-operation with this surveillance initiative, together with the State and Territory Directors of Tuberculosis, and other Health Department personnel in the States and Territories who are involved in compiling the individual data sets. Special thanks is offered to Irene Passaris in the Australian Capital Territory, Rob Menzies, Amanda Christensen and Mohammed Habib in New South Wales, Angela Merianos and Tania Wallace in the Northern Territory, Anil Patel and Patrick Derhy in Queensland, Scott Cameron and Ral Antic in South Australia, Avner Misrachi and David Coleman in Tasmania, John Carnie, Mary Randall and Ross Andrews in Victoria, and Jag Gill in Western Australia.

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Editor's column

With this issue we say farewell to another of the long term members of our editorial team, Margaret Curran, who has moved to another area of the Department of Health and Family Services. Margaret has been the Assistant Editor for *CDI* for the past 2 years and her considerable professional and organisational skills have contributed to all aspects of the journal during that time. In addition to editorial tasks, she has regularly provided analysis of surveillance data, organised and contributed to the annual surveillance reports, written articles and collated the overseas briefs. Her enthusiasm, cheerfulness and commitment to seeing the job well done will be greatly missed by all of us on the editorial team. Our best wishes go with her in her new position.

On page 192 we announce the first publication in the *Communicable Diseases Intelligence Technical Report Series*, an exciting addition to the role of *CDI* .

This month, *CDI* has a focus on tuberculosis with the publication of the clinical and laboratory surveillance reports for 1996 by Gilroy et al (page 173) and Dawson (page 183). Rates of tuberculosis continue to remain stable but there has been a slight change in the pattern of disease, with an increased proportion of lymphadenitis, particularly in females. It is probably too early to assess the significance of the increase in multi-drug resistance reported by Dawson. However, the trend requires close monitoring and prompts a call for the national data for 1997 to be analysed and reported as soon as possible.

Case reports serve to remind us of important public health issues. The report of a recent case of toxigenic diphtheria in New Zealand (page 188) illustrates the continuing need to ensure that infants, children and adults are immunised against this potentially deadly disease. The recent case of anthrax in Queensland (McCall et al page 189) reminds us that, although rare, sporadic cases of anthrax do occur in Australia and require appropriate laboratory and public health investigation.

Last summer's outbreaks of cryptosporidiosis associated with swimming pools, and the recent Sydney water crisis, have brought the issues of water testing and treatment into the media spotlight. Meetings of health authorities in New South Wales and Victoria are planned to consider these issues. The welcome announcement of the first Australian Conference on *Cryptosporidium* in Water (page 191) will be of interest to many *CDI* readers and is sure to be well attended.

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Tuberculosis in Australia: bacteriologically confirmed cases and drug resistance, 1996

Report of the Australian Mycobacterium Reference Laboratory Network

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Abstract

The Australian Mycobacterium Reference Laboratory Network collected and analysed laboratory data on new diagnoses of infection with *Mycobacterium tuberculosis* complex during 1996. A total of 750 cases were identified, representing an annual incidence of 4.1 cases of laboratory confirmed tuberculosis per 100,000 population. The incidence rate varied between States, reflecting differences in the distribution of persons belonging to 'high-risk' categories for tuberculosis. Incidence statistics were almost identical to those recorded by the Network in 1994 and 1995. The male:female ratio remained at around 1.2:1. As was the case in 1995, the median age group for males was 45-49 years and for females 35-39 years. The frequency of positive microscopy in pulmonary samples was stable at around 55%. Lymphatic disease accounted for 19% of the total cases in 1996 compared with 15% in the previous year, confirming that lymphadenitis is becoming more common in females with tuberculosis in Australia. Approximately 11% of isolates had *in vitro* resistance to at least one of the four standard anti-tuberculosis drugs, an increase from 8% in 1994-95. Fifteen isolates were multi-drug resistant, compared with a total of only 38 during the previous seven years. Thus, the 1996 data points to an increasing frequency of multi-drug resistant strains among isolates from Australian patients with tuberculosis. *Commun Dis Intell* 1998;22:183-187.

Introduction

Tuberculosis remains unchallenged as a major cause of human suffering in much of the world. The World Health Organization (WHO) has estimated that tuberculosis will cause the deaths of around 30 million people in this decade.[1] With the bulk of incident cases (and deaths) occurring in developing countries with minimal public health resources, there seems little possibility that the global picture will improve significantly in the short term. The impact of the spread of HIV into countries with high rates of tuberculosis infection, as well as the increasing prevalence of strains resistant to the most effective anti-tuberculosis drugs, has been well publicised.

The Australian population, primarily due to good management, but in part due to good fortune, has generally been spared many of the problems experienced elsewhere with tuberculosis. National data has shown the

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Table 1. MTBC isolates in Australia, 1994-1996, by State or Territory and year

State	1996		1995	1994
	Number of isolates	Isolates per 100,000 population	Isolates per 100,000 population	Isolates per 100,000 population
New South Wales[1]	341	5.3	4.8	4.4
Victoria	214	4.7	4.1	4.8
Queensland	90	2.7	2.6	2.8
Western Australia	51	2.9	3.2	3.1
South Australia	28	1.9	2.2	2.8
Tasmania	3	0.6	0.4	2.1
Northern Territory	23	12.6	21.3	12.3
TOTAL	750	4.1	3.9	4.0

1. Data for the Australian Capital Territory are included with those from New South Wales

annual incidence rate to be stable at 5-6 cases per 100,000 population, among the lowest in the world.[2] As would be expected, Australians in the older age groups account for many cases, but there is evidence of persistent high rates of disease (and infection) in certain population subgroups such as indigenous Australians and persons born in high-prevalence countries. Only small numbers of multi-drug resistant strains have been encountered thus far, and only a small proportion of cases are related to HIV infection.

The Tuberculosis Working Party of the National Health and Medical Research Council (NHMRC) has recently developed draft guidelines for elimination of tuberculosis in Australia. These guidelines emphasise the importance of surveillance as a strategic tool.[3] In Australia, surveillance data for tuberculosis is available through two sources: the National Mycobacterial Surveillance System (NMSS, conducted by the Communicable Diseases Network Australia New Zealand) and the Australian Tuberculosis Reporting Scheme (supported by the Mycobacterium Reference Laboratory Network, MRLN). The NMSS is based on clinical notifications. Data from the reference laboratory network relates to cases confirmed by isolation of the *Mycobacterium tuberculosis* complex (MTBC). The laboratory network has published data for the period 1986 to 1995.[4,5,6,7] This report is based on data for 1996.

Methods

The Australian Tuberculosis Reporting Scheme is a joint project of the MRLN and the Department of Health and Family Services. Data for tuberculosis are based on isolates of MTBC (other than the BCG strain) from clinical samples. Due to the specialised nature of tuberculosis bacteriology, it can be assumed that the five laboratories that comprise the MRLN account for almost all, if not all, of the bacteriological diagnoses in Australia. Comparable bacteriological procedures are used in the reference laboratories. Relapse patients, that is, those previously diagnosed, treated and considered cured, were included in these data because laboratories cannot usually differentiate them from new cases. Temporary visitors to Australia are also included.

For each new laboratory diagnosis the following information was collected:

- demographic: patient identifier, age, gender, HIV status and State of residence
- specimen: type, site of collection, date of collection and microscopy result, and
- isolate: species of *Mycobacterium* and results of drug susceptibility tests.

Data for 1996 from contributing laboratories were submitted to the scheme co-ordinator, collated and analysed. Duplicate entries (as indicated by identical patient identifier and age) were deleted before analysis. Incidence rates were calculated using the mid-year estimates of the population supplied by the Australian Bureau of Statistics (ABS).

The nature of the first clinical sample that yielded an isolate of MTBC was used to record the site of disease for individual cases. Culture-positive specimens collected at bronchoscopy, as well as gastric washings, were taken to identify cases of pulmonary disease. In most cases of multi-site disease, sputum is the first positive sample. These cases were therefore included among those listed as having pulmonary disease, the most significant category for public health purposes. Although many patients were known to have isolates from more than one body site, such data are of doubtful value for the laboratory-based report and were not collated. Similarly, it is not always possible to accurately categorise cases of miliary and disseminated disease from data available to laboratories.

Results

Total reports and distribution by State

A total of 750 cases were recorded in 1996. This figure represents an annual incidence of 4.1 cases of laboratory confirmed tuberculosis per 100,000 population. The distribution of cases by State of residence is shown in Table 1 (in which data from 1994 and 1995 are included for comparison). State specific incidence rates varied from

Figure 1. MTBC isolates by age group and sex, Australia, 1996

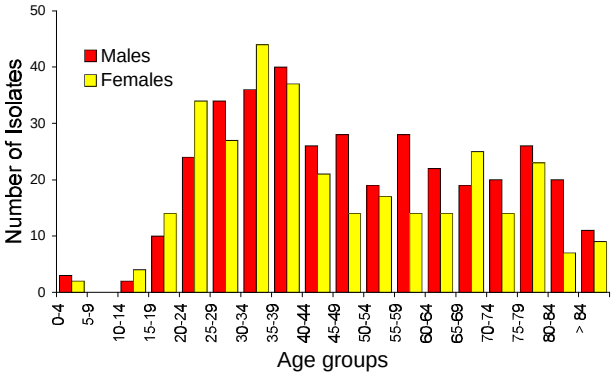
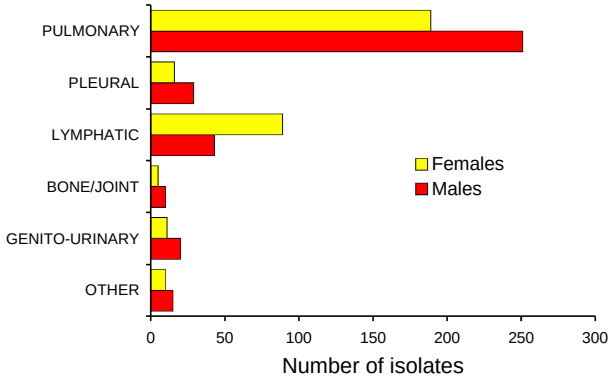


Figure 2. MTBC isolates by site and sex, Australia, 1996



less than 1 (Tasmania) to around 12 per 100,000 (Northern Territory).

Causative organism

The large majority (740) of the 750 cases were due to *Mycobacterium tuberculosis*. The remaining ten were caused by *M. bovis*, typically in males over 60 years of age.

Distribution by gender, age and site of disease

Full information for gender, age and site of disease was submitted for 688 of the 750 cases recorded. Figure 1 shows the distribution of 688 cases by age group and gender. The overall male:female ratio was 1.2:1, although this ratio was reversed in the younger age groups. For all cases, the median age group was 40-44 years. The median age group for males was 45-49 years whereas that for females was 35-39 years. Age and gender specific rates varied from nearly zero in children younger than 15 years to almost 19 per 100,000 per year in males over 80 years of age (data not shown). Only five cases were recorded in children younger than ten years, one of which was a 3 year old child with tuberculous meningitis.

Figure 2 shows the distribution of 688 cases by site of disease and gender. Pulmonary disease accounted for 64% of the total cases (male:female ratio 1.3:1). Disease of lymph nodes was identified in 19% of the total cases (male:female ratio 0.5:1). For females between 20 and 40 years, lymphatic disease was almost as common as was pulmonary disease. Figure 3 shows the distribution of cases with lymphatic disease by age and gender.

Association with HIV

The laboratories recorded six isolates from persons known to be HIV positive. Three were from Queensland, two were from Western Australia, and one was from Victoria. All but one isolate came from pulmonary material.

Smear-positivity in pulmonary disease

A total of 466 cases were detected from samples of pulmonary origin. The specimen types that provided these diagnoses were: sputum (371), bronchoscopy samples (72), other (23). Results of microscopy were available for 418 samples (90%) of pulmonary origin; 53% were positive. For sputum alone, 56% were smear-positive, compared with 38% for bronchoscopy collections. The pulmonary samples from five patients with HIV were smear-positive.

In vitro drug susceptibility

Results were available for each of the 750 isolates. All but two were tested against each of the four drugs recommended for standard treatment of tuberculosis in Australia, that is, isoniazid (H), rifampicin (R), ethambutol

Table 2. *In vitro* resistance of isolates to the standard anti-tuberculosis drugs, Australia, 1994-1996

	1996			1995	1994
	Isolates tested	Number resistant	% resistant[1]	% resistant[1]	% resistant[1]
Isoniazid (H)	750	73	9.7	7.5	6.1
Rifampicin (R)	750	16	2.1	1.1	0.6
Ethambutol (E)	750	2	0.3	0.3	0.0
Pyrazinamide[2] (Z)	748	18	2.3	2.0	0.9

1. Percentage of strains tested which were resistant to drug alone or in combination with others
2. All strains of *M. bovis* are naturally resistant to pyrazinamide

Table 3. Drug resistance patterns in MDR strains, Australia, 1994-1996

Resistance pattern (standard drugs)	Number of isolates		
	1996	1995	1994
H + R only	10	3	2
H + R + E	1	1	0
H + R + Z	4	1	0

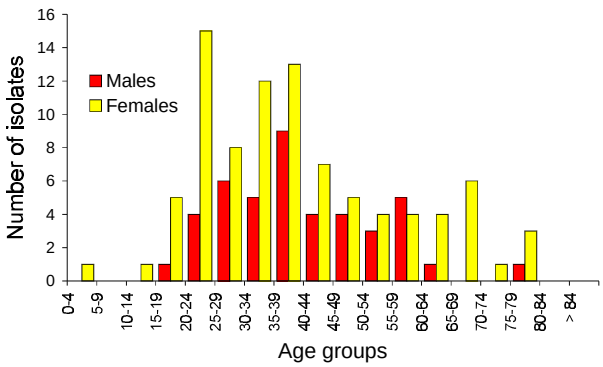
H = isoniazid; R = rifampicin; E = ethambutol; Z = pyrazinamide

(E) and pyrazinamide (Z).[8] Only 192 were tested against streptomycin (S), a drug used occasionally in non-standard regimens. A total of 83 isolates (11.1% of the total) were resistant to at least one of the standard compounds. The frequency of resistance to H, R, E and Z, alone or in combination, is shown in Table 2. Included in Table 2 are results for 10 isolates of *M. bovis* which are naturally resistant to Z. Our data for S, although incomplete, show that at least 10% of isolates are resistant to S, alone or in combination. Resistance to H and/or R was recorded in 74 isolates (9.9% of total). Fifty-eight isolates were resistant to H alone, one was resistant to R alone, and 15 (2% of total) were resistant to both H and R in combination (Table 3). Isolates in the latter group are referred to as multi-drug resistant (MDR). Thirteen MDR isolates came from pulmonary specimens, of which five were smear-positive. All of the MDR isolates were *M. tuberculosis*. All five isolates known to be associated with HIV were fully susceptible to the standard regimen.

Discussion

The data for 1996 show that the incidence of laboratory confirmed tuberculosis in Australia continues to hover around 4 cases per 100,000 per year. This apparently stable situation reflects the findings of the analysis of clinical notifications for the same year.[9] The laboratory network recorded 750 cases, whereas the NMSS received information on 1,038 cases. This means that around 70-75% of Australian notified tuberculosis cases are at present supported by definitive bacteriological confirmation.

Figure 3. MTBC isolates from lymph nodes by age group and sex, 1996



The data in Table 1 show differences in annual tuberculosis incidence rates between States and Territories, ranging from close to zero in Tasmania to more than 12 per 100,000 in Northern Territory. The rates are almost identical to those in our previous report[7]. The consistent variations in rates between States are almost certainly due to peculiarities in the national distribution of high-risk categories, rather than local differences in the risk of acquiring tuberculous infection.

Cases of active disease are distributed unevenly between sexes and across age groups. The data presented in Figure 1 are very similar to that from previous reports and are in keeping with what would be expected from the demographic features in Australia at present. The overall male:female ratio was around 1.2:1, the same as in 1995. Further, the median age groups for males and females are static at 45-49 years and 35-39 years respectively. When age specific rates are considered, our data generally agree with the notion that the risk of developing tuberculosis increases with age. It should be noted however, that all persons above 20 years have rates of at least 4 per 100,000 per year, while males in older age groups have disease rates up to five times this figure. The extremely low rates of bacteriologically confirmed disease in children under 15 years are comforting statistics because they indicate that young persons in the general Australian population are exposed to a low risk of tuberculous infection.

Our data suggest that gender and age are influential factors for determining the site of disease (Figures 2 and 3). In particular, lymphatic disease seems more likely to occur in females than in males. In 1996, 28% of females with tuberculosis had disease in lymph nodes; this statistic has shown a sustained increase from 14% in 1986-1988.[4] It is the author's impression that the majority of females with tuberculous lymphadenitis in Australia are of Asian ethnicity. The limited information available to laboratories does not allow us to determine whether lymphadenitis is common in females from other ethnic groups. A recent bulletin from WHO reports that tuberculosis is the single leading cause of deaths among women of reproductive age.[10]

Acid-fast microscopy continues to serve as a useful diagnostic tool. Data, for the first time, include microscopy results for the large majority of specimens from pulmonary sites. More than half (56%) of the diagnostic sputum samples were found positive by smear microscopy. In addition to providing an immediate rational basis for

chemotherapy, early detection of smear-positive cases will allow interventions that reduce the transmission of infection. Contact tracing can also begin when a positive sputum-smear report is delivered. Seventy-two cases were diagnosed from bronchoscopy samples, of which only 38% were smear-positive. While the degree of infectious risk from patients diagnosed by bronchoscopy is open to debate, it is reasonable to request that pre-bronchoscopy sputum should be submitted for patients undergoing bronchoscopy for suspected tuberculosis so that sputum-smear status will always be known.

The reference laboratories were informed of only six cases associated with HIV infection; no cases were reported from New South Wales. Published data suggests that at least 5-10 cases of HIV-tuberculosis occur annually in Australia.[11] We believe our data for HIV-tuberculosis should be regarded as an underestimate of the true figure.

Collation of surveillance data for *in vitro* drug resistance is an important activity of the reference laboratory network. We have shown that a total of 83 isolates (11.1%) in 1996 demonstrated *in vitro* resistance to at least one of the standard anti-tuberculosis drugs, H, R, E and Z. Because the response of resistant strains to standard short-course chemotherapy cannot be assured, chemotherapy in such cases must be managed by experienced physicians. Most importantly, 74 isolates were resistant to one or both of H and R, the key anti-tuberculosis compounds. As shown in Table 2, around one in ten of all MTBC strains encountered in Australia is resistant to H. Corresponding figures for 1994 and 1995 were only 6.1% and 7.5% respectively. Resistance to R was almost always accompanied by resistance to H, and we found a total of 15 strains (2%) were in this category (MDR). This figure is a significant increase from previous years in which less than 1% of isolates were MDR.

Ten cases of tuberculosis were due to *M. bovis* in 1996, whereas only four cases were recorded in both 1994 and 1995. Although bovine tuberculosis has been eradicated from the national cattle herd, we must, for the foreseeable future, expect that occasional cases of disease due to *M. bovis* will be detected in the population. Because the natural resistance of *M. bovis* to Z requires that the standard short-course regimen be adjusted, laboratories must continue to employ protocols that differentiate *M. bovis* from *M. tuberculosis*.

The WHO and International Union Against Tuberculosis and Lung Disease have initiated a Global Project on Anti-tuberculosis Drug Resistance Surveillance.[12] A primary objective of the project is to collect accurate data on drug resistance in order to evaluate the efficacy of local control programs. The project requires that patients be stratified on the basis of previous treatment for tuberculosis to allow *in vitro* drug resistance to be categorised as either *primary* resistance (where the patient is known not to have received chemotherapy) or *acquired* resistance (where the patient is known to have received chemotherapy). Although Australian data for 1995 was included in the first project report,[13] it was not possible to differentiate resistance categories; the resistance was therefore listed as *combined* (denoting that treatment history is unknown). Drug resistance surveillance in Australia would be more productive if laboratory data were able to be linked to information in the NMSS database. The latter includes ethnicity data, but not details of previous treatment for tuberculosis. While concerns for privacy issues, and the difficulty in collecting accurate information on treatment are acknowledged, it must be stated that, without better information from clinical sources, the laboratory data on drug resistance will continue to be under-utilised. Some individual States already match drug resistance data with patient ethnicity, treatment history and other factors, but there is an unquestionable need for a uniform national approach.

Within the limitations of laboratory data, this report shows only minor changes in the epidemiology of tuberculosis in Australia. The overall rate is stable at around 4 cases per 100,000 per year and the distribution of cases by age and gender is in keeping with results from previous years. A noteworthy finding is that lymph node infections in females are accounting for an increasing proportion of total cases. There is also the apparent upward trend in the prevalence of strains resistant to H and/or R in persons with smear-positive pulmonary disease. This fact alone dictates that Australia's control program must at least be maintained, if not strengthened. More than ever, Australia needs modern and efficient diagnostic laboratories working with medical personnel skilled in the management of 'problem cases' of tuberculosis.

Acknowledgements

The Mycobacterium Reference Laboratory Network comprises:

- Queensland Diagnostic and Reference Laboratory for Mycobacterial Diseases, The Prince Charles Hospital, Chermside, Queensland
- Mycobacterium Reference Laboratory, Institute of Clinical Pathology and Medical Research, Westmead Hospital, Westmead, New South Wales
- Mycobacterium Reference Laboratory, Victorian Infectious Diseases Reference Laboratory, North Melbourne, Victoria
- Mycobacterium Reference Laboratory, Institute of Medical and Veterinary Sciences, Adelaide, South Australia
- Mycobacterium Reference Laboratory, Centre for Pathology and Medical Research, The Queen Elizabeth II Medical Centre, Nedlands, Western Australia

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A case of diphtheria in New Zealand

The New Zealand Ministry of Health has advised the National Centre for Disease Control of a case in Auckland in which toxigenic *Corynebacterium diphtheriae* was isolated from the throat of a 32 month old unimmunised child with pharyngitis. The child responded to antibiotics and did not require hospitalisation or antitoxin. This was the first isolate of toxigenic diphtheria in New Zealand since 1987. The case highlights the need to ensure that infants, children and adults are fully immunised against diphtheria.

There have been no notifications of diphtheria due to toxigenic *Corynebacterium diphtheriae* in Australia since 1993, when one case was reported. However, both toxigenic and non-toxigenic strains of the organism have been shown to be endemic in parts of Australia and there remains the potential for serious disease to occur.[1] Children and adults who are unimmunised, or whose immunity has waned because they have not received appropriate boosting, remain at risk of contracting the disease and spreading it within the community.[2,3] All children and adults should be vaccinated in accordance with the recommendations of the National Health and Medical Research Council.[4] These were last published in *CDI* in 1997 and are reiterated below.

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National Health and Medical Research Council recommendations on diphtheria vaccination

The National Health and Medical Research Council recommends diphtheria vaccination as part of the standard childhood vaccination schedule.[1] Primary vaccination is achieved with three doses of a diphtheria toxoid-containing vaccine at one to two monthly intervals, with boosters at 18 months and four to five years.

Prior to the eighth birthday DTP (diphtheria, tetanus, pertussis vaccine) should be given. If there is a **genuine** contraindication to pertussis vaccine, CDT (adsorbed diphtheria, tetanus vaccine, paediatric formulation) should be used. After the eighth birthday, the low dose diphtheria adult formulation (ADT) should be given. The change to ADT after the eighth birthday is required because of the reduced tolerance of older children and adults to diphtheria toxoid.

Older children who have not received diphtheria vaccination are also likely to have missed tetanus vaccination. Those who have not reached their eighth birthday should receive three injections of DTP (or CDT) at intervals of one to two months, and those individuals who have passed their eighth birthday should receive three doses of ADT at intervals of two months.

The need for booster injections in adult life is unclear. However, as protective antibody levels wane with age, it is considered prudent for adults to have booster injections, which may be given as ADT vaccine, at 10 year intervals. Diphtheria can be a significant risk for travellers to some countries, so all international travellers should ensure that their vaccination is current.

Reference

1. National Health and Medical Research Council. *The Australian Immunisation Handbook*. Sixth edition. Canberra: Australian Government Publishing Service, 1997.

Legionellosis and recent travel to Bali

The National Centre for Disease Control has been advised of two cases (one in June and one in August) of legionellosis in persons who had recently returned from Bali. The public health authorities in Bali have been notified and investigations are continuing. It is an important reminder of the need to ask about recent travel when trying to ascertain the source of exposure for patients diagnosed with legionella infection.

Sporadic human anthrax in urban Brisbane

Brad McCall[1], David Looke[2], Mark Crome[1], Graeme Nimmo[3], Gabrielle O'Kane[3], Jacqui Harper[3], Andrew Jones[2], Jill Wright[4], Ian Douglas[5], Michael Whitby[2]

Introduction

In July 1998, a young man was admitted to a Brisbane Hospital with a skin infection, subsequently diagnosed as cutaneous anthrax; the first reported case in Queensland since 1939. This report describes clinical and microbiological aspects of the case and the public health investigation.

Clinical Case

On 18 July 1998, a 20 year old forklift driver attended the Emergency Department feeling unwell with a painful lesion over the right anterior superior iliac spine (ASIS). He had first noticed a small painful papule in the area 24 hours beforehand. A 1cm lump was present over his ASIS, surrounded by a 10cm area of reddened, indurated skin. He was febrile and had tender inguinal lymphadenopathy. A differential diagnosis of cellulitis or a spider bite was made. The patient was commenced on oral dicloxacillin and observed overnight. The next morning he was still febrile and the area of induration and erythema was larger. He was admitted under the Orthopaedic Service with a diagnosis of cellulitis and commenced on intravenous penicillin and flucloxacillin. The lesion continued to progress and 24 hours later had developed into a 10cm area of necrotic skin with vesicles. Brawny induration extended over the lower part of the abdominal wall and down the leg. The patient was toxic and in pain. The diagnosis was changed to necrotising fasciitis, swabs of the vesicle fluid were taken and he was taken to theatre where the necrotic tissue with surrounding margins was resected. Gram stain of the fluid showed no polymorphs with scanty gram positive bacilli and gram positive cocci. Clostridial infection was suspected and high dose intravenous penicillin and flucloxacillin continued. Two courses of hyperbaric oxygen therapy were administered. Following debridement, his temperature settled rapidly and he improved clinically. The patient remained in hospital for a further three weeks for skin grafting to be carried out on the affected area, and was discharged on 14 August.

Microbiology

Cultures of the vesicle fluid grew Bacillus species and coagulase negative staphylococci. The bacillus was inoculated into a Vitek Bacillus Card. As *Bacillus anthracis* is not identified by the card, the organism was initially reported as an unidentified Bacillus species. It was subsequently identified as *B. anthracis* on the basis of lack of haemolysis, non-motility, penicillin sensitivity, production of a capsule on bicarbonate serum agar in CO_2, capsular staining with McFadyeans Stain and positive 'string of pearls' test.[1] The Brisbane Southside Public Health Unit (BSPHU) was notified and an investigation was commenced.

Public Health

Upon confirmation of the diagnosis, an investigation team was established which included public health, clinical and laboratory staff, and representation from the Department of Primary Industries, and the Workplace Health and Safety Program of the Department of Employment, Training and Industrial Relations. The aim of the team was to coordinate the investigation to determine the source of the infection, to assess the risk to others and to prevent further cases of the disease.

A detailed history was obtained from the case that included occupational details and other sources of potential exposure to anthrax during the incubation period of the disease (up to seven days, usually within 48 hours).[2] The areas identified for further investigation included the workplace, home environment and exposure to soil through contact sport (rugby). The case had not worked with or been exposed to any livestock or animals during the incubation period.

The case worked as a labourer in a warehouse. During the incubation period he was exposed to new, imported hessian (plant fibre) material used in the packaging of Australian ginned cotton. He was also involved in repackaging of fertiliser produce. Investigations revealed that the fertiliser product was chemical based and not derived from blood and bone produce. Subsequent

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4. Workplace Health and Safety Program, Department of Employment, Training and Industrial Relations, PO Box 317, Annerley, Queensland 4103
5. Queensland Department of Primary Industries, GPO Box 46, Brisbane, Queensland 4001

microbiological analysis of 62 samples from all of the hessian bags used by the case during the incubation period did not reveal the presence of anthrax. Investigation of the home and sport exposures did not reveal any items of concern. In particular, there was no history of animal exposure, no use of blood and bone fertilisers on the football fields, and no exposure to imported animal products in the home.

During the investigation, all people who shared similar exposures were counselled and provided with information on anthrax, its presentation and modes of transmission. Three people from the case's workplace and a number of sporting associates sought medical attention in regard to skin lesions. However, more than one month after the initial presentation, no further cases of cutaneous anthrax have been detected.

Discussion

Human anthrax is a rare disease in Australia with an average notification rate between 1917 and 1991 of 0.08 notifications per 100,000 population per year.[3] The last recorded case of human anthrax in Queensland occurred in 1939.[4] Most cases in Australia in the last 50 years have been related to animal outbreaks in the endemic areas in Victoria and central New South Wales. The last human case was in Victoria in 1997.[5] Cases in developed countries are usually associated with exposure to contaminated animal products.[5,6,7] The source of this case of cutaneous anthrax could not be determined by this investigation.

As non-pathogenic Bacillus species are commonly cultured from environmentally contaminated clinical specimens, laboratories may not investigate the isolation of a Bacillus species past the genus level. Therefore, it is important that this disease is recognised clinically and that where non-haemolytic Bacillus species with characteristic colonial morphology is isolated from a skin lesion, further examination is undertaken to identify the organism. Testing should include penicillin susceptibility testing, a motility test and, if in accordance with the diagnosis, a capsule stain of the organism grown under appropriate conditions.

In this case, the imperative to debride a suspected case of necrotising fasciitis led to surgery and skin grafting. This is usually not necessary with cutaneous anthrax,[8] however, with extensive eschar formation plastic surgical revision may be required.

Where there is no clear exposure, as in this case, the most common differential diagnosis for cutaneous anthrax would be a necrotising spider bite. It is conceivable that such a case could be treated successfully with penicillin, the Bacillus species isolated not be identified, and a potential sporadic case of cutaneous anthrax be entirely missed. Clinicians need to be aware of the clinical features that suggest the diagnosis and laboratories need to ensure that processes are set in place to identify any potential isolate of *B. anthracis*.

Acknowledgements

Dr John Carnie, Infectious Diseases Unit, Department of Human Services, Fitzroy, Victoria.

Dr Robin Condron, Victorian Institute of Animal Science, Attwood, Victoria.

John Bates, Public Health Microbiology, Queensland Health Scientific Services.

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Parasites in Water

In February this year, *CDI* reported on outbreaks of cryptosporidiosis in the Australian Capital Territory and New South Wales associated with swimming pools.[1] Outbreaks of cryptosporidiosis also occurred in Queensland and Victoria. An outbreak of cryptosporidiosis associated with a swimming pool in the Hutt Valley, New Zealand, in the first quarter of 1998 has also been reported.[2] Closure of the pools for cleaning and the implementation of other control measures, such as discouraging people with diarrhoea from using swimming pools, brought the outbreaks under control.

In July, and again in August, both C*ryptosporidium parvum* and G*iardia lamblia* were detected in the Sydney water supply. Although no increase in the number of cases of diarrhoeal illness was found, Sydney residents were advised, as a precautionary measure, to boil their water before drinking. Investigations have been undertaken to detect the cause of the problem and measures to clear the organisms from the water supply have been implemented.

These separate incidents involving protozoal contamination of water have highlighted a number of complex issues relating to the microbiological testing of water and the effectiveness of water-treatment methods for removing organisms which are resistant to chlorination. Over the next month, two separate meetings and a conference will be held to examine these issues in the Australian context.

Meetings

The New South Wales health authorities are convening a meeting of invited experts on 4 September 1998 to review

the implications of parasites in Sydney water in light of present knowledge about these organisms and their control. The meeting will consider the development of a consensus position on the place of routine testing of water supplies and the management of contamination incidents.

On 6 October 1998, the Victorian health authorities are holding a meeting of invited participants and experts to develop a consensus strategy on central issues.

Conference

The first Australian Conference on *Cryptosporidium* in Water will be held on 5 October 1998 in Melbourne. Further information is presented below.

1. Anonymous. Cryptosporidiosis outbreak. *Commun Dis Intell* 1998;22(2):22.
2. Baker M, Russell N, Roseveare C, O'Hallahan J, Palmer S and Bichan A. Outbreak of cryptosporidiosis linked to Hutt Valley swimming pool. *The New Zealand Health Report* 1998;5(6):41-45.

Cryptosporidium in Water Conference

On 5 October 1998, the first Australian conference on *Cryptosporidium* in water will be held in Melbourne. The Australian Water and Wastewater Association, the Cooperative Research Centre for Water Quality and Treatment, and the Water Services Association of Australia are jointly organising the conference. The conference has three streams examining: the epidemiology of cryptosporidiosis, risk assessment of *Cryptopsoridium* in water, and typing of oocysts. International speakers for the conference include Dr Bill MacKenzie (CDC), A/Prof Cynthia Chappell (University of Texas), Dr Peter O'Donoghue (University of Queensland), Dr David Casemore (PHLS), Dr Peter Teunis (RIVM), and Professor Gordon Finch (University of Alberta). The cost of the conference is $290 (Australian). Please refer to the Bulletin Board for contact details.

How long should you boil water to make it safe to drink?

The recent incidents of contamination of the Sydney water supply with *Cryptosporidium* and *Giardia* have generated considerable interest in the issue of how long water should be boiled to make it safe to drink. *CDI* inadvertently muddied the waters (so to speak) in last month's edition when our 'Advice for travellers' recommended that water be boiled for at least 10 minutes.[1] This information was sourced from the fourth edition of the Commonwealth Department of Human Services and Health's publication *Health information for international travel*. [2] This reiterates the unreferenced recommendation of earlier editions of the same publication. Our attention has since been drawn to the Centers for Disease Control (CDC) recommendations for boiling water, which were made in September 1994 on the basis of a contemporary literature review.[3,4] These recommendations have been followed by the New South Wales health authorities in responding to the contamination incidents.

CDC recommends making water microbiologically safe to drink by bringing it to a rolling boil for one (1) minute. This will inactivate all major waterborne bacterial pathogens (for example, *Vibrio cholerae*, enterotoxigenic *Esherischia coli, Salmonella, Shigella sonnei, Campylobacter jejuni, Yersinia enterocolitica* and *Legionella pneumophila*) and waterborne protozoa (for example, *Cryptosporidium parvum, Giardia lamblia*, and *Entamoeba histolytica)*. It will also be effective for waterborne viral pathogens such as hepatitis A virus, which is considered one of the more heat-resistant viruses. An increase in boiling time to three (3) minutes is recommended if viral pathogens are suspected in drinking water in communities at elevations above 2 km.

1. Anonymous. Advice for travellers. *Commun Dis Intell* 1998;22(8):154.
2. Department of Human Services and Health. Health information for international travel. Fourth edition. Australian Government Publishing Service, 1994.
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Communicable Diseases Intelligence Technical Report Series

We are pleased to announce the commencement of the *Communicable Diseases Intelligence Technical Report Series* and the publication of the first two documents in this series: *The control of pertussis in Australia* and *Foodborne disease: Towards reducing foodborne illness in Australia*.

Communicable Diseases Intelligence is the journal of the Communicable Diseases Network Australia New Zealand, which was established in 1989 as a joint initiative of the National Health and Medical Research Council (NHMRC) and the Australian Health Ministers' Advisory Council (AHMAC). Members of the Network include Commonwealth, State/Territory and New Zealand health authorities, and representatives of other government agencies and non-government organisations with expertise in communicable disease control.

The Network oversees the co-ordination of national communicable disease surveillance, the response to communicable disease outbreaks of national significance and the field training of communicable disease epidemiologists, and is responsible for the development of national policy related to the public health aspects of communicable diseases. The*Technical Report Series* reflects the expanding role of the Network in policy development.

The Technical Report Series will be available in two formats - hard copy and electronic. The hard copy versions, will be available through **AusInfo** (see box below) at a cost-recovery price. The electronic versions will be available on the Internet, accessible through the website of the Public Health Division of the Commonwealth Department of Health and Family Services **http:/www.health.gov.au/pubhlth/** or the *CDI* website **http:/www.health.gov.au/pubhlth/cdi/cdihtml.htm**

A short description of the first two documents in the series is provided below. As new documents are developed and published they will be announced in future editions of *CDI.*

Communicable Diseases Intelligence Technical Report Series No. 1 - The control of pertussis in Australia

While morbidity and mortality from pertussis have declined dramatically since the pre-vaccine era, we are still seeing an unacceptable level of this vaccine preventable disease in Australia. This report examines the epidemiology of the disease and the issues involved in making the clinical and laboratory diagnosis. It makes recommendations for enhanced surveillance of the disease and appropriate management of cases and contacts. It also identifies priority areas for research to improve our understanding of the disease and its control. The Report stresses that the most effective measure for the control of pertussis remains the full vaccination of all children against the disease, and includes an appendix which provides historical and current information about pertussis vaccines and their use in Australia.

This Report is in press and will be available shortly.

Communicable Diseases Intelligence Technical Report Series No. 2 - Foodborne disease: Towards reducing foodborne illness in Australia

Foodborne illness is a significant public health problem around the world and has major economic and social impacts. This report assesses current trends in the epidemiology of foodborne disease, identifies gaps in our knowledge, and makes recommendations for action to reduce foodborne disease in Australia. It promotes the need for nationally consistent policies and encourages a multi-sector approach to the prevention, surveillance and control of foodborne diseases. The report was developed by a working party of experts in epidemiology, public health, microbiology, veterinary science and clinical practice as well as representatives from the primary industry, manufacturing and consumer sectors, and endorsed by the Communicable Diseases Network Australia New Zealand in December 1997.

*The hard copy publication (Publication Identification Number 2338) is available for sale for $9.95 from **AusInfo*** (see box below). The document will also be electronically accessible at **http://www.health.gov.au/pubhlth/publicat/document/foodbrne.pdf**

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Measles Control Campaign Update

During the three month period of the Campaign, the uptake of measles-mumps-rubella (MMR) vaccine given at primary school clinics and the number of adverse events following MMR vaccination are being monitored. Data are forwarded to the National Centre for Disease Control for collation and will be a major element in the evaluation of the Campaign.

School immunisation teams collect data on the following variables:

- total enrolments per year/grade for each primary school;
- total number of consent forms returned per year/grade;
- total number of consents given for vaccination at school; and
- total number of children vaccinated at school clinics.

Communicable Diseases Intelligence will routinely report on the progress of the proportion of children enrolled in primary schools by State/ Territory who:

- return consent forms;
- consent to be vaccinated; and
- are vaccinated at school

during the Campaign.

It should be noted that the lag period from the time of vaccination to central data entry varies between States and Territories. Further, figures do not include all children who are vaccinated at venues and times alternate to the scheduled school based clinics. These data will however be collected as part of the overall evaluation of the Campaign.

Any serious adverse events after vaccination occurring during the Campaign are being assessed by a panel of experts who meet once a week.

Measles Control Campaign activity data, to 26 August 1998

Sum total students	248,714
Total forms returned	232,335
Consents to vaccinate	195,729
Total students immunised	183,788

Percentages are as follows:

Of total students	93% returned their forms
Of total forms returned	84% consent to vaccination
Of total consents to vaccination	94% have been vaccinated
Of total students	74% vaccinated.

Adverse events

Anaphylaxis	3
Syncopal fits	2
Faints	2
Hyperventilation	1
Local reactions	2
Arthritis with fever	1

Enquiries can be directed to Sue Campbell-Lloyd, National Manager of the Measles Control Campaign, Sydney Office, Commonwealth Department of Health and Family Services.

Typhoid vaccine

CSL have advised that they have ceased production of their whole-cell typhoid vaccine, which will no longer be available once present stocks run out. The product has been replaced by the purified capsular polysaccharide vaccine *Typhim Vi*, made by Pasteur Merieux. This vaccine is equally effective and produces fewer adverse reactions. The CSL oral live-attenuated typhoid vaccine, *Typh-Vax (Oral)* will remain available for those who prefer not to have injections.

As *Typhim Vi* is not presently approved for use in Australia in children under the age of 5 years, CSL have maintained a stock of long-dated doses of the whole-cell vaccine for use in children.

Communicable Diseases Surveillance

Highlights

Communicable Diseases Surveillance consists of data from various sources. The National Notifiable Diseases Surveillance System (NNDSS) is conducted under the auspices of the Communicable Diseases Network Australia New Zealand. The *CDI* Virology and Serology Laboratory Reporting Scheme (LabVISE) is a sentinel surveillance scheme. The Australian Sentinel Practice Research Network (ASPREN) is a general practitioner-based sentinel surveillance scheme. In this report, data from the NNDSS are referred to as 'notifications' or 'cases', whereas those from ASPREN are referred to as 'consultations' or 'encounters' while data from the LabVISE scheme are referred to as 'laboratory reports'.

Meningococcal disease

The number of notifications of meningococcal disease has increased again this reporting period. However, the number of cases reported to date in 1998 (248) remains lower than for the same period in 1997 (273).

Vaccine preventable diseases

The number of pertussis notifications remains low in most States, although a relatively high number continue to be reported from Queensland. There has been a decrease in the number of cases for Australia (by onset date) in each successive month from October 1997 to July 1998.

With the exception of a relatively high number of rubella cases in Queensland the number of notifications for all other vaccine preventable diseases also remains low.

The total number of measles notifications for 1998 has been revised downwards because of a reclassification of 79 cases previously notified as measles by Victoria. These cases have been reclassified as not measles following results of serology.

Tables

There were 3,368 notifications to the National Notifiable Diseases Surveillance System (NNDSS) for this four week period, 22 July to 18 August 1998 (Tables 1 and 2). The numbers of reports for selected diseases have been compared with historical data for corresponding periods in the previous three years (Figure 1).

There were 2,563 reports received by the *CDI* Virology and Serology Laboratory Reporting Scheme (LabVISE) this four week period, 16 July to 12 August 1998 (Tables 3 and 4).

The Australian Sentinel Practice Research Network (ASPREN) data for weeks 28 to 31 ending 9 August 1998 are included in this issue of *CDI* (Table 5).

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 22 July to 18 August 1998

Disease[1,2]	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1998	This period 1997	Year to date 1998	Year to date 1997
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0
H. influenzae type b infection	0	0	0	1	0	0	0	0	1	5	22	33
Measles[3]	2	8	0	6	0	4	3	5	28	62	236	371
Mumps	1	3	1	4	1	1	2	2	15	9	107	125
Pertussis	3	72	0	83	37	3	66	5	269	794	4,556	4,861
Rubella[4]	3	5	0	44	2	1	10	4	69	85	487	868
Tetanus	0	0	0	0	0	0	0	0	0	1	3	7

NN. Not Notifiable

1. No notification of poliomyelitis has been received 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.
3. The total number of measles notifications for 1998 has been revised downwards because of a reclassification of 79 cases previously notified as measles by Victoria. These cases have been reclassified as 'not measles' following results of serology.
4. Includes congenital rubella.

Table 2. Notifications of diseases received by State and Territory health authorities in the period 22 July to 18 August 1998 (diseases preventable by routine childhood immunisation are presented in Table 1)

Disease[1,2,3]	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1998	This period 1997	Year to date 1998[4]	Year to date 1997
Arbovirus infection (NEC)[5]	0	0	0	0	0	0	4	1	5	1	70	104
Barmah Forest virus infection	0	5	0	14	0	0	3	0	22	26	402	515
Brucellosis	0	2	0	2	0	0	0	0	4	2	28	19
Campylobacteriosis[4,6]	31	-	11	290	195	24	165	101	817	855	6,358	7,188
Chancroid	0	0	0	0	0	0	0	0	0	0	1	1
Chlamydial infection (NEC)[7]	7	NN	60	260	63	25	103	131	649	697	6,684	5,900
Cholera	0	0	0	0	0	0	0	0	0	1	3	2
Dengue	1	2	2	7	1	0	0	1	14	1	359	193
Donovanosis	0	NN	0	0	NN	0	0	2	2	6	24	23
Gonococcal infection[8]	1	58	100	81	9	2	47	86	384	304	3,438	2,892
Hepatitis A	3	41	7	65	7	0	5	8	136	210	1,977	2,163
Hepatitis B incident[4]	0	1	3	1	0	1	6	0	12	18	143	158
Hepatitis C incident[9]	0	5	0	-	5	0	-	-	10	4	104	49
Hepatitis C unspecified[4]	22	NN	22	201	NN	28	8	74	355	786	4,158	6,086
Hepatitis (NEC)	0	0	0	0	0	0	0	NN	0	1	4	14
Hydatid infection	0	0	0	2	0	0	2	1	5	4	26	28
Legionellosis	0	1	0	1	1	0	0	1	4	6	159	104
Leprosy	0	0	0	0	0	0	0	0	0	0	2	7
Leptospirosis	0	1	1	10	0	0	1	0	13	5	109	80
Listeriosis	0	2	0	0	0	0	0	0	2	8	36	56
Malaria	2	11	3	25	3	1	8	3	56	52	545	536
Meningococcal infection	0	19	6	9	4	5	5	7	55	51	248	273
Ornithosis	0	NN	0	0	0	0	3	1	4	2	24	37
Q Fever	1	8	0	14	3	0	4	0	30	47	346	395
Ross River virus infection	0	6	5	26	1	1	0	3	42	121	2,366	6,296
Salmonellosis (NEC)	2	44	14	100	20	4	61	26	271	321	5,235	4,839
Shigellosis[6]	3	-	4	4	4	3	7	7	32	51	406	553
Syphilis[10]	1	36	33	30	7	0	0	6	113	100	891	821
Tuberculosis	4	8	2	16	0	0	15	4	49	74	616	650
Typhoid[11]	0	2	0	0	0	0	0	0	2	6	52	55
Yersiniosis (NEC)[6]	0	-	0	8	3	0	0	0	11	20	162	179

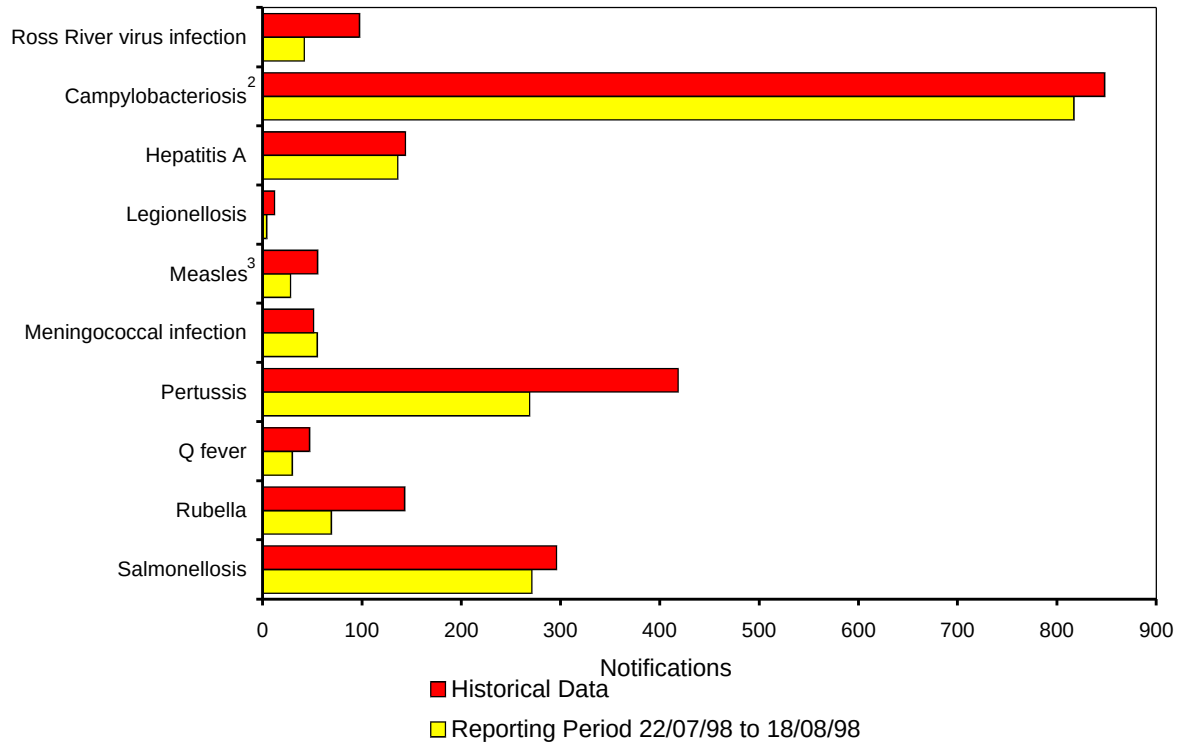
1. For HIV and AIDS, see Tables 6 and 7.
2. Totals comprise data from all States and Territories. Cumulative figures are subject to retrospective revision so there may be discrepancies between the number of new notifications and the increment in the cumulative figure from the previous period.
3. No notifications have been received during 1998 for the following rare diseases: botulism (foodborne), lymphogranuloma venereum, plague, rabies, yellow fever, or other viral haemorrhagic fevers. Two notifications of infant botulism have been received in 1998.
4. Data from Victoria for 1998 are incomplete.
5. NT: includes Barmah Forest virus.
6. Not reported for NSW because it is only notifiable as 'foodborne disease' or 'gastroenteritis in an institution'.
7. WA: genital only
8. NT, Qld, SA and Vic: includes gonococcal neonatal ophthalmia.
9. Qld, Vic and WA incident cases of Hepatitis C are not separately reported.
10. Includes congenital syphilis
11. NSW, Qld, Vic: includes paratyphoid.

NN Not Notifiable.

NEC Not Elsewhere Classified

\- Elsewhere Classified.

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



1. The historical data are the averages of the number of notifications in the corresponding 4 week periods of the last 3 years and the 2 week periods immediately preceding and following those.
2. Data from Victoria for 1998 are incomplete.
3. The total number of measles notifications for 1998 has been revised downwards because of a reclassification of 79 cases previously notified as measles by Victoria. These cases have been reclassified as not measles following results of serology.

Table 3. Virology and serology laboratory reports by State or Territory[1] for the reporting period 16 July to 12 August 1998, and total reports for the year

	State or Territory[1]									
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Total this period	Total reported in *CDI* in 1998
Measles, mumps, rubella										
Measles virus					1		3	3	7	46
Mumps virus		1						4	5	27
Rubella virus		1		8	2			1	12	75
Hepatitis viruses										
Hepatitis A virus		5	1	12	6	1		11	36	288
Arboviruses										
Ross River virus			2	12	1			10	25	554
Barmah Forest virus				2					2	24
Dengue not typed								2	2	25
Murray Valley encephalitis virus								1	1	2
Japanese encephalitis virus								1	1	1
Flavivirus (unspecified)				5					5	49

Table 3. Virology and serology laboratory reports by State or Territory[1] for the reporting period 16 July to 12 August 1998, and total reports for the year, continued

	State or Territory[1]								Total this period	Total reported in *CDI* in 1998
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA		
Adenoviruses										
Adenovirus type 3							5		5	26
Adenovirus type 7							1		1	15
Adenovirus type 40							1		1	5
Adenovirus not typed/pending		12		7	15		4	13	51	471
Herpes viruses										
Herpes virus type 6								1	1	3
Cytomegalovirus		13	1	17	2		21	9	63	492
Varicella-zoster virus		6	1	25	9		39	23	103	818
Epstein-Barr virus		6	3	38	23	2	8	39	119	1,109
Other DNA viruses										
Papovavirus group		1							1	1
Molluscum contagiosum								1	1	2
Contagious pustular dermatitis (Orf virus)								1	1	8
Parvovirus				4	2		1	8	15	129
Picorna virus family										
Coxsackievirus B4							1		1	4
Echovirus type 5							1		1	2
Echovirus type 11							1		1	24
Poliovirus type 2 (uncharacterised)							1		1	5
Poliovirus type 3 (uncharacterised)							1		1	1
Rhinovirus (all types)		6			6		3	21	36	309
Enterovirus not typed/pending				5				23	28	308
Ortho/paramyxoviruses										
Influenza A virus		43	3	37	169		88	130	470	1,545
Influenza B virus		1			5		2	8	16	125
Influenza virus - typing pending								1	1	2
Parainfluenza virus type 1					10			2	12	244
Parainfluenza virus type 2					2			1	3	29
Parainfluenza virus type 3		1		1	2		1	12	17	223
Respiratory syncytial virus		207		28	78	10	229	328	880	2,081
Other RNA viruses										
HTLV-1								1	1	13
Rotavirus		20			18	12	64	75	189	533
Other										
Chlamydia trachomatis not typed		39	31	44	28	3	7	117	269	2,555
Chlamydia psittaci								1	1	33
Mycoplasma pneumoniae		17	3	50	15	3	27	1	116	905
Coxiella burnetii (Q fever)				6	1				7	79
Bordetella pertussis			3	14			30	5	52	762
Legionella longbeachae								2	2	27
TOTAL		379	48	315	395	31	539	856	2,563	13,979

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

Table 4. Virology and serology laboratory reports by contributing laboratories for the reporting period 16 July to 12 August 1998

State or Territory	Laboratory	Reports
New South Wales	Royal Prince Alfred Hospital, Camperdown	122
	South West Area Pathology Service, Liverpool	243
Queensland	Queensland Medical Laboratory, West End	331
	Townsville General Hospital	20
South Australia	Institute of Medical and Veterinary Science, Adelaide	392
Tasmania	Northern Tasmanian Pathology Service, Launceston	31
Victoria	Monash Medical Centre, Melbourne	158
	Royal Children's Hospital, Melbourne	194
	Victorian Infectious Diseases Reference Laboratory, Fairfield	184
Western Australia	PathCentre Virology, Perth	474
	Princess Margaret Hospital, Perth	329
	Western Diagnostic Pathology	85
TOTAL		2,563

Table 5. Australian Sentinel Practice Research Network reports, weeks 28 to 31, 1998

Week number	28		29		30		31	
Week ending on	19 July 1998		26 July 1998		2 August 1998		9 August 1998	
Doctors reporting	59		60		57		55	
Total encounters	7,729		8,152		7,208		7,483	
Condition	Reports	Rate per 1,000 encounters	Reports	Rate per 1,000 encounters	Reports	Rate per 1,000 encounters	Reports	Rate per 1,000 encounters
Influenza	139	18.0	121	14.8	135	18.7	163	21.8
Rubella	0	0.0	0	0.0	3	0.4	0	0.0
Measles	1	0.1	2	0.2	0	0.0	0	0.0
Chickenpox	13	1.7	14	1.7	14	1.9	13	1.7
Pertussis	1	0.1	1	0.1	1	0.1	2	0.3
HIV testing - patient initiated	12	1.6	13	1.6	15	2.1	23	3.1
HIV testing - doctor initiated	6	0.8	7	0.9	3	0.4	3	0.4
Td (ADT) vaccine	36	4.7	28	3.4	46	6.4	54	7.2
Pertussis vaccination	36	4.7	54	6.6	44	6.1	34	4.5
Reaction to pertussis vaccine	2	0.3	0	0.0	0	0.0	0	0.0
Ross River virus infection	0	0.0	0	0.0	1	0.1	1	0.1
Gastroenteritis	57	7.4	85	10.4	81	11.2	80	10.7

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 1998;22:4-5.

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 every four weeks. 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 1998;22:8.

ASPREN currently comprises about 100 general practitioners from throughout the country. Up to 9,000 consultations are reported each week, with special attention to 12 conditions chosen for sentinel surveillance. CDI reports the consultation rates for all of these. For further information, including case definitions, see CDI 1998;22:5-6.

Additional Reports

National Influenza Surveillance, 1998

Three types of data are included in National Influenza Surveillance, 1998. 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 the Tropical Influenza Surveillance Scheme, Territory Health (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 1998; 22:83.

Rates of influenza-like illness reported by the General Practitioner Surveillance Schemes for 1998 have been lower than reports over the same period in 1997. This is in contrast with the laboratory surveillance data that shows higher than normal reports of influenza A compared to all previous years dating back to 1993.

Sentinel General Practitioner Surveillance

Consultation rates for influenza-like illness recorded by the ASPREN scheme showed a decline in the month of July but this trend did not continue for the first two weeks of August (Figure 1), and rates are still around 20 per 1,000 consultations. The New South Wales Sentinel Scheme reported the highest rates of 42.9 per 1,000 in early August and the winter peak of influenza activity is still not over. Reported consultation rates for influenza-like illness across all schemes were less than the 50 per 1,000 consultations reported in late July and early August of last year. The Tropical Influenza Surveillance Programme has reported weekly consultation rates that have been consistently less than 13 per 1,000 for the year to the end of July. This contrasts with 1997, when there was an early peak of 30 per 1,000 consultations in the month of March and a late winter peak that reached the same levels.

Laboratory Surveillance

There have been 1,559 laboratory reports of influenza for the year to date. Of these, 1,461 (91%) were influenza A and 98 (9 %) influenza B (Figure 2). The number of influenza A reports for this year is greater than those reported over the same period for all years dating back to 1993. As the rates of clinical disease have not risen, the laboratory figures are likely to reflect an increase in rates of laboratory testing, rather than a true increase in influenza A. Of laboratory reports of influenza A, a total of 420 (29%) were in children less than 4 years of age. By contrast, children less than 4 years of age accounted for only 3% of reports of all influenza B laboratory reports (Figure 3).

WHO Collaborating Centre for Influenza Reference and Research

To date this season, 448 influenza isolates from Australian laboratories have been analysed. All of these viruses are influenza A (H3N2) subtype strains, no influenza A (H1N1) isolates have been reported and no viable influenza B isolates have been received.

The isolates, which are all cell-culture grown viruses, are antigenically related to the vaccine strain A/Sydney/5/97. However, approximately 30% of the viruses demonstrate some reduction in reactivity with A/Sydney/5/97 antiserum. Further analysis of these less reactive strains is continuing.

Absenteeism surveillance

Rates of absenteeism in Australia Post employees for three consecutive days of each week have been reported on a weekly basis since late April. Absenteeism rates for the year have averaged 0.26% per week. Rates for this reporting period have been no greater than 0.29% (Figure 4).

HIV and AIDS Surveillance

National surveillance for HIV disease is coordinated by the National Centre in HIV Epidemiology and Clinical

Figure 1. Sentinel general practitioner consultation rates, 1998, by week and scheme

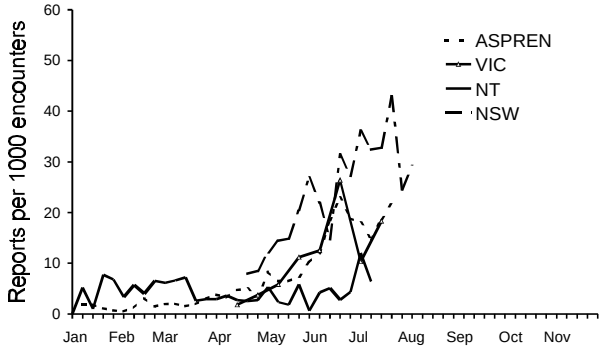


Figure 2. Influenza laboratory reports, 1998, by virus type and week of specimen collection

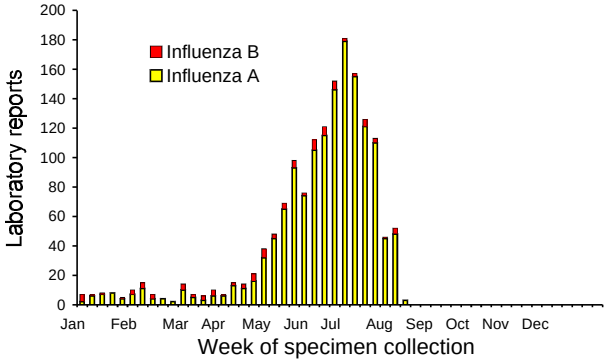


Figure 3. Influenza laboratory reports, 1998, by virus type and age group

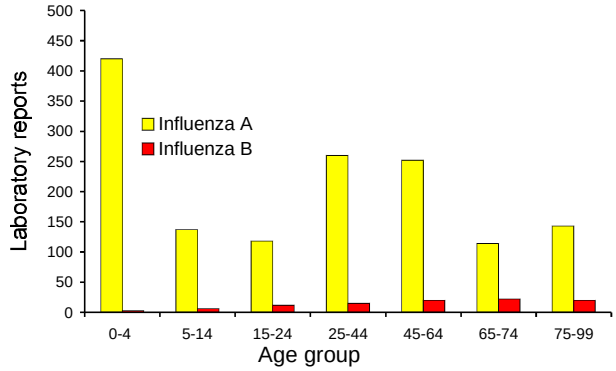
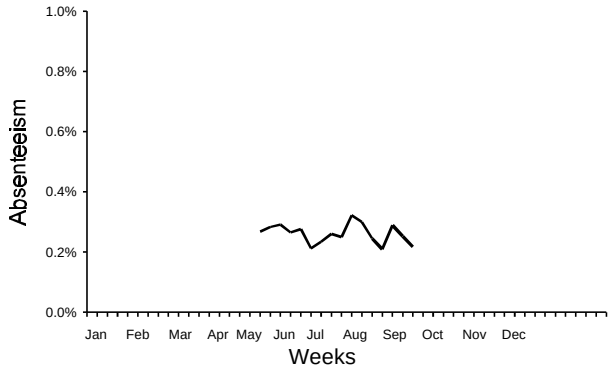


Figure 4. Australia Post absenteeism rates, May to September 1998, by week



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 March 1 to March 31 1998, as reported to 30 June 1998, are included in this issue of CDI (Tables 6 and 7).

Table 6. New diagnoses of HIV infection, new diagnoses of AIDS and deaths following AIDS occurring in the period 1 to 31 March 1998, by sex and State or Territory of diagnosis

		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Totals for Australia: This period 1998	This period 1997	Year to date 1998	Year to date 1997
HIV diagnoses	Female	0	6	0	2	0	0	1	1	10	9	18	23
	Male	0	33	0	8	4	2	10	3	60	53	177	197
	Sex not reported	0	1	0	0	0	0	0	0	1	2	4	7
	Total[1]	0	40	0	10	4	2	11	4	71	64	199	227
AIDS diagnoses	Female	0	0	0	1	0	0	0	0	1	5	2	9
	Male	0	1	1	3	1	0	1	0	7	20	31	88
	Total[1]	0	1	1	4	1	0	1	0	8	25	33	97
AIDS deaths	Female	0	0	0	0	0	0	1	1	2	0	2	4
	Male	0	1	0	1	0	0	3	0	5	23	20	76
	Total[1]	0	1	0	1	0	0	4	1	7	23	22	80

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

Table 7. Cumulative diagnoses of HIV infection, AIDS and deaths following AIDS since the introduction of HIV antibody testing to 31 March 1998, by sex and State or Territory

		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
HIV diagnoses	Female	20	546	7	123	52	4	193	86	1,031
	Male	180	10,262	93	1,790	627	77	3,710	850	17,589
	Sex not reported	0	260	0	0	0	0	28	0	288
	Total[1]	200	11,088	100	1,919	679	81	3,941	939	18,947
AIDS diagnoses	Female	7	157	0	45	19	2	64	23	317
	Male	80	4,333	31	759	320	41	1,526	337	7,427
	Total[1]	87	4,501	31	806	339	43	1,597	362	7,766
AIDS deaths	Female	2	112	0	28	14	2	45	16	219
	Male	62	3,040	23	527	216	27	1,204	241	5,340
	Total[1]	64	3,159	23	557	230	29	1,255	258	5,575

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

Bulletin Board

The Public Health Association of Australia Inc.,
30th Annual Conference
Celebrating Public Health: Decades of Development, Decades of Opportunity
13-16 September 1998
Wrest Point Hotel Casino,
Hobart, Tasmania
Details: PO Box 319,
Curtin ACT 2605
Email: conference@pha.org.au

The Australian Society for Microbiology Inc.,
The 1998 Annual Scientific Meeting and Exhibition
Microbes to the Max
27 September to 2 October 1998
Wrest Point Casino,
Hobart, Tasmania
Phone: 03 9867 8699
Fax: 03 9867 8722
Email: ASMConference@clari.net.au

CRC for Water Quality and Treatment, Water Services Association of Australia and Australian Water and Wastewater Association
Cryptosporidium in Water Conference
5-6 October 1998
Carlton Crest Hotel, Melbourne
Phone: 02 9413 1288
Fax: 02 9413 1047
Email: http://www.med.monash.edu.au/epidemiology/crc/CONFER/crypconf.htm

The Australian Institute of Environmental Health
25th National Conference
25-30 October 1998
Ana Hotel, Surfers Paradise, Queensland
Phone: 07 334 2299

The Public Health Association of Australia Inc.,
6th National Conference on Immunisation
Immunisation; Beyond 2000
4-5 November 1998
Hilton on the Park, Melbourne
Phone: 02 6283 2373
Email: conference@pha.org.au

Centers for Disease Control (USA) and the World Health Organization
2nd International Conference on Emerging Zoonoses
5-9 November 1998
Strasbourg, France
Phone: +33 1 474 22016
Fax: +33 1 426 51725
Email: trgt@netvision.net.il

National Centre for Epidemiology and Population Health
Conference: *Developing Health*
11-12 November 1998
Canberra
Phone: 02 6249 5627
Fax: 02 6249 0740
Email: dev.health@nceph.anu.edu.au

Communicable Diseases Network Australia New Zealand
Conference: *Control of Communicable Diseases in Australia*
10 November 1998
Australian National University, Canberra
Phone: 02 6289 8245
Fax: 02 62897791
Email: ccd.conf@health.gov.au

The Australasian Society for HIV Medicine
19th Annual Conference
18-21 November 1998
Newcastle, venue to be advised
Phone: 02 9382 1656
Fax: 02 9382 3699
Email: B.Pearlman@unsw.edu.au

The CDI Bulletin Board is provided as a service to readers. Every effort has been made to provide accurate material, but readers are advised to contact the organisations for confirmation of details.

Contributions to the Bulletin Board are invited from those organisations with forthcoming events relevant to communicable disease control.

Overseas briefs

Source: World Health Organization (WHO)

Anthrax, Russian Federation

In June and July 1998, 3 outbreaks of anthrax were reported from different regions of the Russian Federation, causing 15 cases and 2 deaths. All the cases occurred in connection with the consumption of meat from privately raised cattle, and all received treatment. Official sources report that the situation is under control. WHO is currently investigating reports of anthrax outbreaks in several other countries.

Meningococcal meningitis, Angola

The Ministry of Health reported a total of 1,113 cases of meningococcal meningitis (group A) from 1 January to 24 August 1998 of which 115 have died (case fatality ratio 10.3%). The most affected provinces were Bié, Malange, Lunda Norte and Huambo. The cumulative attack rate has reached 43 per 100,000 population, and the most affected age group is 15-29 years, followed by the 4-14 years age group. The Ministry of Health has set up a coordinating committee to respond to this epidemic and is appealing for vaccine, autodestruct syringes, medicine, laboratory services, and financial resources to ensure efficient logistical support for the response. A vaccination campaign is being carried out with NGO support in circumstances rendered difficult by the current deterioration in the security situation in some areas of Angola.

Cholera/diarrhoea outbreak, Liberia

The national health authorities of Liberia have reported an outbreak of cholera/diarrhoea which started at the end of May. The areas affected by the outbreak are Nimba County and Margibi County. Up to 26 June a total of 560 cases with 12 deaths had occurred. The county health teams carried out various control measures in the areas affected, including chlorination of wells, health education and opening of ORT treatment centres. Follow-up missions were undertaken by WHO in collaboration with the two county health teams. Another outbreak of severe diarrhoea was reported in Sinoe County at the beginning of July although the number of cases is not yet known. Heavy rains in the area have hampered aid to the area as bridges have been washed away. As well as the activities carried out by the county health teams, WHO, UNICEF, the Belgian Red Cross and other NGO's are collaborating with the national health authorities and the local communities to provide aid.

Cholera

Mozambique

Up to mid-July 1998, Mozambique has notified a total of 26,783 cases of cholera and 619 deaths (case fatality rate of 2.3 %) affecting 8 of the 11 provinces in the country. Although cases continue to be reported there has been a sharp decrease since the middle of June. However, the Ministry of Health has contacted all provincial authorities to be prepared for the next rainy period during which a resurgence of cholera is expected to occur. The reactivation of Provincial Emergency Committees for epidemic preparedness activity is being encouraged.

Afghanistan

Afghanistan has had a cholera outbreak since July this year. Approximately 1,500 cholera cases per day are reportedly occurring in Kabul Province. Other areas affected are Logar and Bamyan Provinces in the central part of the country and Uruzgan Province in the south. Laboratory investigation has confirmed that the outbreak is caused by *Vibrio cholerae* O1 El Tor. According to information available to date the case fatality rate has been low.

In the Central Region, the WHO sub-office reports that more than 10,000 cases of acute diarrhoea, especially among women and children, have been registered in the 59 health facilities in Kabul over the ten days to 21 August, with a few deaths. As the safe water situation is deteriorating in the city, the death rate is likely to increase.

The Ministry of Health, in collaboration with WHO, has set up a Cholera Task Force. In the Northern and North-eastern Regions where access is difficult, the case fatality rate is 3-15%.

Asia

In addition to the seasonal pattern of cholera in this region, extremely heavy rainfalls and floods this year have contributed to an increase in both cholera cases and deaths as well as an increased risk of waterborne epidemics in general. The WHO is concerned about this situation and, through its regional offices, has alerted Ministries of Health in the region to strengthen cholera preparedness activities.

Yellow fever, Brazil

A total of 24 confirmed cases of yellow fever with 9 deaths has recently been reported to the Pan-American Health Organization (PAHO)/WHO for the period February to May 1998. Sixteen cases (68%) were male and 8 (32%) were female. Sixteen cases were known not to have been vaccinated, 2 were reported to have been vaccinated and the status of 6 was unknown.

In Pará State, 53 municipalities with a population of 3.1 million (approximately 60 % of the total population of the State) are considered to be high risk areas and vaccination of the whole population is planned during 1998. In Afuá municipality nearly 85% of the total population of 26,000 have been vaccinated in the past months. The PAHO/WHO Regional Office for the Americas, is cooperating with the Ministry of Health to define priorities for control strategies and to improve the surveillance of yellow fever.

Overseas briefs, *continued*

Legionellosis, France

Since early June 1998, 19 cases of legionellosis have been identified among visitors to Paris. Ten of the cases were French nationals and 9 were tourists from other European countries. All cases occurred between 6 June and 3 July. Three patients died.

Investigations to identify the source of the outbreak are being carried out but no results have been obtained to date. As a precautionary measure, owners of cooling towers in the 2nd and 9th *arrondissements* have been ordered to clean and disinfect their installations.

No new cases have been detected since 3 July 1998. Heightened surveillance and investigations to identify the source continue.

CDI is produced every four weeks by the National Centre for Disease Control, Department of Health and Family Services, GPO Box 9848 Canberra ACT 2601; fax: (02) 6289 7791, phone: (02) 6289 6895.

This journal is indexed by *Index Medicus* and Medline.

Subscriptions

Canberra Mailing, PO Box 650, Fyshwick ACT 2609, fax (02) 6269 1212

Website

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Contributions

Contributions covering any aspects of communicable diseases are invited. All contributions are subject to the normal refereeing process. Instructions to authors can be found in *CDI* 1998;22:9.