Tuberculosis notifications in Australia, 1997

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Abstract

Since the inception of the National Mycobacterial Surveillance System (NMSS) in 1991, annual crude notification rates for tuberculosis (TB) have remained stable at between 5 and 6 per 100,000 population. In 1997, there was a total of 1,001 TB notifications in Australia, of which 954 were new TB cases and 47 relapses. The corresponding annual crude notification rate for new and relapsed TB was 5.15 and 0.25 per 100,000 respectively. Seventy-nine per cent of notifications that had a country of birth reported were overseas born. In keeping with trends observed over recent reporting years, the populations for which notified TB rates were highest include the overseas born from high prevalence countries and indigenous Australians. The lowest rates of disease have continued to be reported in the non-indigenous, Australian born population. Surveillance reports over the last seven years indicate that the rate of disease in this population is gradually declining. ***Commun Dis Intell*** **1999;23:337-347.**

Introduction

The dominant global threat of tuberculosis (TB) to human health has been reaffirmed in a series of recent World Health Organization reports. One-third of the global population, and as many as 50% of the world's refugees, are estimated to be infected with *Mycobacterium tuberculosis* (*M. tuberculosis)*.[1] In 1997, 2.9 million deaths world wide were attributable to TB,[2] and 3.3 million case notifications were reported by 173 countries to the WHO Global Surveillance Programme, of which 38% were sputum smear positive. These reported figures represent only 42% of the estimated 7.9 million cases of TB for the year.[3]

The HIV pandemic continues to fuel the TB epidemic in regions of the world, especially Asia and sub-Saharan Africa. Up to 40% of AIDS deaths in these regions are due to TB, and it is estimated that by the end of the century, HIV will account for 1.5 million new TB cases per year that would otherwise have not occurred.[1]

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Contents

The global burden of TB is maintained by poverty, natural disasters, conflict and political instability, which have served to thwart the development of health services in many countries, or have lead to a progressive erosion in existing health infrastructures. Human migration, that is so often the consequence of these events, has created a social context in which the delivery of effective drug treatment is further compromised. Poorly supervised and partially treated TB are the basis for the emergent problem of multi-drug resistant TB (MDR-TB) that has already taken root in 'hot zones' around the globe. From 35 countries surveyed in 1994-1997, the median prevalence of primary MDR-TB was 1.4% (range: 0-14.4%) and for acquired resistance, the median prevalence was 13% (range: 0-54%).[4] The existing and growing threat of MDR-TB is already raising concerns that the DOTS (Directly Observed Therapy Short course) advocated by the WHO's Global Tuberculosis Programme may need to be upgraded in some countries to a 'DOTS-plus' strategy to help identify resistant disease and offer individualised therapy.[5]

Although 64% of global TB case notifications in 1997 were from South-East Asia and the Western Pacific regions,[3] Australia has maintained stable TB rates in the face of this major regional disease threat.[6] The National Mycobacterial Surveillance System (NMSS) that has been in effect since 1991, has enabled trends in the rates of active TB to be monitored over the last seven years, and has helped describe the epidemiology of TB in Australia. These surveillance efforts have helped identify high-risk groups for targeted control. In time, enhancements to the existing surveillance system will be better able to inform policy makers, public health practitioners and clinicians on the outcomes achieved from TB control efforts.

Methods

Notifications reported to State and Territory health authorities are collated on an annual basis and referred to the National Mycobacterial Surveillance System in computerised format, with all reports being de-identified beforehand. In all States and Territories, with the exception of New South Wales, * a standardised data set is forwarded to Commonwealth for collation and analysis using Epi info version 6.04. A core data field is shared with the National Notifiable Disease Surveillance System (NNDSS). Variables reported in this core field include: a unique identifier for each notification; disease code, to differentiate *Mycobacterium tuberculosis* complex (MTBC) from atypical mycobacteria infections; postcode of residence; date of birth; sex; dates of disease onset and report; indigenous status; and confirmation status of the report. A supplementary data set is included with information pertaining to 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 BCG vaccination, HIV status and classification of tuberculosis as new or relapsed disease.

The case definitions for mycobacterial disease 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).

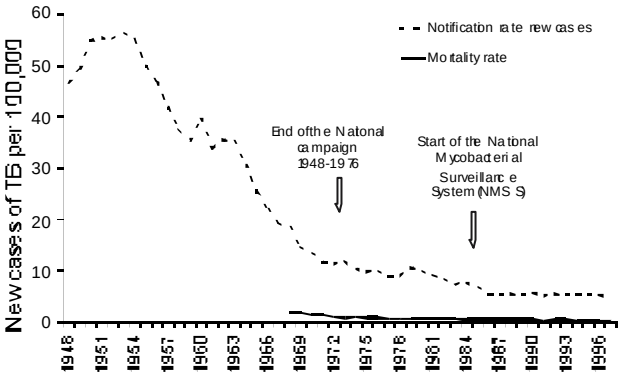
Mortality data for tuberculosis, and denominator population data for the calculation of rates, were obtained from the Australian Bureau of Statistics (ABS). Denominator data for age and sex are based on mid-year population estimates for 1997. Resident population by indigenous status and country of birth were based on estimates of the relevant population sizes as at 30 June, 1997. The classification and grouping of countries adhered to the ABS standard classification of countries for social statistics.[7]

Results

Notification rates - new and relapsed cases

In 1997, 1,001 cases of active tuberculosis were notified nationally: 954 (95%) were new cases and 47 were relapses. The corresponding crude annual notification rate was 5.15 per 100,000 for new cases, 0.25 per 100,000 for relapses and 5.40 per 100,000 for total notifications. These rates are slightly lower than what has been reported over the last decade (Table 1). Since 1986, the decline in notification rates for new disease has slowed compared to the decade after the end of the National TB Campaign (Figure1).

Figure 1. Notification rates for new tuberculosis (1948-1997) and tuberculosis crude mortality rates (1967-1997) per 100,000 population, Australia



* New South Wales forwards the complete data set for mycobacterial notifications. A number of additional fields are included in this data set which are not routinely used for national reporting.

Table 1. Notifications of new and relapsed cases of tuberculosis, and rates per 100,000 population, Australia, 1986-1997, 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	5.37	54	0.29	1,037	5.66
1997	954	5.15	47	0.25	1,001	5.40

Table 2. Notifications of new and relapsed cases of tuberculosis and rates per 100,000 population, Australia, 1997, by State and Territory

State/Territory	New cases		Relapsed cases		Total cases	
	Number	Rate	Number	Rate	Number	Crude Rate
Australian Capital Territory	11	3.55	2	0.65	13	4.20
New South Wales	414	6.60	31	0.49	445	7.09
Northern Territory	33	17.63	2	1.07	35	18.70
Queensland	97	2.85	8	0.24	105	3.09
South Australia	46	3.11	0	0.00	46	3.11
Tasmania	13	2.75	1	0.21	14	2.96
Victoria	274	5.95	2	0.04	276	5.99
Western Australia	66	3.67	1	0.06	67	3.73
Total	954	5.15	47	0.25	1,001	5.40

Total notification rates varied widely between jurisdictions (Table 2). Since 1991, rates of TB have been less than 5 per 100,000 in Tasmania, Queensland, South Australia and Western Australia. In the Australian Capital Territory rates have been less than 5 per 100,000 for all years except 1992 and 1995. The two most populous States, Victoria and New South Wales, have reported intermediate rates of between 5 and 8 per 100,000 since 1991, and the Northern Territory has reported rates in excess of 15 per 100,000 over the same time period.

Age and sex

Sex was reported in 952 (99.8%) of 954 new TB cases. Of these, males accounted for 506 (53%) and females for 446 notifications. The corresponding rates for new disease in males and females was 5.49 and 4.79 per 100,000 respectively.

Age-specific rates for males were 1.3 to 2.7-fold higher than corresponding rates in females over the age of 65 years (Table 3). In the younger age groups, age-specific rates for males showed an increase above 7 per 100,000 in the 25-29 year age group, and females had similar rates in the 30-34 year old age group. Male rates increased to over 8 per 100,000 in all age groups over the age of 60 years. By contrast female rates increased to over 7 per 100,000 in all age groups over the age of 70 years. Males accounted for 27(57%) cases of relapsed disease and females for 20. The highest age-specific rate for relapsed disease of 1.80 per 100,000 was reported in the 75-79 year old age group. Persons over the age of 65 years accounted for 25 (53%) of all notifications of relapsed disease.

Age standardised notification rates for new TB cases by State and Territory are shown in Table 4. When adjusted by age, the rates in Northern Territory remained 3 to 7-fold higher than other States/Territory.

Principal sites of disease

Of new TB cases, 574 were pulmonary and 171 lymphatic (Table 5). Details of site by age and country of birth are described below.

Table 3. Notifications of new cases of tuberculosis and rates per 100,000 population, Australia, 1997, by age group and sex

Age group (years)	Males[1]		Females[2]		Total	
	Number	Rate	Number	Rate	Number	Rate
0-4	11	1.66	7	1.11	18	1.39
5-9	5	0.74	1	0.16	6	0.46
10-14	8	1.19	4	0.62	12	0.91
15-19	17	2.56	14	2.22	31	2.39
20-24	24	3.44	47	6.96	71	5.17
25-29[3]	70	9.61	48	6.62	118	8.12
30-34	46	6.47	51	7.14	97	6.81
35-39	46	6.24	50	6.75	96	6.49
40-44	31	4.50	38	5.49	69	5.00
45-49	36	5.54	25	3.91	61	4.73
50-54	22	3.95	25	4.66	47	4.30
55-59	28	6.47	22	5.24	50	5.87
60-64	30	8.34	24	6.62	54	7.47
65-69	36	10.72	16	4.55	52	7.57
70-74	40	14.25	27	8.23	67	11.01
75-79	20	10.53	20	7.83	40	8.98
80-84	21	19.30	15	8.39	36	12.52
85+	13	19.92	11	7.29	24	11.11
Unknown	2	-	1	-	3	-
Total	506	5.49	446	4.79	952	5.14

1. Two males no age known
2. One female no age known
3. Two in 25-29 year age group with no known sex

Table 4. Age standardised rates for new tuberculosis cases by State and Territory[1]

	ACT	NSW	NT	Qld	SA	Tas	Vic	WA
Total notifications	11	414	33	97	46	13	271	66
Unadjusted	3.55	6.60	17.63	2.85	3.11	2.75	5.88	3.67
Indirect adjusted	3.74	6.55	19.92	2.90	3.03	2.77	5.82	3.76

1. Indirect age standardised rates calculated using 5 year age-specific TB rates for Australia (based on 1997 mid year population estimates) applied to each of the corresponding age group categories for States/Territories

Table 5. Notifications of new and relapsed cases of tuberculosis in Australia, 1997, by site of disease

Site	New cases	Relapsed cases	Total cases	%Total
Pulmonary	574	40	614	61.3
Pleural	35	0	35	3.5
Lymphatic	171	3	174	17.4
Bone/Joint	43	1	44	4.4
Gen/Urinary	28	0	28	2.8
Miliary	16	1	17	1.7
Meningeal	6	1	7	0.7
Peritoneal	18	0	18	1.8
Others	22	0	22	2.2
Unknown	41	1	42	4.2
Total	954	47	1,001	100

Table 6. Method of diagnosis used in new and relapsed cases of tuberculosis, Australia, 1997

Method of diagnosis	New	% all new cases	Relapsed	% all relapsed cases
Culture	558	58.5	16	34.0
Microscopy	215	22.5	6	12.8
Histology	178	18.7	2	4.3
Tuberculin test	148	15.5	2	4.3
Radiology	285	29.9	15	31.9
Clinical	227	23.8	7	14.9
Others	4	0.4	0	0.0

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

BCG status

BCG status was positive in 156 (16%), negative in 386 (38%) and unknown for 459 (46%) of 1,001 TB notifications. Thirty (19%) of those who had received BCG vaccination in the past were Australian born (19 of these were indigenous Australians), 114 (73%) were overseas born and in 12 (8%) the country of birth was not reported.

Of the 156 cases of active TB that had been BCG vaccinated in the past, 97 (62%) were reported as having pulmonary TB as the principal site of disease, 55 (35%) had extra-pulmonary disease and one case was reported as having miliary disease. In 3 cases a principal disease site was not specified.

Methods of diagnosis

The methods used to obtain a diagnosis of active TB are given for new and relapsed disease cases in Table 6. Of the 1,001 notifications of active TB in Australia for 1997, a positive culture was reported in only 574 (57%) and positive microscopy in 221 (22%). The range of culture positive notifications by State or Territory ranged from 38-86%. For all States and Territories (except New South Wales, for which this information was not readily available), culture was used in combination with microscopy or histology in 170 (50%) of 358 culture positive cases.

Pathogen

Despite the low reporting of culture as a diagnostic method, a pathogen was reported in 862 (86%) of all notified cases of TB. Of these 853 (99%) were *M. tuberculosis*, 5 (0.6%) *M. bovis* and 4 (0.4%) *M. africanum*.

Antimicrobial therapy

The choice of antibiotic regimen started at the time of notification was reported in 842 (84%) cases of TB (Table 7). The two most commonly prescribed combinations were isoniazid, rifampicin, pyrazinamide and ethambutol in 665 (79%) cases, and a three drug combination of isoniazid, rifampicin and pyrazinamide in 110 (13%) cases. In 809 (96%) cases, one of the prescribed regimens included a combination of isoniazid and rifampicin.

Of all the 842 drug regimens reported, a six drug regimen was started in 3 (0.5%), a five drug regimen in 3 (0.3%), a four drug regimen in 680 (81%), a three drug regimen in 139 (16%) and a two drug regimen in 17 (2%) cases. In only 1 case of relapsed disease was a regimen of more than four drugs prescribed.

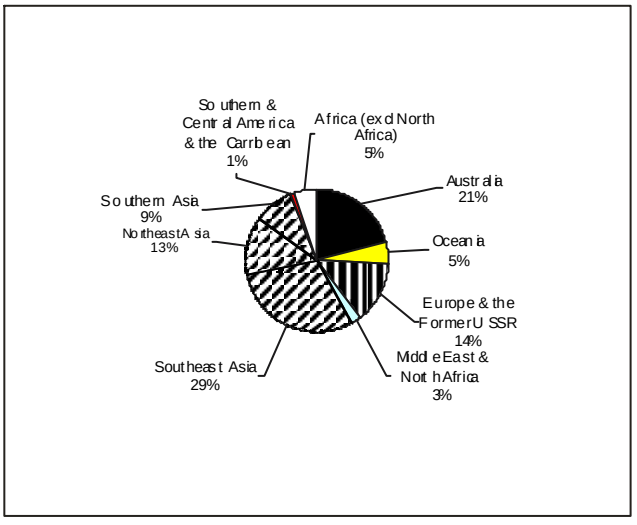
HIV status

HIV status was unknown in 900 (90%) notified cases of TB. Of the 101 cases in which HIV status was reported, there were 10 positive and 91 negative. The TB/HIV co-infected cases consisted of 6 males and 4 females. Seven (70%) were aged between 20 and 45 years, 2 were aged over 75 years and only 1 case was reported in a child aged 1 year. None of the HIV reported TB cases were relapses. Seven of the 10 were overseas born. The principal sites of TB reported included pulmonary (8), lymphatic (1) and disseminated (1).

Country of birth

The majority of notified cases of TB were people born overseas. The proportion of TB cases in the overseas born, by region of birth, are shown in Figure 2. The number of new TB cases reported in the Australian and overseas born populations was 176 and 673 respectively. The corresponding rate of new TB disease in the Australian and overseas born populations was 1.2 and 15.6 per 100,000 respectively. Rates of new TB in the Australian born population are lower than reported since 1991. Rates in the overseas born have been constant

Figure 2. Proportion of tuberculosis cases where country of birth was reported, in Australian and overseas born, by region of birth, 1997 [1]



1. Country of birth was not reported in 11% of notifications

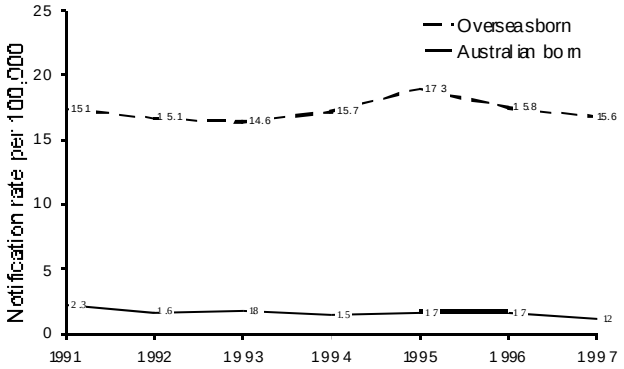
Table 7. Initial drug regimen at time of notification of tuberculosis, Australia, 1997

	New cases	Relapsed cases	Total
6 drug regimen			
H+R+Z+E+cyc+cipro	1	0	1
H+R+Z+E+clarithro+cipro	1	0	1
H+Z+E+ RFB+clo+cipro	1	0	1
5 drug regimen			
H+R+Z+E+str	1	1	2
H+Z+capreo+cyc+RFB	1	0	1
4 drug regimen			
H+R+Z+E	629	36	665
H+R+Z+eth	4	0	4
H+R+Z+str	0	1	1
H+R+E+str	2	0	2
H+R+E+clarithro	1	0	1
H+Z+E+ RFB	6	0	6
H+Z+E+str	1	0	1
3 drug regimen			
H+R+Z	108	2	110
H+R+E	22		22
H+Z+E	5	1	6
R+Z+E	1		1
2 drug regimen			
H+Z	13	1	14
H+E	1		1
R+E	0	1	1
H+RFB	1		1
Unknown	155	4	159
Total	954	47	1,001

H=isoniazid; E=ethambutol; Eth=ethionamide; RFB=rifabutin;
R=rifampicin; Str=streptomycin; Cipro=ciprofloxacin; Clo=clofazamine;
Z=pyrazinamide; c larithro=clarithromycin; Capreo=capreomycin; cyc=cycloserine.

since 1991 with no similar downward trend, as seen in the Australian born, being observed (Figure 3).

Figure 3. Tuberculosis notification rates, new disease, in the Australian and overseas born, 1991-1997



In cases of relapse, Australian born were most frequent. Ten (24%) were Australian born, of which 3 were indigenous Australians. The remaining 31 cases in the overseas born came from the following regions: Asia (21), Europe (6), Middle East (1), South America (1), Africa(1) and Oceania (1). Country of birth was unknown for 6 relapsed cases.

The relative rates of all TB notifications (new and relapsed) per 100,000 overseas born resident population in Australia, are shown in Figure 4. The countries with the highest rates of TB include Vietnam 116 cases (70.1 per 100,000); Indonesia 36 cases (68.2 per 100,000); India 53 cases (59.0 per 100,000); China 75 cases (57.6 per 100,000); and the Philippines 57 cases (54.4 per 100,000). Together these countries accounted for 337 (48%) notifications in the overseas born. The rates of TB in the overseas born per 100,000 resident population in Australia for 1997 are presented together with World Health Organization case notification rates for TB in the country of origin for the same year (Table 8). In some countries, such as Indonesia the estimated rates are considered to be higher than what is officially reported.

The length of time that overseas born persons had been resident in Australia was reported for 386 (55%)

Figure 4. Tuberculosis notification rates, by country of birth, per 100,000 resident population in Australia, 1997

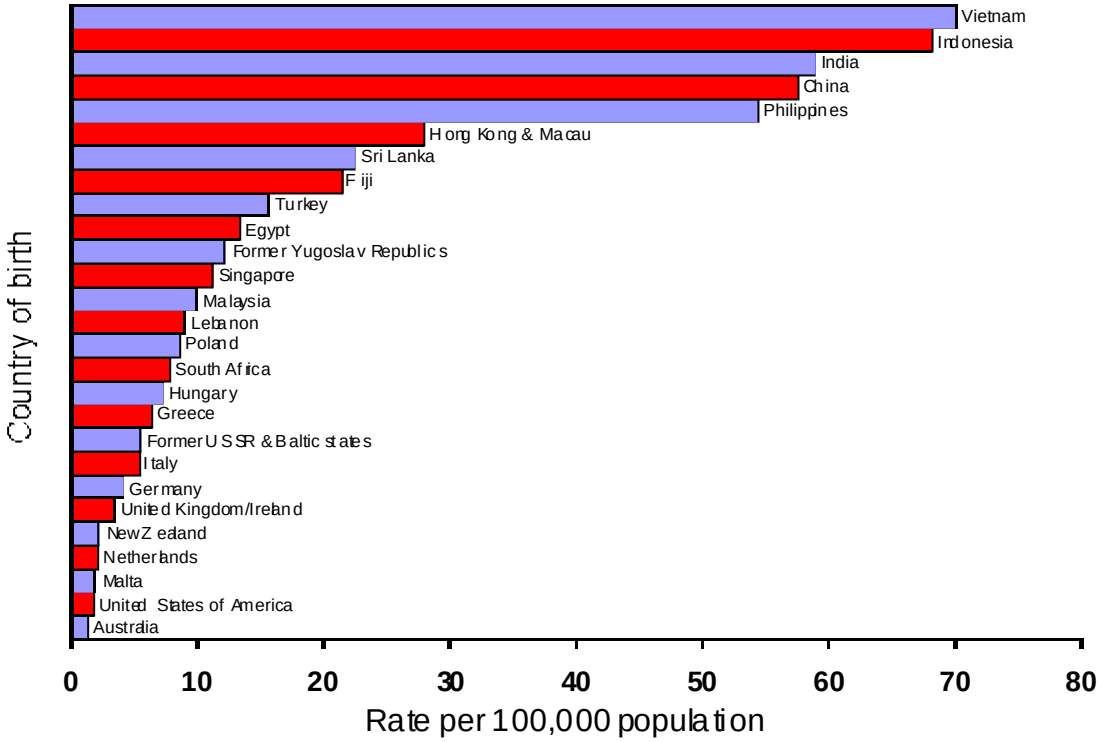
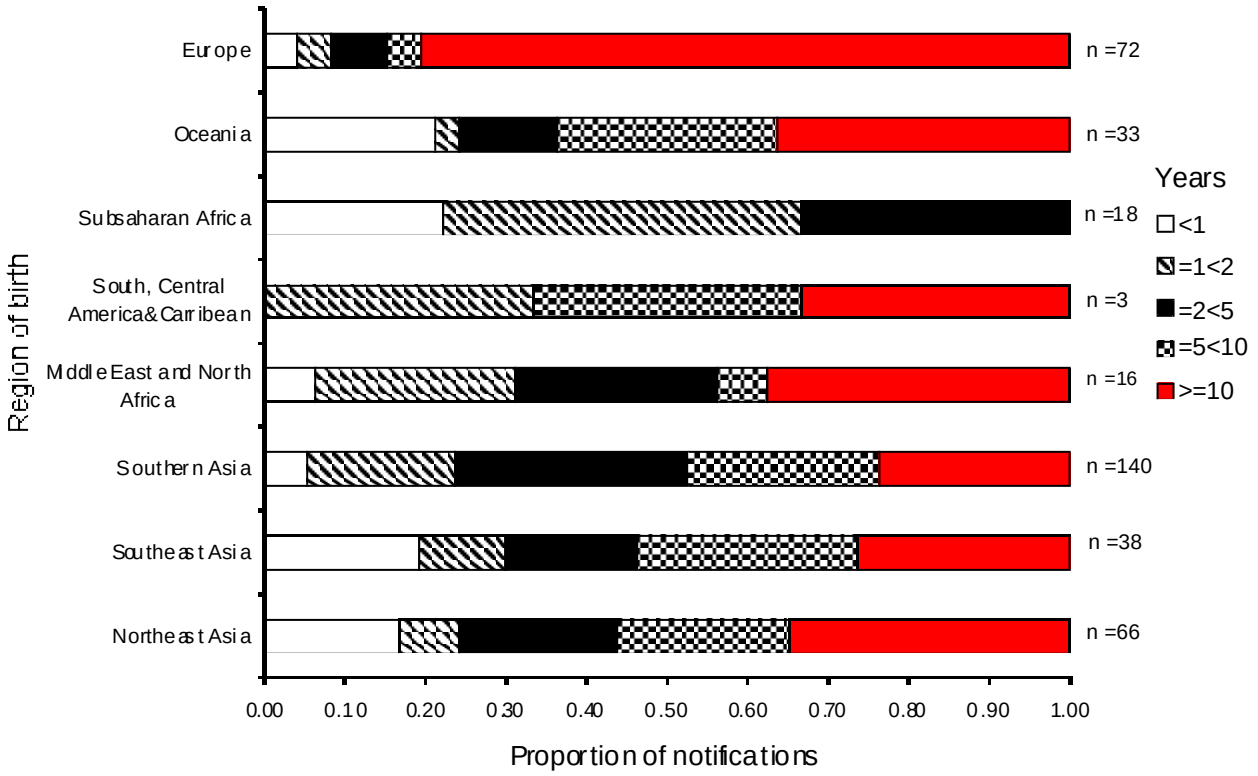


Figure 5. Years of Australian residency for tuberculosis notifications in the overseas born, by region of birth



notifications. Of these 55(14%) had been resident for less than 1 year, 44 (11%) from 1 to less than 2 years, 66 (17%) from 2 to less than 5 years, 75 (19%) from 5 to less than 10 years and 146 (38%) for 10 years or more. The majority (80%) of persons from Europe developed active TB after 10 years of Australian residency, and 40- 50% of those from the Asian region developed TB within 5 years of Australian residency. The 18 TB notifications in sub-Saharan Africans, for which number of years of Australian residency were reported, all occurred within 5 years of arrival in Australia (Figure 5).

The age and sex distribution of Australian and overseas born TB notifications is given in Figures 6 and 7. The overseas born show high age specific rates in both young adults and the elderly, whereas in the Australian born population, a gradual increase in age-specific rates with advancing age is more characteristic.

Table 8. Total notifications of tuberculosis, Australia, 1997. Number and estimated rates per 100, 000 by reported country and region of birth*

	Number	Estimated population by country of birth in Australia	Rate per 100,000 population in Australia, by country of birth	WHO notification rate (per 100,000) for country, 1997
Australia	186	14,209,600	1.3	6.3
Oceania				
Fiji	9	41,900	21.5	21.1
New Zealand	7	325,500	2.2	5.0
Other	26	55,600	48.6	
Europe & the former USSR				
Germany	5	121,500	4.1	13.6
Greece	9	141,700	7.1	7.3
Hungary	2	27,500	7.3	42.4
Italy	14	256,700	5.5	8.5
Malta	1	54,500	1.8	3.0
Netherlands	2	94,700	2.1	9.5
Poland	6	70,000	8.6	36.2
United Kingdom/Ireland	42	1,214,100	3.5	10.1/12
Former Yugoslav Republics	24	197,600	12.1	39.3-71.2[1]
Former USSR & Baltic States	3	54,700	5.5	30.7-119.3[2]
Other	14	179,700	7.8	
Middle East & North Africa				
Egypt	5	37,400	13.4	21.7
Lebanon	7	77,700	9.0	22.3
Turkey	5	32,000	15.6	33.1
Other	7	67,900	10.3	
Southeast Asia				
Indonesia	36	52,800	68.2	10.9
Malaysia	9	90,800	9.9	64.4
Philippines	57	104,700	54.4	294.5
Singapore	4	35,800	11.2	57.5
Vietnam	116	165,400	70.1	111.0
Other	44	68,500	64.2	
Northeast Asia				
China	75	130,300	57.6	33.7
Hong Kong & Macau	22	78,700	28.0	111.7
Other	19	85,500	22.2	
Southern Asia				
India	53	89,900	59.0	118.3
Sri Lanka	12	53,300	22.5	35.7
Other	14	25,000	56.0	
Northern America				
Canada	0	28,500	0.0	6.2[3]
United States of America	1	56,600	1.8	6.4
Other	0	400	0.0	

Table 8. Total notifications of tuberculosis, Australia, 1997. Number and estimated rates per 100, 000 by reported country and region of birth*, (continued)

Southern & Central America, and the Carribean				
Chile	0	26,200	0.0	26.5
Other	6	57,400	10.5	
Africa (excl North Africa)				
South Africa	5	64,300	7.8	242.7
Other	43	57,900	74.3	
Unknown	111			
Totals	1,001	18,532,300		

1. Federal Republic of Yugoslavia = 39.3 per 100,000; Bosnia Herzegovina = 71.2 per 100,000
2. Tajikstan = 30.9 per 100,000; Krygyzstan = 119.3 per 100,000. Rates for the Russian federation are 82.3 per 100,000
3. As 1997 figures for Canada are not available, the 1996 figure is given

The relative distributions of pulmonary, lymphatic and 'other than lymphatic' extra-pulmonary TB by sex and 15 year age groups in the Australian and overseas born populations is shown in Figures 8, 9 and 10. Overseas born males accounted for the highest numbers of pulmonary TB notifications in those aged over 15 years. Overseas born females accounted for the highest number of notifications of lymphatic disease in all age groups. Of the 155 notifications of lymphatic disease for which country of birth and sex were reported, 107 (69%) were overseas born females. Of these, 67 (62%) were between the ages of 25 and 50 years. Overseas born females accounted for the majority of extra-pulmonary disease notifications, in age groups over 30 years. Overall, 42% of all disease in the overseas born and 28% in the Australian born was extra-pulmonary.

Of the 36 cases of TB notified in children less than 15 years of age, a country of birth and disease site was reported in 30. Of these, 19 were pulmonary, 4 lymphatic and 7 were an alternative disease site. Ten (53%) of the 19 pulmonary cases, none of the 4 cases of lymphatic disease and 3 of 7 extra-pulmonary (other than lymphatic) TB sites were in Australian born children.

Figure 7. Age-specific tuberculosis notification rates in the Australian born, per 100,000 Australian born resident population, 1997

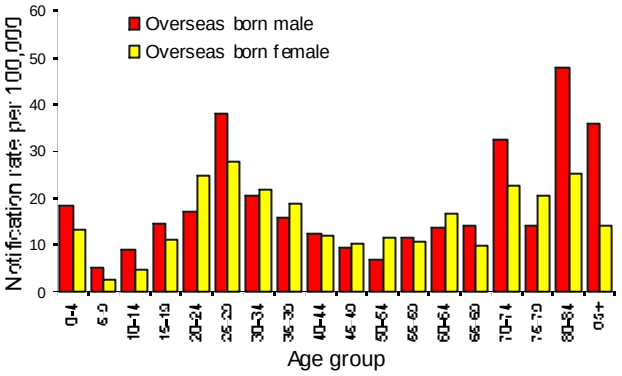


Figure 6. Age-specific tuberculosis notification rates in the overseas born, per 100,000 overseas born population, 1997

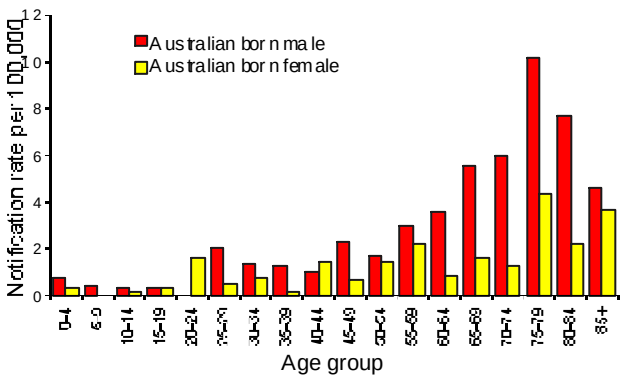
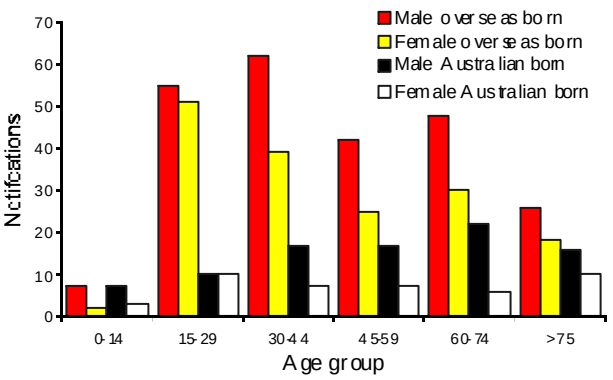


Figure 8. Pulmonary tuberculosis as principal disease site. Notifications in Australian and overseas born, by age group and sex, 1997



Indigenous status

Indigenous status was reported for 847 (85%) of all notifications. Indigenous Australians accounted for 40 TB cases in 1997, of which 3 were relapses and 37 new cases of TB. Twenty (50%) notifications of TB in indigenous Australians were reported from the Northern Territory. The annual crude incidence rate of new disease per 100,000 indigenous population was between 9.1 and 10.1 based on upper and lower indigenous population estimates for the year. Relapse rates were 0.73 and 0.76 per 100,000 based on the same estimates. The comparative TB rate of new disease in the Australian born, non-indigenous population was 1.0 per 100,000.

Twenty-two notifications were in males and 18 in females. Six (15%) of indigenous notifications were aged over 60 years, and 1 case was aged less than 14 years. The remaining 33 (82.5%) notifications were aged between 20 and 60 years.

Mortality

In 1997, the Australian Bureau of Statistics[8] reported 35 deaths for which TB was the underlying cause. The crude mortality rate was 0.19 per 100,000, which is the lowest rate reported for TB in 30 years. Of these, 25 (71%) were in males and 10 in females. Twenty-eight (80%) deaths occurred in persons over the age of 60 years, and no TB deaths were registered in persons under 25 years of age.

Sites of disease reported included pulmonary (27), other respiratory (1), meninges and central nervous system (2) and miliary (5).

Discussion

The NMSS has only ever reported on active TB disease. Symptomatic TB is often progressive and the majority of sufferers will seek medical attention during the course of their illness. Such cases are detected by passive surveillance. In other instances active TB cases will be picked up through active TB surveillance efforts. Contact tracing, post-migration screening and occasional screening of high risk populations such as health care workers, represent active surveillance strategies that will occasionally detect active TB cases. The relative number of active TB cases notified nationally detected through active, versus passive, surveillance is unknown.

Australia continues to report one of the lowest TB rates in the world. Other developed countries that have reported rates of less than 6 per 100,000 in 1997 include Sweden, Iceland and Norway.[3] Since 1986 annual crude notification rates for TB in Australia have stabilised between 5 and 6 per 100,000.[6,9]

The lack of a progressive decline in national TB rates over the last decade is explained in part by the reservoir of individuals within the population who are infected, but have no evidence of disease. Most of these cases will not be picked up through active surveillance unless they are a contact of an active TB case, or belong to a high-risk group. This reservoir is being added to over time with the intake of migrants, especially those from high prevalence countries. Untreated, approximately 10% of infected individuals with normal immunity will develop active TB within their lifetime, and half of these will do so within the first 2 years of infection.[10]

In the Australian born population, the highest rates of active TB are reported in the aging population. Many of these cases represent infections that were acquired in the distant past when TB in Australia was prevalent. The years of highest TB prevalence in Australia were those that predated 1950, the year that all States agreed to participate in the National TB Campaign.[11] Compared to the elderly Australian born, the rate of active TB in Australian born children in age groups under 15 years reported in both 1996 and 1997 has been less than 1 per 100,000, which is an indirect indicator of low prevalence of infection within this group. Almost half of all TB notifications in the overseas born in 1997 were from India, Indonesia, China, The Philippines and Vietnam. The WHO has indicated that the first four countries in this list, together with Bangladesh and Pakistan, account for more

Figure 9. Lymphatic tuberculosis as principal site of disease. Notifications in the Australian and overseas born, by age group and sex, 1997

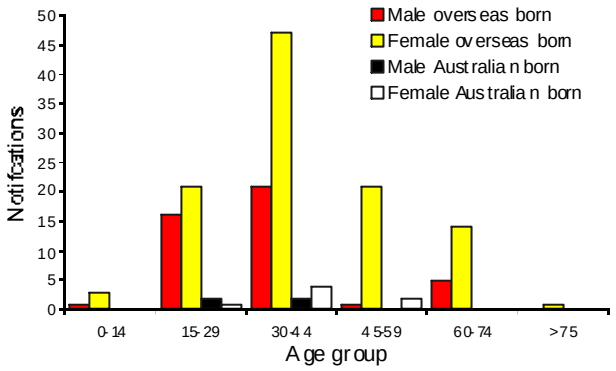
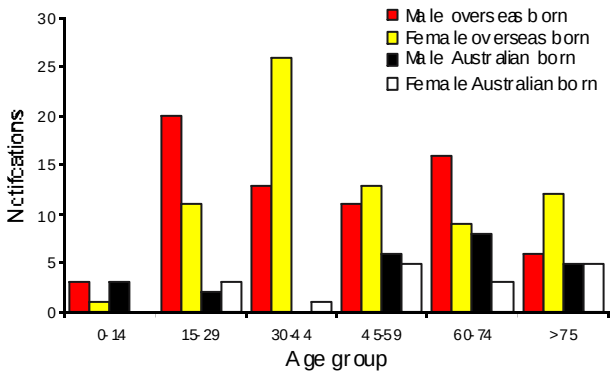


Figure 10. Extra-pulmonary tuberculosis (other than lymphatic) as principal disease site. Notifications in the Australian and overseas born, by age group and sex, 1997



than 50% of all new TB cases notified annually throughout the world.[12]

The proportion of overseas born cases represented in annual TB notifications has increased over the last decade. In 1986, 60% of all annual notifications were migrants, as compared to 70% in 1990, 75% in 1996 and 79% in 1997. However, rates of tuberculosis in the overseas born have not increased over the same time period. For all years, with the exception of 1995, rates in the overseas born have been between 15 and 16 per 100,000. The Australian born population have not only demonstrated a decline in the proportion of all TB notifications but have also demonstrated a progressive decline in notification rates, from 2.8 in 1986, to 2.3 per 100,000 in 1991,[9,13] to 1.2 per 100,000 in 1997.

Compared to 19 other industrialised countries surveyed by the WHO in 1997,[3] the proportion of TB occurring in non-nationals was highest for Australia (79%). Denmark reported 68%, Sweden 66%, France 51%, and the United States of America 39%. However, TB notification rates for the overseas born population was lowest in Australia compared to other industrialised countries. Reported notification rates in the foreign born populations of other industrialised countries, ranged between 29 and 109 per 100,000. These differences may be explained by different screening protocols for potential migrants, intake of 'higher risk' groups, such as refugees and asylum seekers, or a higher proportion of illegal immigrants who evade regulatory screening.

The progression to active TB within 12 months of arrival in Australia in approximately 14% of migrants may indicate the acquisition of TB close to the time of intended migration in these cases. Refugees, who have been interned in camps or prisons where malnutrition, poor sanitation and overcrowding increase their susceptibility to infection, may be at increased risk of progression to disease shortly after their arrival in Australia. Alternatively resettlement conditions for many migrants may be socio-economically stressful. Such factors in the early months after migration may hasten the progression to active disease. Alternatively, certain high-risk migrants, such as refugees and those on TB Undertakings (TBUs) are targeted for screening in the first few months post-migration. This may improve the ascertainment of disease in such cases in the first year of arrival in Australia. The current national surveillance system does not report on the residency status of those who are overseas born. There is therefore no way of gauging how much disease is potentially occurring in short-term visitors such as tourists, students or those on working visas, as compared to the overseas born population who have permanent residency. Similarly, the amount of active disease being detected in refugees and migrants on TBUs is unable to be ascertained from current national data. In Western Australia, an increasing trend towards notification of TB in non-resident migrants has been reported since 1991, and 15% of notifications over this time period have been in non-resident migrants.[14] The systematic reporting of such information at a national level would help to guide immigration and public health policy.

The pattern of tuberculosis, as described by site of disease, is different between the Australian and overseas born populations. A higher proportion of extra-pulmonary disease is described in the overseas born. Overseas born females, especially young and middle aged adults, account for the highest proportion of lymphatic disease. Peripheral tuberculous lymphadenitis most frequently affects patients in their second and third decades, and the predominance of this entity in females is well recognised in a number of studies.[15]

Over the last 7 years, rates of TB have been 10 to15-fold higher in indigenous Australians compared to the non-indigenous, Australian born population. Reporting accurately on trends in this group has been made difficult by the shifts in the census denominator estimates for this population,[16,17] and also because of the inconsistent reporting of indigenous status by some jurisdictions.[18] Among the risk factors for TB in indigenous Australians are poor socio-economic status, diabetes, renal disease, smoking, alcohol abuse and poor nutrition.[19]

The representativeness of data on HIV status, and on culture positivity for notified cases of TB is poor. HIV status continues to be under reported within the NMSS, with information missing in 90% of notifications. For all years dating back to 1992, the number of positive cultures reported to the NMSS has consistently under-estimated those reported by the National Mycobacterial Reference Laboratory Network (MRLN). In 1997, 574 notifications reported that the diagnostic method was culture, with 722 isolates forwarded to the MRLN.[20]

The existing surveillance system for TB reporting needs to be enhanced to include information on treatment outcomes, and to provide more complete data on the residency status of overseas born TB cases. Linkages between the NMSS and other surveillance systems, such as the national HIV/AIDS registry and the MRLN, would provide a more complete analysis of trends occurring over time with HIV/TB co-infection, and of MTBC drug resistance patterns in Australia.

There are no indications that the global TB threat is abating, which reinforces the need for all nations to remain vigilant. Having a surveillance system in place that can accurately report on trends, and important changes in the epidemiology of TB, alerts public health authorities and policy makers to emergent problems. The ongoing challenge of national surveillance is to better forewarn so that we, as a nation, are better forearmed to respond to potential public health threats.

Acknowledgements

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Tuberculosis in Australia: bacteriologically confirmed cases and drug resistance, 1997

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 1997. A total of 722 cases were identified, representing an annual incidence of 3.9 cases of laboratory culture-confirmed tuberculosis (TB) per 100,000 population. Historical data shows that Australia's TB incidence rates of culture-confirmed TB have varied little in recent years, ranging from 3.9 to 4.1 cases per 100,000 population. The incidence rate continues to vary between States, reflecting differences in the distribution of persons belonging to high-risk categories for TB. The male to female ratio showed a slight increase to almost 1.3:1, but in keeping with previous years, males with culture-confirmed TB were older (median age group 45-49 years) than females (median age group 35-39 years), and approximately half of all pulmonary diagnoses involved positive microscopy. Lymphatic disease again accounted for almost 20% of the total cases, with 66% of cases being recorded in females. Approximately 9% of isolates, a decrease from 11% in 1996, had *in vitro* resistance to at least one of the four standard anti-tuberculosis drugs. Fourteen isolates were multi-drug resistant in 1997 compared with 15 in 1996. Overall, the data indicates a remarkably stable picture for TB in Australia. *Commun Dis Intell* 1999;23:349-353.

Introduction

Australia's incidence rate for tuberculosis (TB) is among the lowest of any country in the world. Nevertheless, due to the high rates of disease in neighbouring regions, as well as persistent high rates of infection in certain population subgroups such as indigenous Australians and persons born in high-prevalence countries, TB remains a potential threat to the effectiveness of Australia's public health programs. Furthermore, in the past decade, the emergence of resistance to isoniazid and rifampicin, the key anti-TB compounds, has severely compromised TB control efforts in many countries. The opinion of expert authorities is that Australia's TB control programs must be maintained, if not strengthened.[1]

Draft guidelines from the Tuberculosis Working Party of the National Health and Medical Research Council emphasise the importance of surveillance as a strategic tool for elimination of TB.[2] In Australia, surveillance data for TB is available through two sources: the National Mycobacterial Surveillance System (NMSS, conducted by the Communicable Diseases Network of Australia) 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 1996.[3,4,5,6,7] This report is based on data for 1997.

Methods

The Australian Tuberculosis Reporting Scheme is a joint project of the MRLN and the Department of Health and Aged Care. The data are based on isolates of MTBC (other than the BCG strain) from clinical samples. Due to the specialised nature of TB 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 1997 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.

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Table 1. MTBC isolates in Australia, 1995-1997, by State or Territory and year

State	Number of Isolates	1997 Isolates per 100,000 population	1996 Isolates per 100,000 population	1995 Isolates per 100,000 population
New South Wales[1]	329	5.0	5.3	4.8
Victoria	193	4.2	4.7	4.1
Queensland	74	2.2	2.7	2.6
Western Australia	51	2.8	2.9	3.2
South Australia	39	2.6	1.9	2.2
Tasmania	8	1.8	0.6	0.4
Northern Territory	28	15.0	12.6	21.3
Total	722	3.9	4.1	3.9

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

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 722 cases were recorded in 1997. This figure represents an annual incidence of 3.9 cases of laboratory culture-confirmed TB per 100,000 population. The distribution of cases by State of residence is shown in Table 1 (data from 1995 and 1996 are included for comparison). State-specific incidence rates varied from 1.8 (Tasmania) to 15 per 100,000 (Northern Territory).

Causative organism

The large majority (706) of the 722 cases were due to *M. tuberculosis*. Nine cases were due to infection with *M. bovis*, and 7 were due to *M. africanum* .

Distribution by gender, age and site of disease

Full information for gender, age and site of disease was submitted for 651 (91%) of the 722 cases recorded. Figure 1 shows the distribution of the 651 cases by age group and gender. The overall male to female ratio was 1.3:1, 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 less than one in children younger than 15 to almost 30 per 100,000 per year in males over 80 years of age (data not shown). Nine cases related to children younger than 10 years. Five children had disease in pulmonary sites and four had lymph node infections. There were no culture-confirmed cases of tuberculous meningitis in children.

Figure 2 shows the distribution of 651 cases by site of disease and gender. Pulmonary disease accounted for 64% of the total cases (male to female ratio 1.6:1), while

Figure 1. MTBC isolates, 1997, by age group and sex

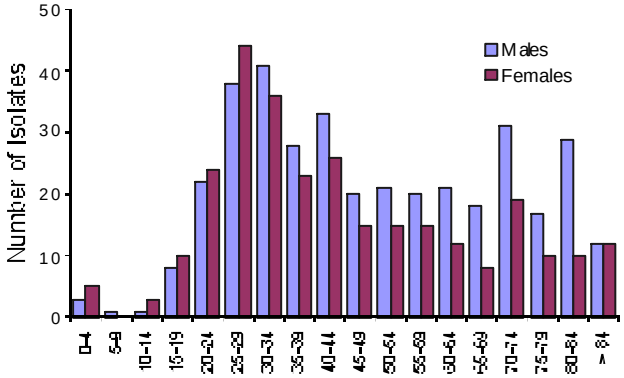

Figure 2. MTBC isolates by site and sex, Australia, 1997

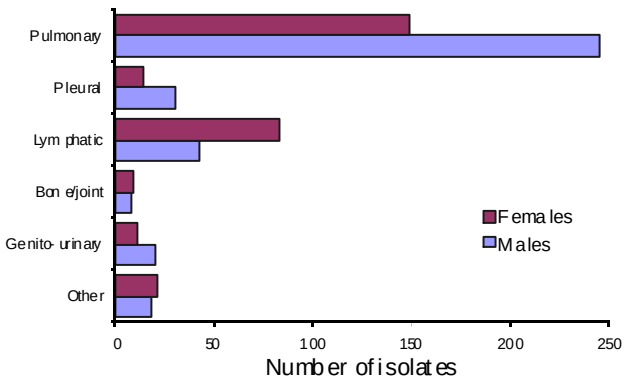

Table 2. *In vitro* resistance of isolates to the standard anti-tuberculosis drugs, Australia, 1995-1997

	Number resistant	1997 % resistant[1]	1996 % resistant[1]	1995 % resistant[1]
Isoniazid (H)	48	6.6	9.7	7.5
Rifampicin (R)	15	2.1	2.1	1.1
Ethambutol (E)	4	0.6	0.3	0.3
Pyrazinamide[2] (Z)	24	3.3	2.3	2.0

1. Percentage of 722 strains tested which were resistant to drug alone or in combination with others
2. All strains of *M. bovis* are naturally resistant to pyrazinamide

disease of the lymph nodes accounted for 19% of the total cases (male to female ratio 0.5:1).

Association with HIV

The reference laboratories recorded seven isolates of MTBC from persons known to be HIV+. Four patients were from Victoria, and one from each of Queensland, South Australia and Western Australia. Two patients had disease in pulmonary sites, and a further two had positive blood cultures.

Smear-positivity in pulmonary disease

A total of 437 (60.5%) of 722 cases were detected from samples of pulmonary origin. In 320 patients (73% of those with pulmonary disease) the diagnosis was made from sputum. A further 93 diagnoses (21%) were made from bronchoscopy samples. Results of microscopy were provided for 242 sputum samples; of these 135 (56%) were positive. Results of microscopy were provided for 72 bronchoscopy samples; of these 24 (33%) were positive.

***In vitro* drug susceptibility**

Each of the 722 isolates were tested against the four drugs recommended for standard treatment of TB in Australia, that is, isoniazid (H), rifampicin (R), ethambutol (E) and pyrazinamide (Z).[1] A total of 65 isolates (9.0% 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 (includes results for 9 isolates of *M. bovis* which are naturally resistant to Z). Resistance to H and/or R was recorded in 49 isolates (6.8% of total). Thirty-four were resistant to H alone, one was resistant to R alone, and 14 (1.9 % 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). All of the MDR isolates were *M. tuberculosis*.

Table 3. Drug resistance patterns in MDR strains, Australia, 1995-1997

Resistance pattern[1] (standard drugs)	Number of isolates		
	1997	1996	1995
H + R only	6	10	3
H + R + E	1	1	1
H + R + Z	5	4	1
H + R + E+ Z	2	0	0

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

Twelve MDR isolates came from sputum or pulmonary samples of which six had positive microscopy. Fifteen isolates identified as *M. tuberculosis* were resistant to Z, and in six cases no other drug resistance was detected. Among seven isolates from patients known to be HIV+, one was MDR (pulmonary disease, negative sputum microscopy), one was resistant to H alone, and one was resistant to Z alone (identified as *M. bovis*). In addition to the standard drugs, streptomycin (S) was tested against 202 isolates (28% of total). Twenty-two (10.8%) were found to be resistant to S, and in all but four cases, resistance to S occurred in combination with resistance to at least one other drug.

Discussion

The data collected from laboratory sources shows that the incidence of bacteriologically confirmed TB in Australia remains at around 4 cases per 100,000 per year. The 722 cases recorded represents only around 75% of cases notified to the NMSS. However, it should be noted that notifications to NMSS can be based on clinical or histological diagnosis alone. The discrepancies in data from the two sources stem from the different criteria for notification and should not been taken to indicate deficiencies in either system. Considering the variety of factors influencing the epidemiology of a disease such as TB, the stability of Australian statistics is somewhat remarkable.

As shown previously, there are differences in annual TB bacteriologically-confirmed incidence rates between States and Territories, ranging from below two in Tasmania to more than 15 per 100,000 in Northern Territory (Table 1). The 1997 data show only minor changes from previous years. The variations in rates between States are almost certainly due to peculiarities in the national distribution of persons in high-risk subgroups, rather than local differences in the risk of acquiring tuberculous infection.

As one would expect, and in keeping with earlier data, the large majority of isolates were *M. tuberculosis*. Seven isolates were identified as *M. africanum* , a species that has previously been recognised rarely in Australia. *Mycobacterium bovis* again accounted for a small but noteworthy number of cases of tuberculosis. Because bovine tuberculosis has been virtually eliminated from Australia's cattle herds, such cases almost certainly represent reactivation of past infection. The importance of *M. bovis* as a human pathogen in Australia during 1970-1994 has been reviewed in a recent publication.[8]

Full data on age, sex and site of disease was available for 651 (90%) of the 722 cases. The Network received full

data for 92% of cases in 1996.[7] All cases with missing data come from New South Wales and Victoria, which record the highest numbers of cases, and where laboratory services are decentralised. The reference laboratories are taking steps to improve this statistic so that in future a more complete analysis can be carried out. Level II laboratories can assist in this process by providing full patient demographics when forwarding isolates to reference laboratories.

Cases of active disease are distributed unevenly between sexes and across age groups (Figure 1). The features of this chart are very similar to what was presented in the 1996 report.[7] The overall male to female ratio is now closer to 1.3:1, which is slightly higher than reported in 1996 and 1995.[6] The median age groups for males and females are static at 45-49 years and 35-39 years respectively. Numbers (and rates) of bacteriologically confirmed disease in children under 15 years remain very low and indicate that the general Australian population is exposed to an almost negligible risk of tuberculous infection. Detailed analyses of cases notified to NMSS have clearly illustrated the different age-distributions of Australian-born patients when compared to persons born overseas.[9] Australians with TB tend to be older than their counterparts born overseas. The latter now account for around 70% of Australian TB notifications and constitute the majority of cases in the young and middle age groups.

The Network's reports have previously identified increases in the relative frequency of lymph node disease among patients with TB in Australia. We have also commented on the significant bias towards females, in contrast with observations for other forms of TB.[7] In this regard, statistics for 1997 are identical to those for 1996; lymph node disease accounted for 19% of all cases, and the male to female ratio was 0.5:1.

The reference laboratories were informed of seven cases associated with HIV infection. Published data suggests that at least 5-10 cases of HIV-TB occur annually in Australia.[10] As no cases were reported from New South Wales, which has the highest prevalence of HIV infection we believe our data for HIV-TB are an underestimate of the true figure. It is noteworthy that two cases were diagnosed from blood culture.

The 1996 report presented results of acid-fast microscopy for the first time; 56% of diagnostic sputum samples had positive microscopy. This year, we have found an identical statistic. Bronchoscopy collections provided 93 diagnoses during 1997, as opposed to 72 during 1996. This year 33% of such samples had positive microscopy; 38% were positive in 1996. Physicians contemplating bronchoscopy for suspected TB should be reminded of the value of a pre-bronchoscopy sputum for measuring a patient's 'infectious risk'.

Methods based on direct detection of MTBC-specific nucleic acids by enzyme-mediated amplification are now regarded as legitimate diagnostic tools. Several Australian laboratories recently carried out an evaluation of the LCx Test for *M. tuberculosis* (Abbott Diagnostics), one of several commercial amplification tests for TB.[11] Commercial nucleic acid amplification tests (NAAT) have high sensitivity and specificity when applied to microscopy-positive samples. In addition, NAAT will return a positive result with around 50% of samples that are smear-negative but culture positive. Nucleic acid amplification tests should now be viewed as indispensable adjuncts to conventional microscopy and culture; they are available in all Australian reference laboratories. A negative NAAT with smear-positive samples is useful as the infecting organism is most likely an atypical mycobacterium. And because NAAT on sputum will invariably remain positive for a period following treatment in pulmonary disease, they have the potential to confirm TB in certain categories of patients, for example, those who have received treatment prior to sample collection.

Collation of surveillance data for *in vitro* drug resistance is an important activity of the MRLN. Such information is not available through the NMSS. This year we have shown that a total of 65 isolates (9%) had *in vitro* resistance to at least one of the standard anti-TB drugs, H, R, E and Z. The corresponding figures for previous years were: 1996 (11%); 1995 (9%); 1994 (7%). Forty-nine isolates (6.8% of the total) were resistant to one or both of H and R, the most effective anti-TB compounds. The corresponding figures for previous years were: 1996 (9.9%); 1995 (7.5%); 1994 (6.1%). The majority of strains resistant to H and/or R are resistant to H alone, but in 1997 we found 14 (1.9%) were resistant to H and R, that is, were MDR. The corresponding figures for previous years were: 1996 (2%); 1995 (0.7%); 1994 (0.3%). We have already reported that a small number of strains identified as *M. tuberculosis* have been found resistant to Z alone.[6] This year we found six strains in this category. This finding conflicts with the long-held belief that 'wild' strains of *M. tuberculosis* are susceptible to Z.

More detailed study of H-resistant strains and a better understanding of the genetic mechanisms for H-resistance have suggested that the current breakpoint (0.1 mcgm/mL) for determining resistance to H by the standard BACTEC proportion method is too low. A level of around 0.4 mcgm/mL would seem to be a better indicator of *in vivo* resistance to H. Many strains judged as 'resistant' under the 0.1 mcgm/mL criterion are likely to respond to standard therapy. Until the issue is resolved through appropriate clinical evaluation, reference laboratories would be advised to test H at both 0.1 and 0.4 mcgm/mL, or alternatively ensure that strains resistant at 0.1 mcgm/mL are retested at 0.4 mcgm/mL.

Our previous reports made reference to the WHO and International Union Against Tuberculosis and Lung Disease Global Project on Anti-tuberculosis Drug Resistance Surveillance.[12] The project requires that patients be stratified on the basis of previous treatment for TB 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). We have as yet, been unable to stratify Australian data, and WHO reports to date have listed drug resistance for Australian isolates as *combined* (denoting that treatment history is unknown). The MRLN data remains undervalued, nationally as well as internationally, without linkage to the NMSS database. Use of a common identifier such as laboratory accession number should enable matching of drug resistance data with patient ethnicity, treatment history, and other factors. Some Australian States already collect such data, but the need for a uniform national approach cannot be overstated.

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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CDI Subject Index, 1999

K

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CDI Author Index, 1999

CDI Reviewers 1999

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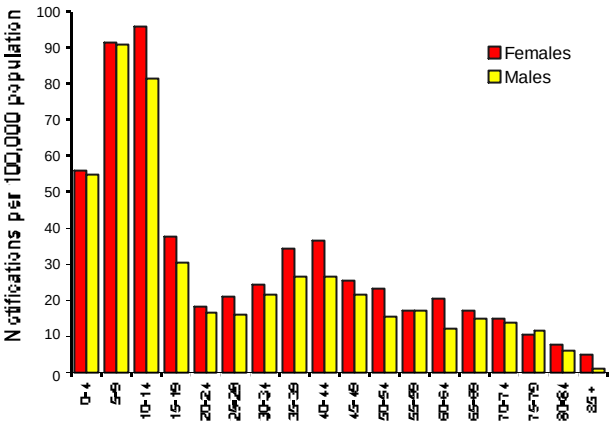
Erratum

The graph published in issue 23(11)295, in the article *Australia's notifiable diseases status* as:

Figure 27. Notification rate of pertussis, 1998, by age group and sex

is incorrect. It is to be replaced by the following graph:

Figure 27. Notification rate of pertussis, 1998, by age group and sex



Christmas greetings from the editorial team

The editorial team would like to take this opportunity to wish all our readers a very Happy Christmas Season, and all the best of wishes for the New Year, 2000.

We have experienced a number of changes to the team throughout the year. A big thankyou is extended to all of those who have worked with us and moved on. Our best wishes go with you in your new positions. We also have gladly welcomed a number of new staff members to our team and look forward to continually working to improve the quality of the service we bring to our readers.

Our appreciation and thanks are also extended to all those who have assisted in the production of *CDI* in other capacities, in particular, our article reviewers that perform a vital role in ensuring the quality of the articles we bring you is maintained at a high level.


Jenny


Alison


Ming


Corrine


Eddie


Leslee

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'.

Vaccine preventable diseases

A total of 516 notifications were received in this reporting period; an increase on the previous reporting period (466) and the same period in 1998 (479). The number of measles notifications continued to decrease in this period (12) compared with the previous period (18). There was also a decrease in the overall year to date notifications of measles for 1999 (233) compared with 1998 (298). The number of Hib notifications remained fairly stable in this reporting period (3) compared with the previous period (6).

The number of pertussis notifications was higher in this period (469) compared with the previous period (432). An increase in the number of notified cases occurred in New South Wales (88), Victoria (178) and Western Australia (12). Overall, the year to date number of notifications remained lower for 1999 (4,005) than 1998 (6,153). Over the course of the year, the first peak in pertussis notifications was seen in the Australian Capital Territory in mid June, then New South Wales, Tasmania, Victoria and Queensland (Figure1). Notified cases of pertussis occurred primarily in those aged 10-14 years and older, and increases in the numbers of notified cases also occurred in the same age groups (Figure 2). For the last reporting period 84% of cases were in these age groups and for the year to date 85% of cases were in these age groups. The ratio of males to females was 1:1.4 where gender was reported for both the reported period and the year to date.

Figure 1. Notifications of pertussis, by State/Territory, and month of onset, 1999

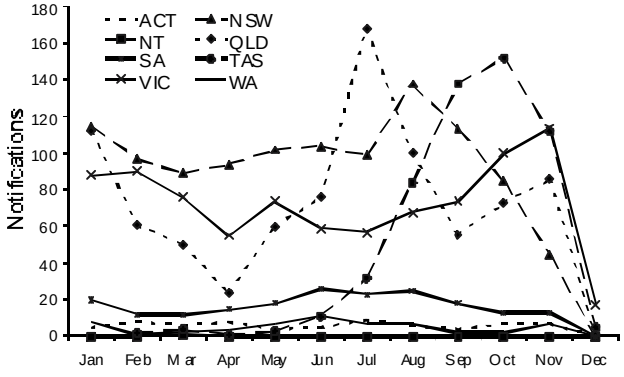
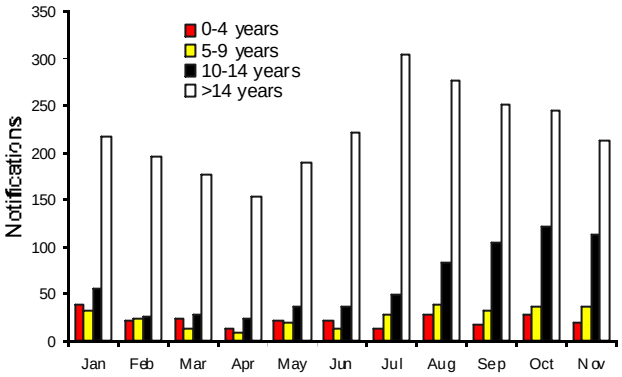


Figure 2. Notifications of pertussis, by age group and month of onset



Meningococcal infection

The number of meningococcal infection notifications remained steady in this reporting period (33) compared to the previous period (33). Overall, there was a decrease in the number of notifications from Victoria (11) and New South Wales (7). As previously noted, the overall year to date notifications (524) remained higher than for the year to date in 1998 (425). Notifications were highest in the 15-19 years (9; 27%) and 0-4 years (7; 21%) age groups. For the 22 cases for whom gender was reported, the male to female ratio was 1.8:1.

Vectorborne diseases

There were 91 notifications of Ross River virus received for this period, an increase from the previous reporting period (72) but less than for the same period in 1998 (237). An increase in case notifications from Victoria (8) and Western Australia (39) contributed to the increase in this period. In total 4,273 notifications have been received for the year to date, an increase of 55% compared to 1998 (2,771). This overall increase was due to a peak in May.

A total of 7 dengue notifications were received in this reporting period, an increase from the previous reporting period (1) but a 10-fold reduction from the same period last year (70). Overall the total number of notifications for the

year to date (176) was reduced from the previous year (502) which included an outbreak in the first half of 1998.

Zoonoses

There were 22 notifications of leptospirosis received in this reporting period, an increase of about 50% from the previous reporting period (12) and identical to the same period in 1998 (22). The year to date figures (323) were 80% higher than the previous year (180) and were markedly higher than any previous year. This increase was mostly associated with an increase in case notifications from Queensland in the first 6 months of the year. The peak number of notifications occurred in the 20-24 year age group.

Notifications of ornithosis increased in this reporting period (8) compared with the last reporting period (4). All 8 cases were from Victoria and the age range was from 21-69 years. Overall the total number of notifications of ornithosis for the year to date in 1999 (78) was 59% higher than the year to date notifications in 1998 (49).

Foodborne diseases

There were 11 cases of infections with Shiga-like toxin (verotoxin) producing *E. coli* (SLTEC/VEC) reported in this period; an increase from the previous reporting period (3). All these cases were reported from South Australia. Overall notifications for the year to date have increased in 1999 (34) from 1998 (9).

Three cases of haemolytic uraemic syndrome (HUS) have been reported in this period; an increase compared to one case in the previous reporting period. One case was reported from South Australia and 2 cases from Victoria. Overall the number of year to date notifications were similar for 1999 (16) and 1998 (13).

Please note: The reported outbreak of *Haemophilus influenzae* type b in June, referred to in the last issue of *CDI*; 23(12)328, was due to a reporting artifact and not in fact an outbreak. *CDI* was subsequently informed that the 12 cases reported had onset dates in previous years, but were reported in June 1999.

Tables

There were 5,062 notifications to the National Notifiable Diseases Surveillance System (NNDSS) in the four week period, 10 November to 7 December 1999 (Tables 1 and 2). The number of reports for selected diseases have been compared with historical data for corresponding periods in the previous three years (Figure 4).

There were 5,531 reports received by the *CDI* Virology and Serology Laboratory Reporting Scheme (LabVISE) in the four week period, 4 November to 1 December 1999 (Tables 3 and 4).

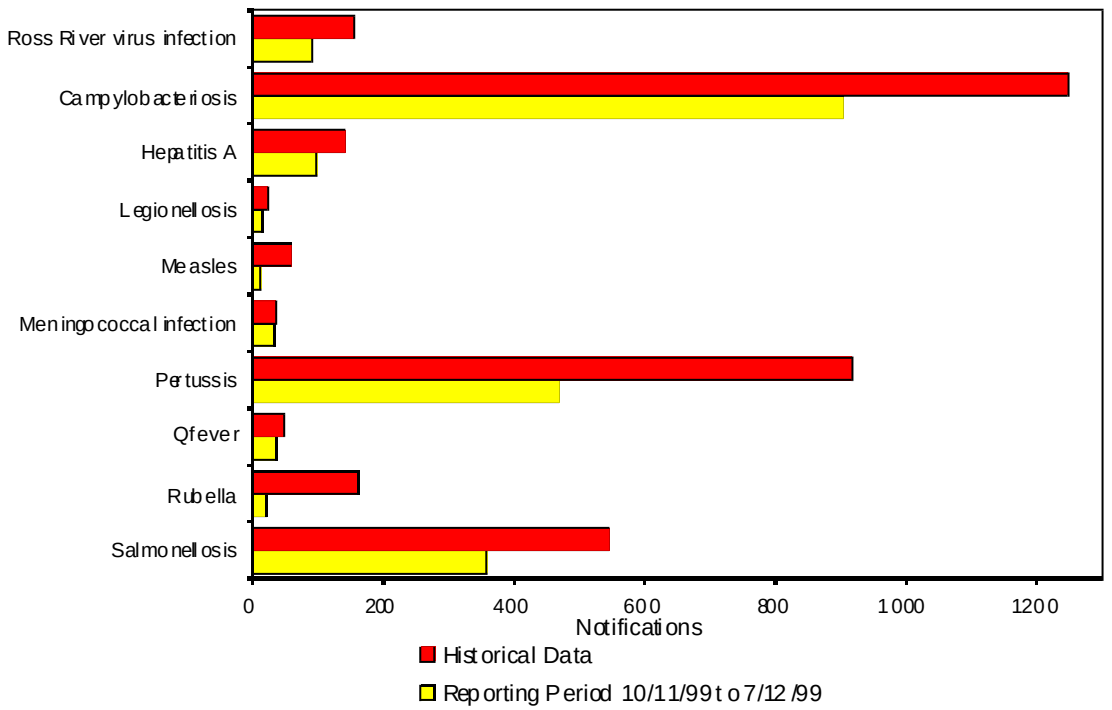
The Australian Sentinel Practice Research Network (ASPREN) data for weeks 45 to 48, ending 5 December 1999, are included in this issue of *CDI* (Table 5).

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 10 November to 7 December 1999

Disease[1]	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1999	This period 1998	Year to date 1999[2]	Year to date 1998
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0
H. influenzae type b infection	0	0	0	2	1	0	0	0	3	6	39	35
Measles	0	1	2	1	1	2	4	1	12	18	233	298
Mumps	0	0	0	0	1	0	7	2	10	20	169	171
Pertussis	9	88	0	76	16	90	178	12	469	432	4,005	6,153
Rubella[3]	0	2	0	11	0	1	8	0	22	40	363	749
Tetanus	0	0	0	0	0	0	0	0	0	1	2	7

1. No notification of poliomyelitis has been received since 1978.
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. Includes congenital rubella.

Figure 4. 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.

Table 2. Notifications of diseases received by State and Territory health authorities in the period 10 November to 7 December 1999

Disease[1,2,3]	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1999	This period 1998	Year to date 1999[4]	Year to date 1998
Arbovirus infection (NEC)	0	0	0	0	0	0	0	0	0	9	71	67
Barmah Forest virus infection	0	3	1	19	0	0	0	5	28	36	596	526
Brucellosis	0	0	0	5	0	0	0	0	5	4	50	43
Campylobacteriosis[5]	25	-	14	221	194	45	270	135	904	1,617	11,817	12,414
Chancroid	0	0	0	0	0	0	0	0	0	0	0	1
Chlamydial infection (NEC)[6,7]	28	95	61	273	98	20	246	129	950	1,080	12,969	10,686
Cholera	0	0	0	0	0	0	0	0	0	0	3	4
Dengue	0	0	4	2	0	0	0	1	7	70	176	502
Donovanosis[7]	0	0	0	0	NN	0	0	0	0	1	17	31
Gonococcal infection[8]	1	82	104	87	11	3	87	60	435	493	5,273	5,028
Haemolytic uraemic syndrome[9]	NN	0	0	0	1	0	NN	0	1	1	16	13
Hepatitis A	0	10	15	9	9	0	37	18	98	122	1,515	2,445
Hepatitis B incident	0	2	8	1	3	0	3	6	23	23	277	251
Hepatitis B unspecified[10]	5	101	0	68	0	0	2	15	191	603	6,546	6,240
Hepatitis C incident	1	1	0	-	8	0	6	13	29	39	309	319
Hepatitis C unspecified[10]	14	329	11	255	88	21	288	58	1,064	1,612	19,115	18,096
Hepatitis (NEC)[11]	0	0	0	0	0	0	0	NN	0	2	20	17
Hydatid infection	0	NN	0	0	0	0	1	1	2	5	29	42
Legionellosis	0	0	0	6	4	0	3	2	15	27	234	252
Leprosy	0	0	0	0	0	0	0	0	0	0	5	2
Leptospirosis	0	7	0	3	0	0	9	3	22	22	323	180
Listeriosis	0	1	0	0	0	0	1	1	3	5	59	53
Malaria	3	3	7	11	3	1	5	5	38	43	670	670
Meningococcal infection	0	7	0	6	2	0	11	7	33	31	524	425
Ornithosis	0	NN	0	NN	0	0	8	0	8	16	78	49
Q Fever	0	10	0	25	0	0	1	1	37	53	479	540
Ross River virus infection	0	5	1	38	0	0	8	39	91	237	4,273	2,771
Salmonellosis (NEC)	5	48	15	142	20	7	83	38	358	580	6,832	7,294
Shigellosis[5]	0	-	5	5	3	0	8	4	25	47	527	580
SLTEC, VTEC[12]	NN	0	0	NN	11	0	NN	NN	11	0	34	9
Syphilis[13]	1	30	33	52	1	2	0	0	119	135	1,819	1,512
TTP[14]	0	0	0	0	0	0	0	0	0	1	0	1
Tuberculosis	1	21	4	4	0	1	0	8	39	82	773	911
Typhoid[15]	0	0	0	1	0	0	1	0	2	1	63	64
Yersiniosis (NEC)[5]	0	-	0	6	2	0	0	0	8	9	141	195

1. Diseases preventable by routine childhood immunisation are presented in Table 1.
2. For HIV and AIDS, see Tables 8, 9, 10 and 11.
3. No notifications have been received during 1999 for the following rare diseases: lymphogranuloma venereum, plague, rabies, yellow fever, or other viral haemorrhagic fevers.
4. 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.
5. Not reported for NSW because it is only notifiable as 'foodborne disease' or 'gastroenteritis in an institution'.
6. WA: genital only.
7. Notifications from NSW have been received since September 1998, and were first reported in *CDI* in Issue 23(9).
8. NT, Qld, SA and Vic: includes gonococcal neonatal ophthalmia.
9. Nationally reportable from August 1998.
10. Unspecified numbers should be interpreted with some caution as the magnitude may be a reflection of the numbers of testings being carried out.
11. Includes hepatitis D and E.
12. Infections with *Shiga*-like toxin (verotoxin) producing *E. Coli* (SLTEC/VTEC) became nationally reportable in August 1998.
13. Includes congenital syphilis.
14. Thrombotic thrombocytopaenic purpura became nationally reportable in August 1998.
15. NSW, Qld: includes paratyphoid.

NN Not Notifiable.
NEC Not Elsewhere Classified.
- Elsewhere Classified.

Table 3. Virology and serology laboratory reports by State or Territory[1] for the reporting period 4 November to 1 December 1999, and total reports for the year

	State or Territory[1]								Total this period	Total reported in 1999[2,3]
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA		
Measles, mumps, rubella										
Measles virus					1		2	1	4	181
Mumps virus							1	3	4	55
Rubella virus		4		67	1	1			73	144
Hepatitis viruses										
Hepatitis A virus			25	31	13		1	4	74	381
Hepatitis D virus				1	1				2	6
Arboviruses										
Ross River virus		11	13	148		1	1	11	185	1,354
Barmah Forest virus		2		36				1	39	165
Dengue not typed					1			2	3	55
Flavivirus (unspecified)			1	1					2	23
Adenoviruses										
Adenovirus type 3					1		1		2	32
Adenovirus type 5							2		2	6
Adenovirus type 7							1		1	4
Adenovirus type 19							1		1	3
Adenovirus type 40								9	9	76
Adenovirus not typed/pending		21		12	32		19	42	126	1,195
Herpes viruses										
Herpes virus type 6								1	1	12
Cytomegalovirus		37		106	49		29	14	235	1,177
Varicella-zoster virus		18	15	248	12		63	32	388	1,665
Epstein-Barr virus		29	14	550	106	1	13	17	730	2,339
Other DNA viruses										
Parvovirus		1		33	8		18	8	68	443
Picorna virus family										
Coxsackievirus A9		1	1						2	10
Coxsackievirus B1							1		1	1
Coxsackievirus B2		1				1			2	4
Coxsackievirus B4		1							1	3
Coxsackievirus B5		2					1		3	8
Echovirus type 3		2							2	2
Echovirus type 9		1					1		2	49
Echovirus type 11		20					1		21	172
Echovirus type 30		1	1						2	29
Poliovirus type 1 (uncharacterised)		5			1				6	28
Poliovirus type 2 (uncharacterised)		3							3	23
Poliovirus type 3 (uncharacterised)		3							3	10
Rhinovirus (all types)		54			6		4	6	70	487
Enterovirus type 71 (BCR)							3		3	20
Enterovirus not typed/pending		5	2	14			12	16	49	768
Ortho/paramyxoviruses										
Influenza A virus		9	1	142	25		14	15	206	1,835
Influenza B virus		1		13	8		7	1	30	267
Parainfluenza virus type 1		2		1			1		4	45
Parainfluenza virus type 2				2	4		1		7	110
Parainfluenza virus type 3		23	2	40	12		18	49	144	888
Respiratory syncytial virus		38	2	182	26	1	26	35	310	3,078

Table 3. Virology and serology laboratory reports by State or Territory[1] for the reporting period 4 November to 1 December 1999, and total reports for the year (continued)

	State or Territory[1]									
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Total this period	Total reported in 1999[2,3]
Other RNA viruses										
HTLV-1								2	2	14
Rotavirus		61			75		52	50	238	2,204
Norwalk agent							2		2	70
Other										
Chlamydia trachomatis not typed		62	116	653	56		6	44	937	3,149
Chlamydia pneumoniae								1	1	2
Chlamydia psittaci							6		6	84
Chlamydia species		3		4					7	19
Mycoplasma pneumoniae		11	1	232	18		43	3	308	1,176
Coxiella burnetii (Q fever)		9	1	72					82	208
Streptococcus group A		9	47	193					249	315
Yersinia enterocolitica		1		1					2	11
Brucella species				5					5	8
Bordetella pertussis		5		258		1	42	2	308	763
Legionella longbeachae					1			2	3	43
Cryptococcus species		2							2	8
Leptospira species		2		20				3	25	49
Treponema pallidum		13	306	212					531	673
Entamoeba histolytica				2				1	3	5
Total	0	473	548	3,279	457	6	393	375	5,531	25,954

1. State or Territory of postcode, if reported, otherwise State or Territory of reporting laboratory.
2. In 1999, data from the Institute of Clinical Pathology & Clinical Research, Westmead were under reported up to September.
3. Totals comprise data from all laboratories. Cumulative figures are subject to retrospective revision, so there may be discrepancies between the number of new notifications and the increment in the cumulative figure from the previous period.

Table 4. Virology and serology laboratory reports by contributing laboratories for the reporting period 4 November to 1 December 1999

State or Territory	Laboratory	Reports
New South Wales	Institute of Clinical Pathology & Medical Research, Westmead	90
	New Children's Hospital, Westmead	162
	Royal Prince Alfred Hospital, Camperdown	40
Queensland	Queensland Medical Laboratory, West End	4,019
	Townsville General Hospital	9
South Australia	Institute of Medical and Veterinary Science, Adelaide	454
Victoria	Monash Medical Centre, Melbourne	34
	Royal Children's Hospital, Melbourne	158
	Victorian Infectious Diseases Reference Laboratory, Fairfield	190
Western Australia	PathCentre Virology, Perth	284
	Princess Margaret Hospital, Perth	91
Total		5,531

Table 5. Australian Sentinel Practice Research Network reports, weeks 45 to 48, 1999

Week number	45		46		47		48	
Week ending on	14 November 1999		21 November 1999		28 November 1999		5 December 1999	
Doctors reporting	60		58		58		51	
Total encounters	7,243		6,631		6,913		5,941	
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	31	4.3	23	3.5	20	2.9	17	2.9
Rubella	0	0.0	1	0.2	0	0.0	0	0.0
Measles	0	0.0	1	0.2	1	0.1	1	0.2
Chickenpox	11	1.5	9	1.4	14	2.0	13	2.2
New diagnosis of asthma	13	1.8	18	2.7	13	1.9	3	0.5
Post operative wound sepsis	10	1.4	3	0.5	7	1.0	2	0.3
Gastroenteritis	76	10.5	86	13.0	85	12.3	84	14.1

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 1999;23:55.

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 1999;23:58.

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 in 1999. CDI reports the consultation rates for seven of these. For further information, including case definitions, see CDI 1999;23:55-56.

Additional Reports

Gonococcal surveillance

John Tapsall, The Prince of Wales Hospital, Randwick, NSW, 2031 for the Australian Gonococcal Surveillance Programme.

The Australian Gonococcal Surveillance Programme (AGSP) reference laboratories in the various States and Territories report data on sensitivity to an agreed 'core' group of antimicrobial agents on a quarterly basis. The antibiotics which are currently routinely surveyed are the penicillins, ceftriaxone, ciprofloxacin and spectinomycin, all of which are administered as single dose regimens. When in vitro resistance to a recommended agent is demonstrated in 5% or more of isolates, it is usual to reconsider the inclusion of that agent in current treatment schedules. Additional data are also provided on other antibiotics from time to time. At present all laboratories also test isolates for the presence of high level resistance to the tetracyclines. Tetracyclines are however not a recommended therapy for gonorrhoea. Comparability of data is achieved by means of a standardised system of testing and a programme-specific quality assurance process. Because of the substantial geographic differences in susceptibility patterns in Australia, regional as well as aggregated data are presented.

Reporting period 1 January to 31 March 1999

The AGSP laboratories examined a total of 937 isolates in this quarter. About 44% of this total was from New South Wales, 19% from Victoria, 14% from Queensland, 13% from the Northern Territory, 8% from Western Australia and 2% from South Australia. Isolates from other centres were few in number.

Penicillins

Figure 5 shows the proportions of gonococci fully sensitive (MIC ≤ 0.03 mg/L), less sensitive (MIC 0.06 - 1 mg/L), relatively resistant (MIC≥ 1 mg/L) or else penicillinase producing (PPNG) aggregated for Australia and by State and Territory. A high proportion of PPNG and relatively resistant strains fail to respond to treatment with penicillins (penicillin, amoxycillin, ampicillin) and early generation cephalosporins.

About 27% of all isolates were penicillin resistant by one or more mechanisms. The penicillin-resistant isolates comprised 35% of all isolates in New South Wales and Victoria and 15 - 20% of gonococci in Queensland and South Australia. In the Northern Territory and Western Australia, 4 - 6% of isolates were penicillin resistant.

The number of PPNG isolated across Australia (88) increased in this quarter compared to the corresponding period in 1998 (57). Most of the PPNG were found in Sydney (58) and Victoria (19). Sydney had the highest proportion of PPNG (14%). Acquisition data, where available, indicated a high proportion of cases in Sydney were acquired through local contact (ratio overseas to local acquisition = 1:4). These proportions were reversed in Melbourne, with South East Asian countries being the main source of acquisition. Only low numbers of PPNG were present in strains from Queensland, Western Australia and the Northern Territory.

Nearly twice as many isolates (161) were resistant to the penicillins by separate chromosomal mechanisms (CMRNG), maintaining a trend noted for some time. These CMRNG were again prominent in Sydney (95) and Melbourne (44).

Ceftriaxone and spectinomycin

All isolates in Australia were again susceptible to these injectable agents.

Quinolone antibiotics

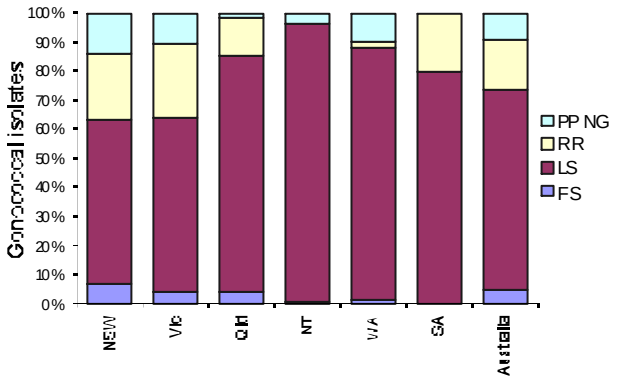
The total number (106) and proportion (11%) of all isolates with altered susceptibility to the quinolone group (QRNG) was substantially higher than the 62 QRNG in the same period in 1998. The QRNG were concentrated in New South Wales (80) and Victoria (18); together these accounted for 92% of all QRNG. Fifteen of the New South Wales and 4 of the Victorian QRNG exhibited high level resistance (MIC ciprofloxacin≥ 1 mg/L) and MICs ranged up to 16mg/L. The majority of QRNG were in males, locally acquired and in the MIC range 0.06 - 0.5 mg/L. QRNG were also present in Brisbane; representing 4% of strains. Single isolates of QRNG were found in the Northern Territory and Perth.

In the corresponding period in 1998, the 62 QRNG represented about 7% of all isolates.

High level tetracycline resistance (TRNG)

The number (95) and proportion (10%) of TRNG detected was almost double that reported for the first quarter of 1998. Most (68%) of the TRNG were found in Sydney where they represented 15% of strains. The 16 TRNG in Victoria and the 7 in Perth each accounted for 9% of

Figure 5. Categorisation of gonococci isolated in Australia by penicillin susceptibility and by region, 1 January to 31 March 1999



FS Fully sensitive to penicillin, MIC≤ 0.03 mg/L

LS Less sensitive to penicillin, MIC 0.06 - 0.5 mg/L

RR Relatively resistant to penicillin, MIC ≥1 mg/L

PPNG Penicillinase producing *Neisseria gonorrhoeae*

gonococci examined in those centres and the 6 in Queensland (4%). Darwin was the only other centre where TRNG were detected in this quarter.

Reference

1. Anonymous. Management of sexually transmitted diseases. World Health Organization 1997; Document WHO/GPA/TEM94.1 Rev.1 p 37.

Sentinel Chicken Surveillance Programme

Sentinel chicken flocks are used to monitor flavivirus activity in Australia. The main viruses of concern are Murray Valley encephalitis (MVE) and Kunjin which cause the potentially fatal disease Australian encephalitis in humans. Currently 26 flocks are maintained in the north of Western Australia, seven in the Northern Territory, nine in New South Wales and ten in Victoria. The flocks in Western Australia and the Northern Territory are tested year round but those in New South Wales and Victoria are tested only from November to March, during the main risk season.

Results are coordinated by the Arbovirus Laboratory in Perth and reported bimonthly. For more information see CDI 1999;23:57-58

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Sentinel chicken serology was carried out for 18 of the 27 flocks in Western Australia in September and October 1999. There was one confirmed seroconversion to MVE virus in September from Paraburdoo in the Pilbara. In response to the unusually late activity of MVE virus in the north of Western Australia the Health Department of Western Australia issued a media warning in mid September to warn residents and visitors to the region of the on-going risk of disease. Additional health warnings were sent via the Regional Public Health Units to Aboriginal communities in the region.

Serum samples from six of the seven Northern Territory sentinel chicken flocks were tested in our laboratory in September and October 1999. There was one new, confirmed seroconversion to Kunjin virus at Howard Springs in September 1999.

Table 7. Flavivirus seroconversions in the Northern Territory sentinel chicken flocks in September and October 1999

Location	May 1999		June 1999			
	MVE	KUN	MVE	KUN	MVE/KUN	FLAVI
Howard Springs	1					
Leanyer		1		1	1	1
Beatrice Hill	3		2			
Tennant Creek	2					

MVE Antibodies to Murray Valley encephalitis virus detected by ELISA
KUN Antibodies to Kunjin virus detected by ELISA
MVE/KUN Antibodies to both MVE and KUN viruses detected by ELISA
FLAVI Antibodies to a flavivirus only (not MVE or KUN) detected by ELISA

Table 6. Flavivirus seroconversions in Western Australian sentinel chicken flocks in September and October 1999

Location	MVE	MVE/KUN	FLAVI	MVE	KUN	MVE/KUN	FLAVI
KIMBERLEY							
Kalumburu		1					
Derby				**2**		1	
Broome	2						
PILBARA							
Port Hedland	1						
Harding Dam*	2		1	2		1	1
Karratha						1	
Newman	2						
Onslow				1	**1**		
Exmouth				1			
GASCOYNE							
Carnarvon	1						

* 2 flocks of 12 chickens at these sites
MVE Antibodies to Murray Valley encephalitis virus detected by ELISA
KUN Antibodies to Kunjin virus detected by ELISA
MVE/KUN Antibodies to both MVE and KUN viruses detected by ELISA
FLAVI Antibodies to a flavivirus only (not MVE or KUN) detected by ELISA

HIV and AIDS Surveillance

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

Tabulations of diagnoses of HIV infection and AIDS are based on data available three months after the end of the reporting interval indicated, to allow for reporting delay and to incorporate newly available information. More detailed information on diagnoses of HIV infection and AIDS is published in the quarterly Australian HIV Surveillance Report, and annually in HIV/AIDS and related diseases in Australia Annual Surveillance Report. The reports are 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; http://www.med.unsw.edu.au/nchecr.

Table 8. New diagnoses of HIV infection, new diagnoses of AIDS and deaths following AIDS occurring in the period 1 to 31 May 1999, by sex and State or Territory of diagnosis

										Totals for Australia			
		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1999	This period 1998	Year to date 1999	Year to date 1998
HIV diagnoses	Female	1	1	1	1	0	0	2	1	7	8	30	34
	Male	1	18	1	5	0	2	12	1	40	45	233	285
	Sex not reported	0	1	0	0	0	0	0	0	1	1	1	5
	Total[1]	2	20	2	6	0	2	14	2	48	54	264	324
AIDS diagnoses	Female	0	0	0	0	0	0	0	0	0	1	3	6
	Male	0	1	0	0	2	0	3	0	6	25	35	120
	Total[1]	0	1	0	0	2	0	3	0	6	26	38	126
AIDS deaths	Female	0	0	0	0	0	0	0	0	0	0	1	2
	Male	0	2	0	0	1	0	0	0	3	13	35	59
	Total[1]	0	2	0	0	1	0	0	0	3	13	37	61

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

Table 9. Cumulative diagnoses of HIV infection, AIDS and deaths following AIDS since the introduction of HIV antibody testing to 31 May 1999, by sex and State or Territory

		State or Territory								
		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
HIV diagnoses	Female	24	588	9	138	57	5	205	109	1,135
	Male	189	10,607	107	1,904	654	79	3,803	884	18,227
	Sex not reported	0	259	0	0	0	0	24	0	283
	Total [1]	213	11,473	116	2,049	711	84	4,045	996	19,687
AIDS diagnoses	Female	8	173	0	46	21	3	67	26	344
	Male	85	4,533	35	794	328	44	1,591	344	7,754
	Total [1]	93	4,718	35	842	349	47	1,665	372	8,121
AIDS deaths	Female	3	113	0	30	15	2	47	16	226
	Male	64	3,133	24	556	227	28	1,248	245	5,525
	Total [1]	67	3,254	24	588	242	30	1,301	262	5,768

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

HIV and AIDS diagnoses and deaths following AIDS reported for 1 to 31 May 1999 as reported to 31 August 1999 and 1 to 31 July 1999, as reported to 31 October 1999, are included in this issue of CDI (Tables 8, 9, 10 and 11).

Please note: HIV and AIDS data for May 1999 are also included in this issue as well as the July data, as it was not previously presented.

Table 10. New diagnoses of HIV infection, new diagnoses of AIDS and deaths following AIDS occurring in the period 1 to 31 July 1999, by sex and State or Territory of diagnosis

										Totals for Australia			
		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1999	This period 1998	Year to date 1999	Year to date 1998
HIV diagnoses	Female	0	3	0	1	0	1	3	0	8	15	43	54
	Male	1	30	0	8	1	0	13	3	56	49	333	382
	Sex not reported	0	0	0	0	0	0	0	0	0	0	1	5
	Total[1]	1	33	0	9	1	1	16	3	64	64	377	441
AIDS diagnoses	Female	0	1	0	1	0	0	0	0	2	3	5	10
	Male	0	2	0	3	1	0	1	0	7	31	52	181
	Total[1]	0	3	0	4	1	0	1	0	9	34	57	191
AIDS deaths	Female	0	0	0	0	0	0	0	0	0	1	2	5
	Male	0	5	0	0	0	0	1	0	6	11	49	83
	Total[1]	0	5	0	0	0	0	1	0	6	12	52	88

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

Table 11. Cumulative diagnoses of HIV infection, AIDS and deaths following AIDS since the introduction of HIV antibody testing to 31 July 1999, by sex and State or Territory

		State or Territory								
		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
HIV diagnoses	Female	24	592	9	140	57	6	210	111	1,149
	Male	189	10,661	107	1,922	656	79	3,826	891	18,331
	Sex not reported	0	258	0	0	0	0	24	0	282
	Total[1]	213	11,530	116	2,069	713	85	4,073	1,005	19,804
AIDS diagnoses	Female	8	174	0	47	23	3	67	26	348
	Male	86	4,550	35	798	342	44	1,596	344	7,795
	Total[1]	94	4,736	35	847	365	47	1,670	372	8,166
AIDS deaths	Female	3	114	0	30	15	2	47	16	227
	Male	65	3,141	24	557	228	28	1,251	245	5,539
	Total[1]	68	3,263	24	589	243	30	1,304	262	5,783

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

Serious Adverse Events Following Vaccination Surveillance Scheme

The Serious Adverse Events Following Vaccination Surveillance Scheme is a national surveillance scheme which monitors the serious adverse events that occur rarely following vaccination. More details of the scheme were published in CDI 1999:23;58.

Acceptance of a report does not imply a causal relationship between administration of the vaccine and the medical outcome, or that the report has been verified as to the accuracy of its contents.

It is estimated that 250,000 doses of vaccines are administered every month to Australian children under the age of six years.

Results for the reporting period 1 September to 30 November 1999

There were 19 reports of serious adverse events following vaccination for this reporting period (Table 12). Onset dates were from 1998 to 1999, the majority (90%) being in 1999. Reports were received from Australian Capital Territory (3), New South Wales (1), Northern Territory (2), Queensland (8), South Australia (2), Victoria (2) and Western Australia (1) for this period.

The most frequently reported events following vaccination were other reactions (5 cases, 26%) and convulsions (5 cases, 26%), followed by hypotonic/hyporesponsive episodes (3 cases, 16%), temperature of 40.5^{o}C or more (2 cases, 10.5%), ITP (2 cases, 10.5%), and persistent screaming (1 case, 5%). For one case the description of the adverse event was missing. Both cases of ITP were reported following MMR. One case occurred after the second dose of MMR and for the other case the dose was not reported.

The number of adverse events reported during this period continued to decline from the previous reporting period and was the lowest number reported in the previous two years. The greatest number of adverse events were associated with MMR (5 cases, 26%), and Diphtheria-Tetanus-Pertussis (DTP) either alone or in combination with other vaccines (8 cases, 42%).

Hospitalisation status following a reported adverse event was described for all but two cases and six were hospitalised (32%). Of those who were hospitalised five had recovered at the time of reporting. Overall there was incomplete information on recovery status on one case while all the other cases had recovered at the time of reporting.

Table 12. Adverse events following vaccination reported in the period 1 September to 30 November 1999[1]

Event	Vaccines										Reporting States or Territories	Total reports for this period[3]
	DTP	DTP/Hib	DTP/OPV/Hib	CDT/DTP/Hib	Hib	Hib/OPV/other	MMR	Hib/MMR	Hib/Hep B/MMR	Other[2]		
Persistent screaming			1								ACT	1
Hypotonic/Hyporesponsive		1	1			1	1				ACT, Qld	4
Temperature		1									Qld	1
Convulsions				1	1		1	1	1		NSW	5
ITP							2				Qld, WA	2
Other	1	2	1				1				SA, Vic, NT	5
Total	1	4	3	1	1	1	5	1	1	0		19

1. Events with onset dates from 1998 to1999 were reported in this period.
2. Includes influenza vaccination, DTPa, CDT, OPV, Hepatitis B vaccine, pneumococcal vaccination, BCG, ADT and rabies immunoglobulin (HRIG).
3. 1 child with an adverse event had no vaccine specified.

Bulletin Board

The First Pacific Rim Biomedical Seminar
Transportation of Infectious and Diagnostic Substances
3 March 2000
Sheraton on the Park
Sydney, NSW
Contact: Christine Sherwood
Phone: 1800 023 560; or
Sydney: 9693 2988
Email: sherwood@worldcourier.com.au

International Society of Travel Medicine/WHO/CDC
2nd European Conference of Travel Medicine
29-31 March 2000
Venice, Italy
Contact: Dr Walter Pasini, Italy
Phone: 390-541-24301
Fax: 390-541-25748
Email: wpasini@rimini.com

Australian Society for Infectious Diseases Meeting
April 16-19, 2000
Fairmont Resort Leura
Organisers: Dart Associates:
Phone: 02 94189396
For scientific content: Contact Tom Gottlieb,
Concord Hospital
Phone: 02-97677533
Fax; 02-97677868 or
Email: Tom@micr.crg.cs.nsw.gov.au

Australian Infection Control Association
First Biennial Conference
Infection Control Beyond 2000
3-5 May 2000
Hilton Adelaide International, South Australia
Contact: AICA 2000 Secretariat
PO Box 1280 , Milton, Queensland 4064
Phone: 07 3369 0477
Fax: 07 3369 1512
Email: aica2000@im.com.au
Website: http://www.aica.org.au/aica2000.htm

Australian School of Environmental Studies
Arbovirus Research in Australia
3-7 July 2000
Couran Cove Nature Resort, Gold Coast, Queensland
Contact Dr Michael Brown, Queensland Institute of
Medical Research, PO Box Royal Brisbane Hospital,
Herston, Queensland, 4029
Website: http://www.mcaa.org.au

Royal North Shore Hospital
Outpatient Parenteral Therapy - beyond 2000
17-22 September 2000
Fairmont Resort
Leura, New South Wales
Phone: 02 9956 8333
Fax: 02 0056 5154
Email: confact@conferenceaction.com.au

The Australasian Society for HIV Medicine
12th Annual Conference
16-19 November 2000
The Carlton Crest, Melbourne, Victoria
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 information, but readers are advised to contact the relevant organisation for confirmation of details. Information about the availability of resources is included when space allows. Inclusion of a resource on the Bulletin Board does not imply endorsement of the resource by either the Communicable Diseases Network Australia New Zealand or the Commonwealth Department of Health and Aged Care.

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)
This material has been condensed from information on the WHO Internet site. A link to this site can be found under 'Other Australian and international communicable diseases sites' on the CDI homepage.

Cholera

Democratic Republic of the Congo

Since the beginning of November, 74 cases of cholera and 4 deaths have been reported in the areas of Kinshasa worst affected by current flooding. Investigations are in progress and preventive and control measures are being implemented.

Fiji

On 30 July 1999, the Ministry of Health of New Zealand reported an imported case of cholera to WHO and to the Ministry of Health of Fiji. *Vibrio cholerae* O1 El Tor subtype Ogawa wasconfirmed in a 26 year old male from New Zealand who had visited a small offshore reef island in Fiji as a tourist in June 1999. A similar case in a visitor from New Zealand, possibly acquired at the same Fiji island resort, was investigated by the Ministry of Health of Fiji 8 months earlier. No other cases were found at that time.

After the second report, the Ministry of Health in Fiji launched a thorough investigation, in collaboration with WHO. No further cholera cases have been detected, but the investigators did find evidence of faecal contamination of the island's fresh water source (i.e. the groundwater lens) and of the salt water intake for a desalination facility.

The island's drinking-water is separately obtained. Revised chlorination procedures are currently in place. Other measures have already been taken to provide a long-term solution on the affected island. There is no evidence to suggest that a problem exists in Fiji beyond this small resort island.

Rwanda

On 25 October, an outbreak of cholera was notified. Two samples were confirmed by laboratory as *Vibrio cholerae* serotype Inaba. From 14 to 31 October, a total of 140 cases and 5 deaths were reported in Ruhengeri health region. Most cases used water from the river Kigombe for domestic purposes and drinking.

The health authorities have established a surveillance system; provided oral rehydration salts, intravenous fluids and antibiotics to local health officers for treating cases; disseminated education messages on hygiene through the local health officers; and distributed chlorine tablets to the population for treating water.

Japanese encephalitis, India

The national health authorities have reported an outbreak of Japanese encephalitis which started in early September in Andhra Pradesh state. A total of 965 cases with 200 deaths (CFR 20.7%), mainly in children, occurred up to 6 December. Laboratory confirmation was obtained for 16 out of 28 samples tested. The national health authorities sent teams to the affected areas to provide technical assistance and control and preventive measures are being implemented. Japanese encephalitis is endemic in Andhra Pradesh where outbreaks occur every 2 to 3 years.

Legionnaires' disease, Belgium

Following a trade fair in Kapellen, Belgium between 29 October and 7 November, an outbreak of Legionnaires' disease has been reported. So far, out of 80 persons who developed clinical symptoms, 13 had positive urinary tests including 4 who died. Initial investigation suggests that whirlpool baths exhibited at the show are the most likely origin of the infection. The investigation by the health authorities is in progress.

Yellow fever, United States of America

A 48 year old unvaccinated man travelling in Bolivar state (Venezuela) became ill on 23 September and returned to California on 25 September. He was hospitalised on 27 September with fulminant hepatitis and renal failure, and died on 4 October. Yellow fever was confirmed by immuno-histochemistry and PCR. The Venezuelan authorities were informed and a field investigation is under way.

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Contributions

Contributions covering any aspects of communicable diseases are invited. All contributions are subject to the normal refereering process. Instructions to authors can be found in *CDI* 1999;23:59.

Website

http://www.health.gov.au/pubhlth/cdi/cdihtml.htm

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