

Tuberculosis notifications in Australia, 2000

Ming Lin, Jenean Spencer, Paul Roche, Moira McKinnon and the National TB Advisory Committee (Ral Antic - Chair, Ivan Bastian, Amanda Christensen, Mark Hurwitz, Anastasios Konstantinos, Vicki Krause, Avner Misrachi, Graham Tallis, Justin Waring) for the Communicable Diseases Network Australia

Abstract

Australia has one of the lowest incidences of tuberculosis (TB) in the world. The annual incidence rate has remained stable at between 5 and 6 per 100,000 population, since 1991. In 2000, there were 1,060 TB notifications in Australia, of which 1,004 were newly diagnosed cases and 56 were relapse cases. The corresponding incidence rate for new and relapsed TB was 5.2 and 0.3 cases per 100,000 population, respectively. The highest incidence of TB disease in Australia continues to be among the overseas-born (18.0 per 100,000 population) and Indigenous Australians (15.3 per 100,000 population). By contrast, the incidence of disease in the non-Indigenous Australian-born population remains low (1.2 per 100,000 population). *Commun Dis Intell* 2002;26:214-225.

Keywords: tuberculosis, Mycobacterium tuberculosis

Introduction

Tuberculosis is a global public health threat. In 2000, there were an estimated 8.7 million new cases of TB worldwide, an increase from 8.4 million in 1999. In 2000, 3.7 million cases (42% of all estimated TB cases) were reported to the World Health Organization (WHO) Global Surveillance Programme, by 202 countries. Directly Observed Treatment – Short course (DOTS) is now used for 55 per cent of the world's TB patients in 148 countries.¹

Although the global case notification rate for TB has remained stable since 1980, there are differences in the epidemiology of the disease in different regions. While TB incidence has been increasing in central and eastern Europe (8% per annum) and in eastern and southern African countries affected by HIV (10% per annum), TB is declining in developed countries.¹

Poorly supervised and inadequately treated TB cases are the basis for the emergent problem of multi-drug resistant TB (MDR-TB). The status of drug resistant tuberculosis in Australia in 2000 is addressed in the TB laboratory annual report in this issue of *Communicable Diseases Intelligence*.²

A majority of the world's TB cases occur in South East Asia and the Western Pacific regions, geographically adjacent to Australia. Australia has maintained a low and stable rate of TB through effective pre-migration screening and the activities of specialised, multi-disciplinary TB services in the States and Territories.

The National Mycobacterial Surveillance System (NMSS), established in 1991, has monitored trends in the national rates of TB over the last 10 years. Future enhancements to the national TB surveillance system, such as use of a common database to facilitate timely collection of data from States and Territories will serve to better inform policy makers, public health practitioners and clinicians.

Methods

Data collection

In Australia, all jurisdictions have legislation requiring medical practitioners, laboratories and other health officials to report cases of TB to State and Territory health authorities. Notifications reported to State and Territory health authorities are collated on an annual basis and sent to NMSS in de-identified computerised format. Data fields include a unique identifier for each notification, disease code, postcode of residence, date of birth, sex, Indigenous status, dates of disease onset and report, 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 TB as new or relapsed disease. The National Tuberculosis Advisory Committee (NTAC) of the Communicable Diseases Network Australia (CDNA) is responsible for determining what data are collected.

Data processing and quality control

TB notifications reported in 2000 were received by September 2001. The data were checked for completeness and accuracy. Missing data and apparent errors together with any queries arising from the data were returned to jurisdictions for review, correction of errors and ascertainment of completeness of case information for the year.

A number of data quality factors may affect the usefulness of the data, including the percentage of cases notified and the completeness and accuracy of data. In Australia, most cases of TB are thought to be reported to the notification system. The reason for this achievement includes an effective TB screening program, a high standard health care system (the Australian health care system provides free TB treatment to both Australians and non-Australian residents), and the activities of specialised, multi-disciplinary TB services in the States and Territories.

Case definition

The case definitions for tuberculosis used in Australia in 2000 are described below:

Tuberculosis (new case)

A case which has been confirmed by the identification of *Mycobacterium tuberculosis* (or *M. africanum* or *M. bovis*) by smear, 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).

Population estimates for 2000

The rates used in this report have been calculated using population figures provided by the Australian Bureau of Statistics (ABS). Denominator data for age and sex are based on mid-year population estimates for 2000. Population estimates of Australian-born Indigenous people are based on the Projected Indigenous Population 1997 to 2006, Australia.³ In these projections, assumptions are made about future births, deaths and

migrations in the Indigenous population and a 'low' and 'high' estimate of projected population numbers are produced. In this report, we have used the low estimate as the denominator for rates in Indigenous populations as in previous reports. Resident populations in Australia by birthplace of origin were based on estimates of the relevant populations as at 30 June 2000. Countries of birth were coded by the ABS Standard Classification of Countries for Social Statistics.

The population estimates of total Australian-born people were calculated by subtracting the overseas-born population subtotal (estimated in 2000) from the total population in 2000. The population estimates of non-Indigenous Australian-born people in 2000 were calculated by subtracting the total Indigenous population estimate from total Australian-born population estimate.

In this report, notifications may include persons who were visitors or non-permanent residents of Australia during the notification period. As the result, some incidence rates may be overestimated.

TB-related deaths

Mortality data for TB were obtained from the ABS. All the cases with the ICD-10 code A15 to A19 and B90 were classified as deaths caused by TB.

Results

Data quality

In 2000, most of the data fields were complete for cases reported to NMSS. Information on sex and age was reported for all TB notifications and country of birth was recorded for 1,050 (99%) of all TB notifications. In 2000, Indigenous status was reported for 230 (97%) of all notifications for people born in Australia. The principal site of tuberculosis disease was reported for 1,050 (99%) and the diagnosis method was reported for 936 (88%) of the notifications. The anti-TB drug regimen given at the time of diagnosis was reported for 962 (91%) cases of TB. Data fields that were incomplete in the 2000 data collection were HIV status (7% complete), BCG vaccination (32% complete) and length of residence in Australia for overseas-born persons (66% complete).

TB notification rates

In 2000, 1,060 cases of TB were notified nationally (5.5 cases per 100,000 population), representing a 9 per cent decrease from 1999 notification data. The national notification rate has remained at the current level since the mid-1980s (Figure 1). Of the 1,060 cases in 2000, 1,004 (95%) were new cases and 56 (5%) were relapsed cases. The corresponding incidence rate was 5.2 cases per 100,000 population for new cases and 0.3 cases per 100,000 population for relapsed cases (Table 1)

Crude incidence rates vary widely between jurisdictions (Table 2). In 2000, the notification rates of TB have remained below the national average in the Australian Capital Territory, Queensland, South Australia, Tasmania and Western Australia. There was a 41 per cent decrease in TB notifications in the Northern Territory, from 50.3 cases per 100,000 population in 1999 to 29.7 cases per 100,000 population in 2000. This was related to the large number of cases of TB among East Timorese refugees who were evacuated to Darwin in the latter part of 1999.

Figure 1. Incidence rate of TB Australia, 1950 to 2000

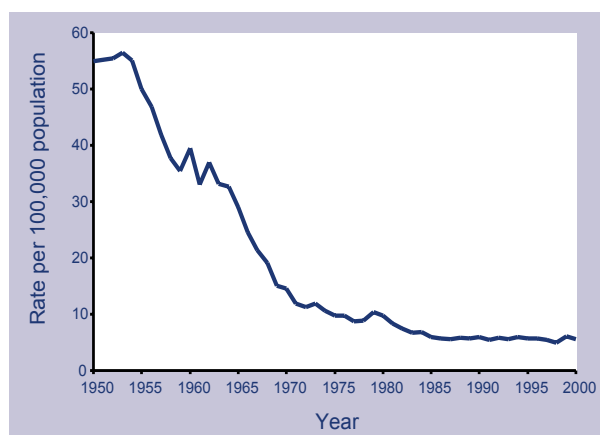


Table 1. Notifications of new and relapsed cases of TB, and rates per 100,000 population, Australia, 1990 to 2000, by year

Year	New cases		Relapsed cases		Total cases	
	Number	Rate	Number	Rate	Number	Rate
1990	979	5.7	37	0.2	1,016	5.9
1991	903	5.2	47	0.3	950	5.5
1992	983	5.6	28	0.2	1,011	5.8
1993	944	5.4	47	0.3	991	5.7
1994	996	5.6	61	0.3	1,057	5.9
1995	988	5.5	50	0.3	1,038	5.8
1996	983	5.4	54	0.3	1,037	5.7
1997	954	5.2	47	0.3	1,001	5.5
1998	884	4.7	39	0.2	923	4.9
1999	1,117	5.9	42	0.2	1,159	6.1
2000	1,004	5.2	56	0.3	1,060	5.5

Table 2. Notifications of new and relapsed cases of TB and rates per 100,000 population, Australia, 2000, by State or Territory

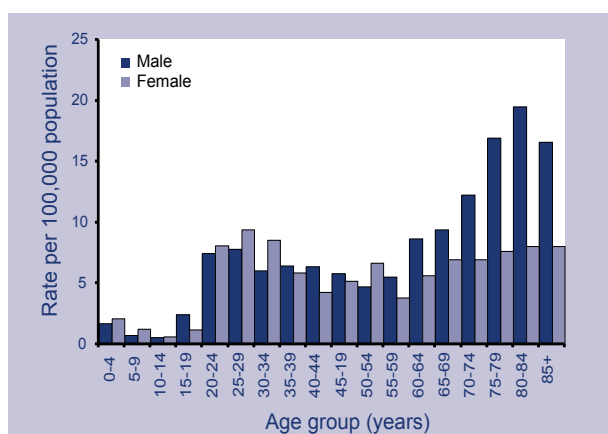
State/Territory	New cases		Relapsed cases		Total cases	
	Number	Rate	Number	Rate	Number	Rate
Australian Capital Territory	11	3.5	0	0.0	11	3.5
New South Wales	399	6.2	32	0.5	431	6.7
Northern Territory	57	29.2	1	0.5	58	29.7
Queensland	97	2.7	10	0.3	107	3.0
South Australia	55	3.7	1	0.1	56	3.8
Tasmania	10	2.1	0	0.0	10	2.1
Victoria	283	5.9	8	0.2	291	6.1
Western Australia	92	4.9	4	0.2	96	5.1
Australia	1,004	5.2	56	0.3	1,060	5.5

Note: Only 4 cases were not residents in the State of notification.

TB Incidence by age and sex

In 2000, sex and age was reported in all TB notifications. Notification rates by age and sex are shown in Figure 2. Of newly acquired TB cases, 526 (52%) were male and 478 (48%) were female giving a male to female ratio of 1.1:1. The corresponding incidence rates for newly acquired TB in males and females was 5.5 cases and 5.0 cases per 100,000 population, respectively. Of relapse cases, half were males and half females and all were aged more than 20 years.

Figure 2. Incidence rate of TB, Australia, 2000, by age and sex



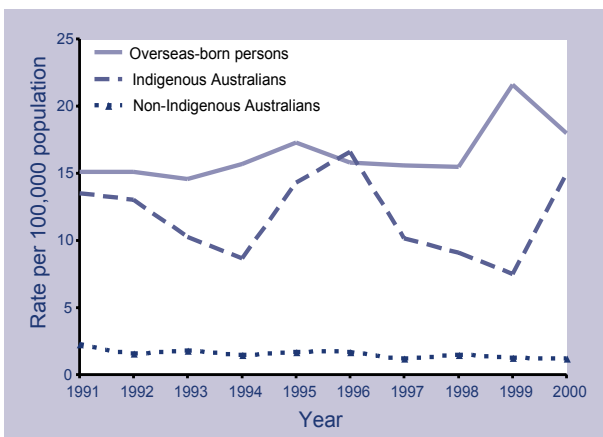
Tuberculosis occurred more commonly in men in both Indigenous and non-Indigenous Australian populations (38 Indigenous cases and 100 non-Indigenous cases) than in women (26 Indigenous cases and 72 non-Indigenous cases) with an overall male to female ratio in Australian born of 1.4:1. However, TB affected equal proportions of men and women in the overseas-born population (408 male cases and 406 female cases).

One of the aims of the recently released Australian TB Strategic Plan is to reduce TB among children. In 2000, there were 45 cases in individuals aged less than 15 years (incidence rate 1.1 cases per 100,000 population). All were newly diagnosed TB cases. Most cases in children occurred in the Indigenous Australians (12 cases; 7.4 cases per 100,000 population) and overseas-born population (14 cases; 6.5 cases per 100,000 population) compared with non-Indigenous Australians (19 cases; 0.5 cases per 100,000 population). Twenty-four cases of TB occurred in children under the age of 5 years. Of these cases, 14 (58%) were non-Indigenous Australians, 7 (29%) were Indigenous Australians and 3 (13%) were residents born overseas.

TB incidence by country of birth

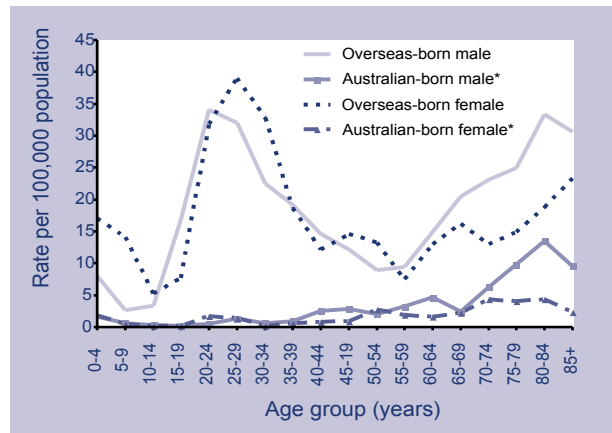
In 2000, information on country of birth was recorded for 1,050 (99%) of all TB notifications. The majority of TB notifications occurred among overseas-born Australian residents (814 cases, 78% of total). The incidence rate of TB in the Australian-born population (including both Indigenous and non-Indigenous Australians) and the overseas-born population was 1.6 cases and 18.0 cases per 100,000 population respectively. The incidence rate of TB in overseas-born persons was 15 per cent lower in 2000 compared with 1999 (21.3 cases per 100,000 population). This reduction was related to the effect that the large number of cases of tuberculosis among East Timorese refugees evacuated to Australia in 1999 had on the incidence rate in overseas-born persons in that year (Figure 3).

Figure 3. Trends of TB incidence rates, Australia, 1991 to 2000, by country of birth



The age- and sex-specific incidence rates in the Australian-born (including both Indigenous and non-Indigenous Australians) and overseas-born populations are illustrated in Figure 4. The overseas-born population shows high age-specific rates in both young adults and the elderly, whereas in the Australian-born population, there is a gradual increase in age-specific rates with advancing age. The highest rates among overseas-born persons were in the 20 - 24 year age group for men (34.1 cases per 100,000 population) and the 25 - 29 year age group for women (39.0 cases per 100,000 population). The highest rates among Australian-born persons were in the 80 - 84 year age group for men (13.4 cases per 100,000 population) and in the 70 - 74 year and 80 - 84 year age groups for women (4.3 cases per 100,000 population).

Figure 4. Incidence rates of TB in the Australian and overseas-born, by age and sex



* Including both Indigenous and non-Indigenous Australians

Table 3 shows the number of TB notifications and incidence rates per 100,000 in 2000 in the overseas-born resident population in Australia by country of birth, compared with the 2000 estimated TB incidence rates in these countries. In some countries, such as Indonesia and Burma, officially reported rates are considered underestimates. The incidence of TB was highest in Australian residents born in Somalia in 2000 (809 cases per 100,000 population). The rate, however, was calculated using the ABS 1996 Census population data due to lack of a current estimated resident population for people born in Somalia and resident in Australia. Australian residents born in India had the second highest TB incidence rate (84.4 cases per 100,000 population, Figure 5). In 1999, Indonesian-born residents had the highest rates (229.4 cases per 100,000 population) due to the large number of TB cases diagnosed in East Timorese-born refugees in that year. In 2000, the rate in Indonesian-born residents has fallen to 81.4 and the East Timorese-born residents are now counted separately (5 cases were reported in East Timorese-born persons in 2000).

Table 3. Notifications of tuberculosis, Australia, 2000. Number and estimated rate per 100,000 population for selected countries of birth

Country of birth	New cases	Relapsed cases	Total cases	Estimated Australian resident population* by country of birth, 2000	Rate per 100,000 population in Australia by country of birth, 2000	WHO incidence rate (per 100,000 population) [†] for country, 2000
Vietnam	130	8	138	174,449	79.1	112
India	91	2	93	110,190	84.4	111
Philippines	82	5	87	123,035	70.7	170
China	61	3	64	168,071	38.1	36
Indonesia [‡]	55	0	55	67,553	81.4	32
Korea [§]	25	6	31	41,357	75.0	Rep Korea (47) DPR Korea (153)
Hong Kong (SAR)	24	1	25	56,283	44.4	75
Papua New Guinea	18	2	20	27,380	73.0	252
UK/Ireland	17	3	20	1,160,039	1.7	10
Cambodia	16	2	18	23,711	75.7	144
Somalia	17	0	17	2,100	809.5	65
Malaysia	13	1	14	97,632	14.3	68
Sri Lanka	13	1	14	56,048	25.0	44
Thailand	14	0	14	22,327	62.7	54
Myanmar	10	3	13	41,357	31.4	65
Fiji	10	1	11	40,312	27.3	18
Italy	11	0	11	241,749	4.6	6
Overseas-born	769	45	814	4,517,267	18.0	
Australian-born	225	11	236	14,639,770	1.6	
Not stated	10	0	10			
Total	1,004	56	1,060	19,157,037		

Rates per 100,000 resident population should be interpreted with caution, as some cases are visitors to Australia who are not included in the census data.

* The Australian resident population for Somalia was the estimate from the ABS 1996 Census data.

† Rates from WHO 2002 Global Tuberculosis report.

‡ Population for Indonesia includes those born in East Timor.

§ The notifications for Korea included both Republic Korea and Democratic Peoples Republic Korea.

Fourteen (2%) of overseas-born TB cases were aged less than 15 years with an age specific rate of 6.5 cases per 100,000 population compared with 0.8 cases per 100,000 Australian-born population in the same age group. Of these TB cases in children, country of birth was reported as Papua New Guinea (4 cases), New Zealand (3 cases), China, Ethiopia, India, Indonesia, Somalia, the United States of America (USA) and Vietnam (1 case for each country).

TB incidence in Indigenous Australians

Indigenous status was reported for 230 (97%) of all notifications for people born in Australia. Indigenous Australians accounted for 64 TB cases in 2000, a 88 per cent increase on the 34 cases reported in 1999, but a similar number to that in 1996. The annual incidence rate for Indigenous Australians has increased from 8.3 cases per 100,000 Indigenous population in 1999 to 15.3 cases per 100,000 population in 2000. By contrast, the incidence rate remained low for non-Indigenous Australians in 2000 (1.2 cases per 100,000 population).

The largest increase in TB cases in Indigenous Australians occurred in the Northern Territory (17 cases in 1999 to 37 cases in 2000). Increases were also noted in Queensland (8 cases in 1999 to 14 cases in 2000), New South Wales (3 cases in

1999 to 5 cases in 2000) and South Australia (one case in 1999 to 2 cases in 2000). Western Australia reported 5 cases in both years and Tasmania reported one case in Indigenous Australians in this year. The Australian Capital Territory and Victoria reported no cases in Indigenous Australians in 2000. Table 4 shows the crude incidence rates of TB in the Indigenous population by jurisdiction.

Among the 64 TB cases in Indigenous Australians, 38 were male and 26 female with a male to female ratio of 1.5:1. Twelve (19%) notifications in Indigenous Australians were in children aged less than 15 years with an age specific rate of 7.4 cases per 100,000 Indigenous population. This is in contrast to the rate of 0.5 cases per 100,000 population in the same age group in the non-Indigenous Australian-born population.

The incidence rate in Indigenous males aged 75 years and over (159.1 cases per 100,000 population), was markedly higher than in the same age group in the non-Indigenous Australian-born population (10.2 cases per 100,000 population). The rates in Indigenous women in the 65 - 69 years age group (79.8 cases per 100,000 Indigenous population) was also markedly higher than the rate in the same age group of non-Indigenous Australian (1.3 cases per 100,000 population) (Table 5). Forty-two (66%) Indigenous Australians had pulmonary tuberculosis.

Figure 5. Incidence rate of TB per 100,000 resident population, Australia, 2000 by country of birth

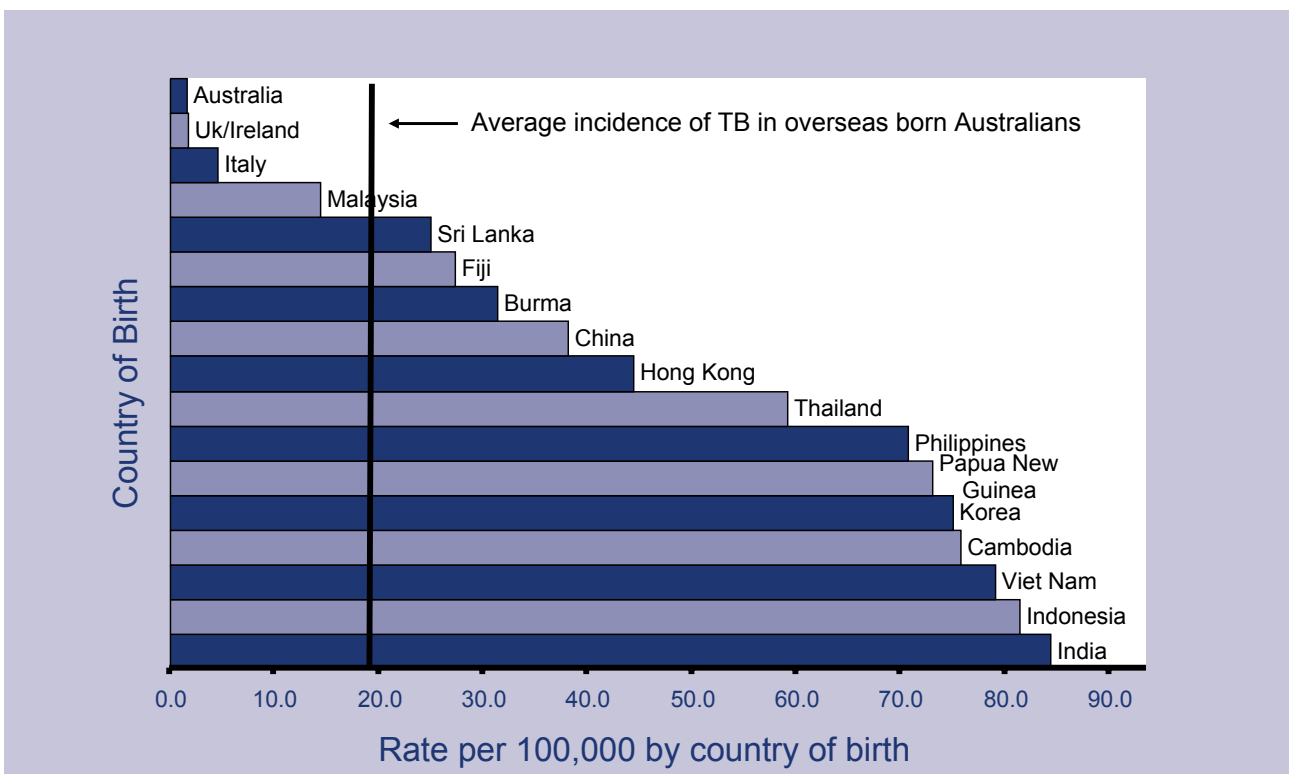


Table 4. Notifications of tuberculosis and incidence rates in Indigenous populations, Australia, 1999 and 2000, by jurisdiction

State/Territory	1999		2000	
	Number	Rate*	Number	Rate*
Australian Capital Territory	0	0.0	0	0.0
New South Wales	3	2.6	5	4.2
Northern Territory	17	31.1	37	66.7
Queensland	8	7.1	14	12.1
South Australia	1	8.8	2	17.3
Tasmania	0	0.0	1	6.1
Victoria	0	0.0	0	0.0
Western Australia	5	8.4	5	8.3
Australia	34	8.3	64	15.3

* Per 100,000 population

Table 5. Incidence rates of tuberculosis in Indigenous and non-Indigenous Australians, 2000, by age and sex

Age group (years)	Indigenous Australians				Non-Indigenous Australians			
	Male		Female		Male		Female	
	Number	Rate*	Number	Rate*	Number	Rate*	Number	Rate*
0-4	4	13.7	3	10.8	6	1.0	8	1.4
5-9	1	3.5	2	7.4	3	0.5	1	0.2
10-14	1	3.9	1	4.0	1	0.2	0	0.0
15-19	1	4.4	0	0.0	0	0.0	1	0.2
20-24	3	16.4	2	10.9	0	0.0	7	1.4
25-29	3	17.1	2	10.9	5	0.9	6	1.1
30-34	1	6.7	1	6.0	2	0.4	0	0.0
35-39	3	23.2	1	6.9	2	0.4	2	0.4
40-44	7	64.8	3	25.2	6	1.2	1	0.2
45-49	4	48.2	3	32.4	9	2.0	1	0.2
50-54	1	15.8	2	29.1	7	1.8	9	2.3
55-59	2	46.7	1	21.8	8	2.7	5	1.6
60-64	3	101.2	1	29.1	8	3.4	3	1.2
65-69	1	49.2	2	79.8	4	2.0	3	1.3
70-74	1	83.0	1	59.1	11	5.8	9	3.9
75+	2	159.1	1	51.7	28	10.2	16	3.5
Total	38	18.4	26	12.3	100	1.4	72	1.0

* Per 100,000 population

HIV status of TB cases

HIV test status was not provided for the majority (982, 93%) of notified cases of TB. Of the 78 cases in which HIV status was reported, 17 were positive and 61 were negative. Of the HIV positive cases, seven were Australian-born (all were male), and 10 were born overseas (6 male and 4 females). All HIV positive cases had newly acquired TB and 12 of the 17 had pulmonary disease. The age range of the HIV positive TB patients was 25 - 64 years for men and 20 - 44 years for women.

Principal sites of TB disease

The principal site of tuberculosis disease was reported for all but 9 cases of newly acquired TB and all but one case of relapsed TB (Table 6). The most common site for infection was pulmonary (683 cases; 64%), followed by lymphatic (179 cases; 17%).

Pulmonary disease accounted for 64 per cent (640 cases) of the newly acquired cases, and 78 per cent (43 cases) of the relapse cases. Rates of pulmonary TB in non-Indigenous Australians was 0.8 cases per 100,000 population, compared with 10.0 cases per 100,000 population in Indigenous Australians and 11.4 cases per 100,000 population in those born overseas.

The rate of extra-pulmonary TB in non-Indigenous Australians was 0.4 cases per 100,000 population, compared to 4.3 cases per 100,000 population in Indigenous Australians and 6.5 cases per 100,000 population in those born overseas.

Methods of diagnosis of TB

The diagnosis method was reported for 936 (88%) notifications. Of these cases, 47 (5%) were diagnosed by clinical examination only. The diagnostic modalities employed were reported for 648 cases of the 683 pulmonary cases. A positive result by one or more investigation was reported for 535 of these: 441 were tested positive by culture, 300 by microscopy, 105 by radiography, 48 by histology and 29 by nucleic acid testing. The diagnostic modalities were reported for 254 of 367 extra-pulmonary cases. Of these, 235 had a positive result by at least one method: 131 cases confirmed by culture, 100 by histology, 83 by microscopy, 23 by radiography and 12 by nucleic acid testing.

BCG status of TB cases

BCG vaccination status was reported for 340 (32%) of the 1,060 TB notifications. Of these, 245 (72%) reported receiving BCG vaccination and 95 had no history of BCG vaccination. It was noted that of the 7 Indigenous children with TB, 5 had received BCG vaccination and only 2 of the cases were pulmonary disease.

Table 6. Notifications of new and relapsed cases of TB in Australia, 2000, by principle site of disease

Site	New cases	Relapsed cases	Total cases	Total%
Pulmonary	640	43	683	64.4
Lymphatic	172	7	179	16.9
Pleural	70	2	72	6.8
Bone/joint	41	2	43	4.1
Peritoneal	23	0	23	2.2
Genitourinary	17	1	18	1.7
Miliary	4	0	4	0.4
Meningeal	12	0	12	1.1
Other	16	0	16	1.5
Unspecified	9	1	10	0.9

Anti-TB drug regimens

The anti-TB drug regimen given at the time of diagnosis was reported for 962 (91%) cases of TB (Table 7). There was no information available for 98 notifications. The reasons for incomplete follow-up data may include death, transfer overseas or interstate. Patients who are managed in private practice may also not report back to TB services.

A four-drug regimen of isoniazid (INH), rifampicin (RIF), pyrazinamide (PZA) and ethambutol (EMB) was the most commonly prescribed anti-TB therapy for new cases (737/913; 81%) and relapsed cases (37/49; 76%). The four-drug regimen was the most frequently prescribed treatment for overseas-born persons (642/749; 86%), Indigenous Australians (44/60; 73%) and non-Indigenous Australians (109/148; 73%). The three-drug combination of INH, RIF and PZA was commonly prescribed for children under the age of 5 years (18/23; 78%).

Deaths due to TB

In 2000, the ABS registered 55 deaths for which TB was recorded as the primary cause of death. The crude mortality rate was 0.3 deaths per 100,000 population, which was similar to the 0.2 deaths per 100,000 population in 1999 (Figure 6). Of the total deaths, 35 (64%) were in the Australian-born population and 20 (36%) in the overseas-born resident population. The corresponding mortality rates were 0.2 deaths per 100,000 Australian-born population and 0.4 deaths per 100,000 overseas-born Australians.

Age and sex specific mortality rates showed the largest number of deaths due to TB among the 80 - 84 year age group (7 deaths in men and 6 deaths in women), giving a rate of 4.3 deaths per 100,000 population.

Figure 6. Tuberculosis incidence and mortality rates, Australia, 1970 to 2000

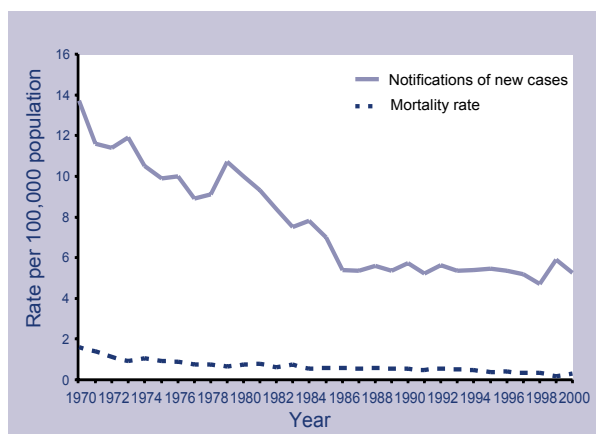


Table 7. Initial drug regimen given for treatment of tuberculosis, Australia, 2000

Drug regimen	New cases	Relapsed cases	Total cases
Eight drug regimen	1	1	2
Seven drug regimen	2	0	2
Six drug regimen	3	0	3
Five drug regimen	5	3	8
Four drug regimen	761	39	800
Three drug regimen	123	6	129
Two drug regimen	18	0	18
Total	913	49	96225

Discussion

In 2000, Australia continued to report one of the lowest TB incidence rates in the world. The incidence rate of TB in Australia has stabilised at less than 6 cases per 100,000 population since 1986, except in 1999, when the rate reached 6.1 per 100,000 population. The reason for the increase in cases of tuberculosis in Australia in 1999 was the significant numbers of cases of tuberculosis found among refugees from Kosovo and East Timor given temporary resident visas under the 'Safe Havens' programs.

Despite the decrease in notifications in the overseas-born population in the year, 78 per cent of TB cases in Australia in 2000 occurred in this population, and the incidence rate was 15 times the rate in the non-Indigenous Australian-born population. The proportion of overseas-born cases is highly dependent on global international circumstances. The high incidence of TB among the overseas-born in Australia ought to alert physicians to consider TB in patients from these communities presenting with compatible symptoms. The proportion of TB cases occurring in the overseas-born in Australia is similar to that in other developed countries. For example in the USA in 2000, 46 per cent of TB cases were reported in the foreign-born and the incidence rate was more than seven times higher than in the USA-born population.⁴ The fact that Australia's incidence rate has remained stable since the mid-1980s despite increasing migration, reflects effective screening policies and programs currently in place. However, it also reinforces the need to remain vigilant within our national and state surveillance, management and control programs. For example, health screening of 7,000 illegal entrants to Australia between 1 January 2000 and 30 June 2001 resulted in the diagnosis of 11 cases of tuberculosis.⁵

The burden of TB disease remains high in the Indigenous Australian population. Over the last 10 years, rates of TB have remained 10 to 15-fold higher in Indigenous Australians compared to the non-Indigenous Australian-born population. In 2000, the TB incidence rate in Indigenous

Australians increased from 8.3 cases per 100,000 population in 1999 to 15.3 cases per 100,000 population in 2000. In part, this is due to an extended outbreak of TB in the Northern Territory. Among the risk factors for TB in Indigenous Australians are poor socio-economic status, diabetes, renal disease, smoking, alcohol abuse and poor nutrition.⁶ These factors need to be addressed in concert with accessible TB control programs. As programs improve Indigenous status reporting in notifiable diseases there may be an apparent increase in rates of TB among Indigenous Australians.

HIV associated TB is widely recognised as the important issue for TB control. The global burden of TB has been further exacerbated by HIV co-infection in many regions of the world, especially Asia and Africa.¹ Australia has the lowest rate of TB/HIV co-infection in the world. A previous study estimated that 2 per cent of Australian TB patients were HIV positive.⁷ HIV status, however, was only recorded for 7 per cent of the notifications in 2000. Further collaborative efforts are necessary to improve surveillance practice to gain a better understanding of the extent of TB/HIV co-infection in Australia.

For Australia to maintain a low incidence of TB and to reach the goal of TB elimination, there is a continued need to enhance the capacity and expertise to respond to persons with TB nationally and internationally. CDNA recently endorsed the National Strategic Plan for TB control in Australia beyond 2000, to ensure TB management and control activities are undertaken with optimal coordination among national and international public health partners. Future annual reports will focus on progress towards the performance indicators developed in the strategic plan.⁸

There are few 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 emerging problems and appropriate action.

Acknowledgments

The members of the Communicable Diseases Network Australia 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 involved in compiling the individual datasets. Special thanks is offered to Louise Carter, Hillary McClure and Joyce Della in the Australian Capital Territory, Rob Menzies and Mohammed Habib in New South Wales, David Peacock in the Northern Territory, Patrick Derhy in Queensland, Sara Noonan in South Australia, David Coleman in Tasmania, Trevor Lauer and Lynn Browne in Victoria, and Jag Atrie in Western Australia. In addition, a note of appreciation is extended to the many physicians and medical practitioners and nurses who contribute to the collection of these data.⁷

References

1. WHO. Global tuberculosis control: surveillance, planning, financing. Geneva: World Health Organization, 2002.
2. Lumb R, Bastian I. Tuberculosis in Australia: bacteriologically confirmed cases and drug resistance, 2000. *Commun Dis Intell* 2002;26:226-233.
3. ABS. Experimental Projections of the Aboriginal and Torres Strait Islander Population (3231.0). Canberra. 1998
4. CDC. Tuberculosis morbidity among US-born and foreign-born populations - United States, 2000. *MMWR* 2002;51:101-104.
5. King K, Vodicka P. Screening for conditions of public health importance in people arriving in Australia by boat without authority. *Med J Aust* 2001;175:11-12.
6. Plant AJ, Krause VL, Condon JR, Kerr C. Aborigines and tuberculosis: why are they at risk? *Aust J Public Health* 1995;19:487-491.
7. Heath TC, Roberts C, Winks M, Capon AG. The epidemiology of tuberculosis in New South Wales 1975-1995: the effects of immigration in a low prevalence population. *Int J Tuberc Lung Dis* 1998;2:647-654.
8. Communicable Diseases Network Australia. National Strategic Plan for TB Control in Australia beyond 2000. *Commun Dis Intell* 2002;26:238-241.