Tuberculosis notifications in Australia, 1996

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Abstract

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

Introduction

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

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

ISSN 0725-3141
Volume 22
Number 9
3 September 1998

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

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

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

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

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

Methods

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

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

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

Contents, ***continued***

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

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

Tuberculosis (new case)

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

  or

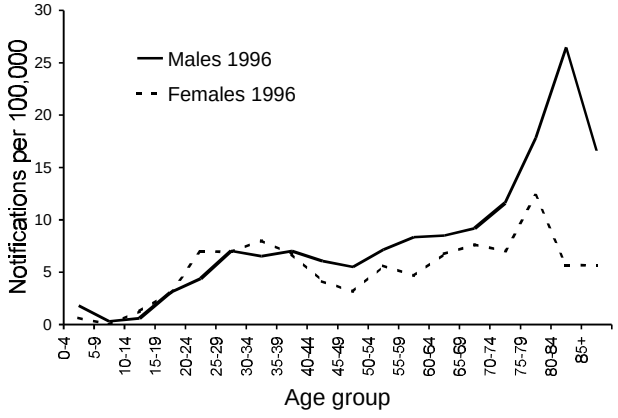
- a case which has been diagnosed to be active clinically and which has been accepted as such by the State or Territory Director of Tuberculosis.

Tuberculosis (relapse)

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

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

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



Results

Notification rates - new and relapsed cases

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

Age and sex

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

Principal sites of disease

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

BCG status

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

Methods of diagnosis

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

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

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

na = not applicable

Pathogen

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

Antimicrobial therapy

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

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

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

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

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

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

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

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

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

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

HIV status

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

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

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

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

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

Country of birth

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

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

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

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

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

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

Indigenous status

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

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

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

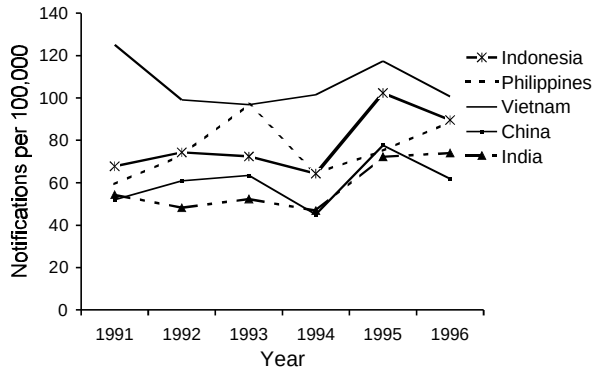
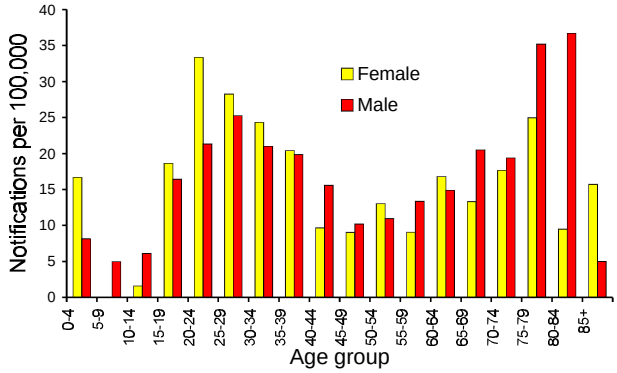


Figure 3. Tuberculosis notification rates in the overseas-born, Australia, 1996, by age group and sex



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

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

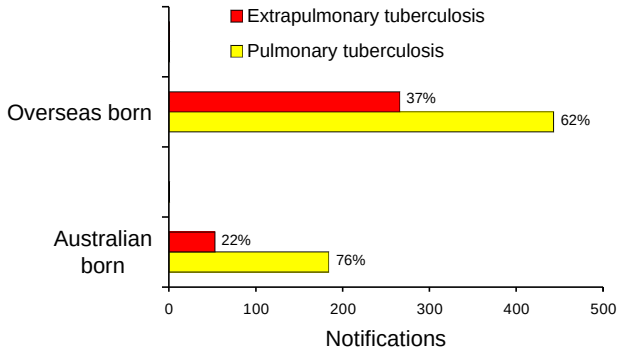


Figure 5. Percentage of tuberculosis notifications by years of Australian residency in selected overseas-born popoulationss with the highest number of notifiactions, 1996

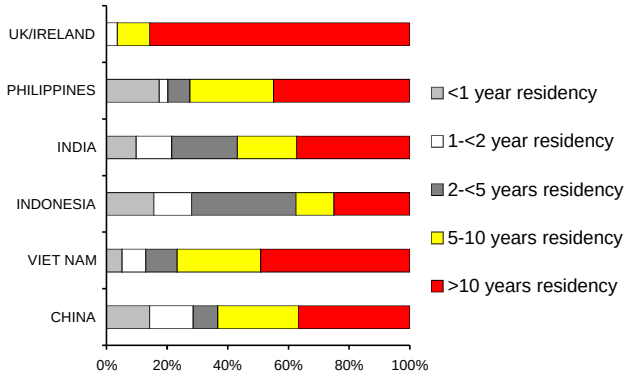


Figure 6. Tuberculoisis notification rates per 100,000 Australian indigenous population, by age group and sex, 1996

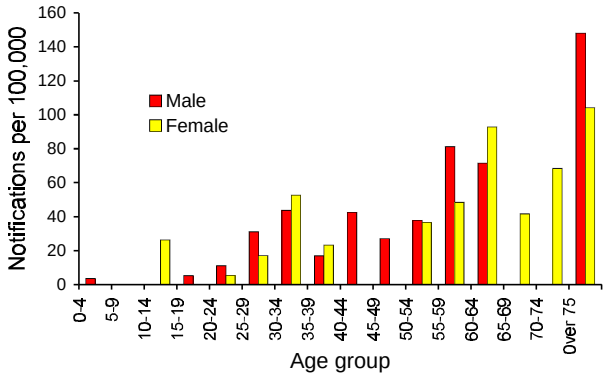
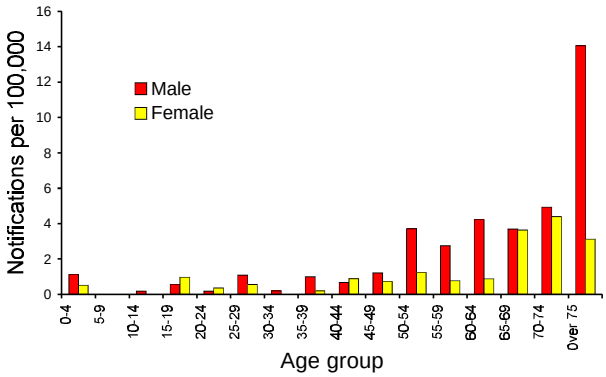


Figure 7. Tuberculosis notification rates per 100,000 Australian non-indigenous population, by age group and sex, 1996



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

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

Relapses

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

Mortality

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

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

Discussion

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

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

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

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

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

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

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

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

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

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

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

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

Acknowledgements

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

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Editor's column

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

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

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

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

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

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

Report of the Australian Mycobacterium Reference Laboratory Network

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Abstract

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

Introduction

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

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

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