

Tuberculosis notifications in Australia, 1998

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Abstract

Since the inception of the National Mycobacterial Surveillance System (NMSS) in 1991, annual crude notification rates for tuberculosis have remained stable at between 5 and 6 per 100,000 population. In 1998, there was a total of 923 TB notifications in Australia of which 884 were new TB cases, and 39 relapsed cases. The corresponding annual crude notification rate for new and relapsed TB was 4.72 and 0.21 per 100,000 respectively. Seventy-seven percent 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 are 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* 2001;25:1-8.

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Introduction

The dominant global threat of tuberculosis (TB) to human health has been reaffirmed in a series of recent World Health Organization reports. Annually, over 2 million deaths worldwide were attributable to TB,¹ with 95 percent of these occurring in developing countries. It is estimated that there were over 8 million new cases of TB in 1998 worldwide with over 3.6 million reported to the WHO Global surveillance programme by 189 countries.¹ Of these TB notifications 39 per cent were reported to be managed under the WHO Directly Observed Treatment-Short course (DOTS) strategy for TB control¹ and 1.4 million of these notifications (40%) were new sputum-positive pulmonary cases.

The HIV pandemic continues to fuel the TB epidemic in many regions of the world, especially Asia and sub-Saharan Africa. Up to 40 per cent of AIDS deaths in Asia and sub-Saharan Africa 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

The global burden of TB has been further exacerbated by poverty, natural disasters, conflict and political instability, all of which have served to thwart the development of health services in many countries, or have led to a progressive erosion of existing health infrastructures. Human migration, 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 inadequately treated TB is the basis for the emergent problem of multi-drug resistant TB (MDR-TB).

Of global TB case notifications in 1998, 59 per cent were from South-East Asia and the Western Pacific regions.¹ In the face of this major regional disease threat, Australia has maintained stable TB rates 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 enabled trends in the rates of active TB to be monitored over the last 7 years, has helped describe the epidemiology of TB in Australia, and has assisted in identifying high-risk groups for targeted control. Future enhancements to the existing system will serve to better 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 NMSS in computerised format with all reports being de-identified beforehand. 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* TB complex from atypical mycobacterial 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 includes Indigenous status, 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 TB as new or relapsed disease.

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 (relapsed)

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).² Denominator data for age and sex are based on mid-year population estimates for 1998. Resident population by Indigenous status and country of birth were based on estimates of the relevant populations as at 30 June 1998. The classification of countries adhered to the ABS standard classification of countries for social statistics.²

Results

Notification rates – new and relapsed cases

In 1998, 923 cases of active tuberculosis were notified nationally (4.92 per 100,000); of those 884 (96%) were new cases and 39 were relapsed cases (Table 1). The corresponding crude annual incidence rate was 4.72 per 100,000 for new cases and 0.21 per 100,000 for relapsed cases (Figure 1).

Crude incidence rates vary widely between jurisdictions (Table 2) because of high incidence rates in overseas born persons in New South Wales and high incidence rates in Indigenous people in the Northern Territory. 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 2 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

In 1998, sex was reported in all cases of notified TB. Information on age was available in over 99 per cent of cases with age data missing for only one male and one female (Table 3). Among the new TB cases males accounted for 446 (51%) and females for 438 (49%) of the notifications. The corresponding incidence rates for new disease in males and females was 4.78 and 4.65 per

Figure 1. Incidence rates for new TB notifications (1948-1998) and crude TB mortality rates (1967-1998) per 100,000 population, Australia

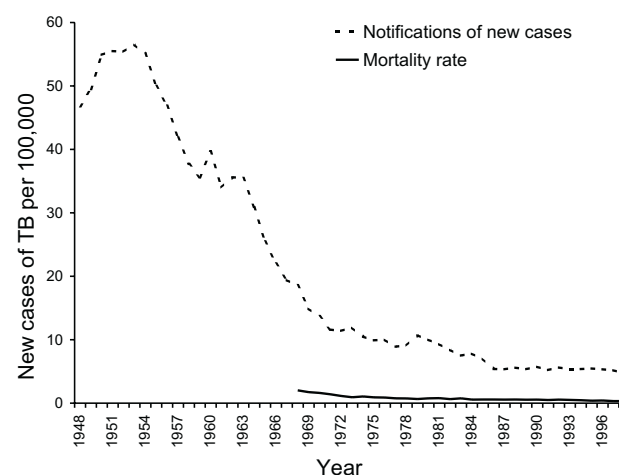


Table 1. Notifications of new and relapsed cases of tuberculosis, and rates per 100,000 population, Australia, 1986 to 1998 by year

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
1998	884	4.72	39	0.21	923	4.92

Table 2. Notifications of new and relapsed cases of tuberculosis and rates per 100,000 population, Australia, 1998, by State and Territory

State/Territory	New cases		Relapsed cases		Total cases	
	Number	Rate	Number	Rate	Number	Crude rate
Australian Capital Territory	14	4.54	0	0.00	14	4.54
New South Wales	376	5.93	20	0.32	396	6.24
Northern Territory	30	15.79	1	0.53	31	16.32
Queensland	99	2.86	6	0.17	105	3.04
South Australia	51	3.43	2	0.13	53	3.56
Tasmania	7	1.48	1	0.21	8	1.70
Victoria	234	5.02	6	0.13	240	5.15
Western Australia	73	3.99	3	0.16	76	4.15
Total	884	4.72	39	0.21	923	4.92

Note: Only 5 cases were not residents in the State of notification.

Table 3. Notifications of new cases of tuberculosis and rates per 100,000 population, Australia, 1998, by age group and sex

Age group (years)	Males		Females		Total	
	Number	Rate	Number	Rate	Number	Rate
0-4	8	1.21	2	0.32	10	0.78
5-9	10	1.47	8	1.24	18	1.36
10-14	4	0.60	7	1.09	11	0.84
15-19	20	2.96	17	2.65	37	2.81
20-24	34	4.90	42	6.29	76	5.58
25-29	45	6.09	69	9.39	114	7.74
30-34	51	7.24	38	5.37	89	6.30
35-39	35	4.69	39	5.20	74	4.95
40-44	32	4.58	37	5.26	69	4.92
45-49	24	3.66	26	4.00	50	3.83
50-54	27	4.56	17	2.98	44	3.79
55-59	19	4.26	13	3.01	32	3.65
60-64	25	6.78	17	4.59	42	5.69
65-69	28	8.40	25	7.18	53	7.77
70-74	18	6.30	18	5.46	38	6.18
75-79	28	13.93	28	10.45	60	12.80
80-84	17	15.45	17	9.45	34	11.73
85+	14	20.21	17	10.74	31	13.62
Unknown	1		1		2	
Total	446	4.78	438	4.65	884	4.72

100,000 population respectively. Ten (10) new cases of tuberculosis were notified in children under 5 years of age with a corresponding rate of 0.78 per 100,000 population.

For relapsed disease, females accounted for 21 (54%) cases and males for 18 (46%). Twenty-nine (74%) of the notifications were in persons aged over 40 years.

Principal sites of disease

A principal site of disease was reported for all but 8 cases of new TB and all cases of relapsed TB. Of the new cases, 518 (59%) had pulmonary and 190 (21.5%) had nodal disease (Table 4). Thirty-two percent (203 cases) of the new pulmonary cases were smear-positive.

Table 4. Notifications of new and relapsed cases of tuberculosis in Australia, 1998, by site of disease

Site	New cases	Relapsed cases	Total cases	Total %
Pulmonary	518	29	547	59.3
Pleural	37	0	37	4.0
Lymph nodes	190	7	197	21.3
Bone/Joint	30	0	30	3.3
Genitourinary	41	1	42	4.6
Miliary	4	0	4	0.4
Meningeal	9	0	9	1.0
Peritoneal	16	0	16	1.7
Others	31	2	33	3.6
Unknown	8	0	8	0.8
Total	884	39	923	100

Rates for pulmonary tuberculosis in Australian born persons was 0.9 per 100,000 population compared to overseas born (8.9 per 100,000 population) and Indigenous (5.6/100,000 population). The rate of extra-pulmonary tuberculosis in Australian born persons was 0.3 per 100,000 population compared with 7.2 per 100,000 population in overseas born persons and 3.3 per 100,000 population in Indigenous Australians.

Bacilles Calmette-Guérin (BCG) status

BCG vaccination status was not provided for 620 (67%) of the 923 TB notifications, 103 (11%) reported a history of BCG vaccination and 200 (22%) had not received a dose of BCG.

Antimicrobial therapy

The choice of antibiotic regimen started at the time of notification was reported in 876 (95%) cases of TB (Table 5). The most commonly prescribed combination was a four-drug combination of isoniazid, rifampicin, pyrazinamide and ethambutol in 671 (76.6%) cases (644 new cases and 27 relapsed cases). The next most common was the three-drug combination of isoniazid, rifampicin and pyrazinamide in 62 (7%) cases. Overall, a six-drug regimen was started in one (0.1%) case, a five-drug regimen in 57

Table 5. Initial drug regimen at time of notification of tuberculosis, Australia, 1998

Drug* regimen	New cases	Relapsed cases	Total
Six-drug regimen			
Iso+rif+pyr+etha+str+eth	1	0	1
Five-drug regimen			
iso+rif+pyr+etha+other	50	2	52
iso+rif+pyr+etha+str	2	1	3
iso+rif+pyr+etha+cyc	1	0	1
iso+rif+pyr+etha+pro	1	0	1
Four-drug regimen			
iso+rif+pyr+etha	644	27	671
iso+rif+pyr+other	8	0	8
iso+pyr+etha+str	1	0	1
iso+rif+etha+cyc	1	0	1
iso+rif+pyr+str	1	0	1
iso+rif+etha+other	1	0	1
rif+pyr+etha+str	1	0	1
Three-drug regimen			
iso+rif+pyr	59	3	62
iso+rif+etha	26	2	28
iso+pyr+etha	14	1	15
iso+etha+other	1	0	1
iso+etha+str	1	0	1
iso+rif+str	1	0	1
rif+pyr+etha	3	1	4
rif+etha+str	1	0	1
rif+pro+cyc	0	1	1
Two-drug regimen			
iso+rif	13	0	13
iso+pyr	2	0	2
iso+etha	2	0	2
etha+other	1	0	1
rif+etha	1	0	1
rif+pyr	1	0	1
Total	838	38	876

* Iso = isoniazid; rif = rifampicin; pyr = pyrazinamide; etha = ethambutol; str = streptomycin; eth = ethionamide; cyc = cycloserine.

(6.5%) cases, a four-drug regimen in 684 (78%) cases, a three-drug regimen in 114 (13. %) cases and a two-drug regimen in 20 (2.3%) cases. The reasons why patients were prescribed a two-drug regime included that they were children (3 cases), suspected of TB or preventative treatment (4 cases), medical complications (2 cases) or to complete treatment commenced overseas (1 case). No further information was available for the remaining 10 two-drug regimen treatments.

HIV status

HIV status was not provided in 864 (94%) of notified cases of TB. Of the 59 cases in which HIV status was reported, 4 were positive and 55 negative.

Country of birth

Most (77%) TB notifications were in people born overseas (710). The number of new TB cases reported in the Australian and overseas born populations was 204 (23%) and 680 (77%) respectively. The corresponding rate of new TB disease in the Australian and overseas born populations was 1.5 and 15.5 per 100,000 population respectively (Figure 2).

The incidence rates of all TB notifications (new and relapsed) per 100,000 overseas born resident populations in Australia are shown in Figure 3. The countries of origin with the highest rates of TB include Vietnam (141 cases; 81.2 per 100,000); Indonesia (42 cases; 73.9 per 100,000); India (61 cases; 64.0 per 100,000); China (52 cases; 34.9 per 100,000); and the Philippines (74 cases; 64.7 per 100,000). Together these countries accounted for 370 (52%) notifications in the overseas born cases. The rates of TB, per 100,000, overseas born resident population in Australia for 1998 are presented together with World Health Organization case incidence rates for TB in the country of origin for the same year (Table 6). In some countries, such as Indonesia, the estimated rates are considered to be higher than those officially reported.

The length of time that overseas born persons had been resident in Australia was reported for 466 (66%) notifications. Of these 90 (19%) had been resident for less than one year 44 (9%) from one to less than 2 years, 58 (12%) from 2 to less than 5 years, 92 (19%) from 5 to less than 10 years and 182 (39%) for 10 years or more.

The age and sex distributions of Australian born and overseas born TB incidence rates are illustrated in Figure 4. The overseas born population show 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.

Indigenous status

Indigenous status was reported for 202 (95%) of all notifications for people born in Australia. Indigenous Australians accounted for 39 TB cases in 1998, of which 1 was a relapsed case and 38 were new cases of TB.

Figure 2. Incidence rates, new disease, in the Australian and overseas born, 1991-1998

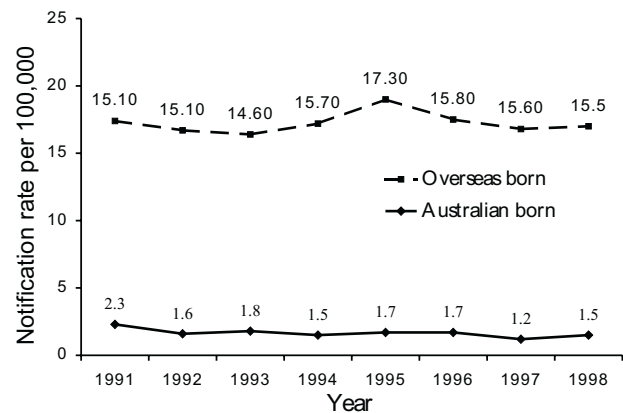


Figure 3. Incidence rates, by country of birth, per 100,000 resident population in Australia, 1998

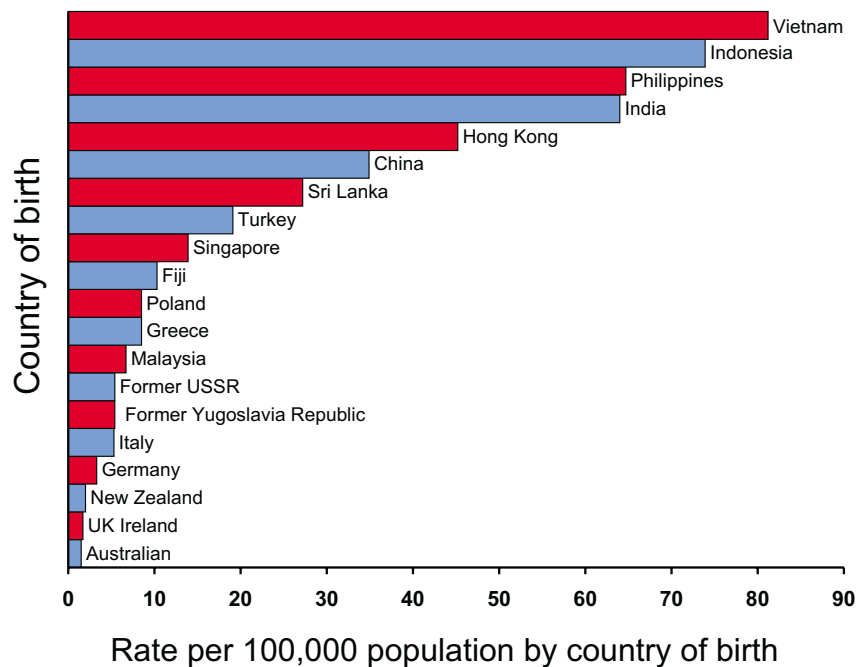


Table 6. Total notifications of tuberculosis, Australia, 1998. Number and estimated rates per 100,000 for selected countries of birth *

Country of birth. Selected countries	New cases	Relapsed cases	Total cases	Estimated population by country of birth	Rate per 100,000 population in Australia, by country of birth	WHO 1998 incidence rate (per 100,000) in country birth
Vietnam	135	6	141	173,549	81.2	112.7
Philippines	68	6	74	114,304	64.7	219.2
India	60	1	61	95,259	64.0	115.0
China	50	2	52	149,101	34.9	36.4
Indonesia	41	1	42	56,798	73.9	19.6
Hong Kong	23	2	25	55,256	45.2	115.2
UK and Ireland	18	2	20	1,168,986	1.7	9.6
Sri Lanka	15	0	15	55,240	27.2	38.1
Italy	13	0	13	247,519	5.3	10.0
Greece	12	0	12	140,955	8.5	10.2
Former Yugoslavia	10	1	11	203,488	5.4	28.5
New Zealand	7	0	7	342,705	2.0	9.7
Turkey	6	0	6	31,428	19.1	34.9
Malaysia	6	0	6	89,527	6.7	65.9
Poland	6	0	6	70,639	8.5	34.4
Fiji	4	0	4	38,889	10.3	20.9
Singapore	4	0	4	28,772	13.9	61.0
Germany	4	0	4	122,690	3.3	12.7
USSR	3	0	3	55,344	5.4	82.4
Total born overseas	680	30	710	4,383,760	16.2	
Australian born	204	9	213	14,364,044	1.5	
Total	884	39	923	18,747,804	4.9	4.9

Figure 4. Age specific TB incidence rates in Australian born and overseas born individuals per 100,000 resident population

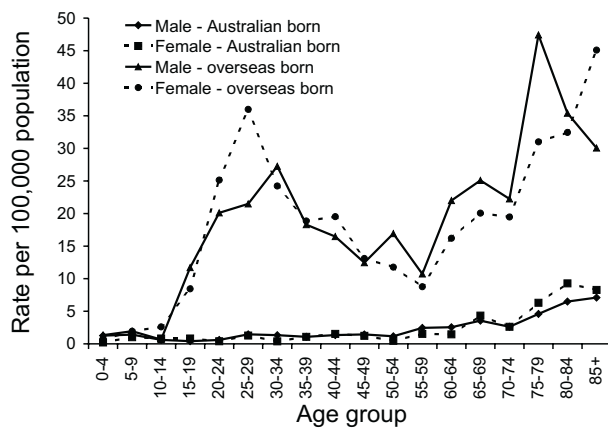
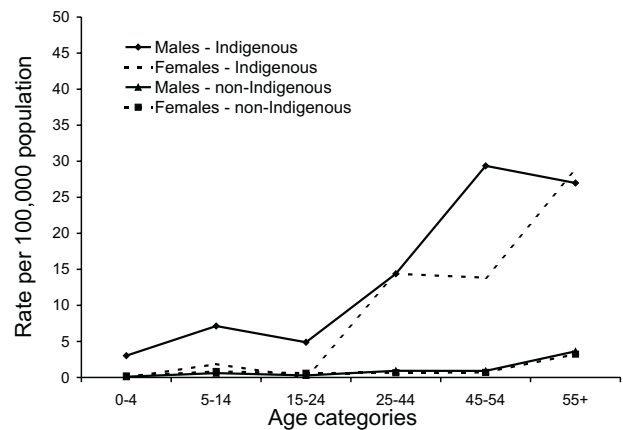


Figure 5. Age specific TB incidence rates in Indigenous Australian born and non-Indigenous Australian born



Twenty-five (64%) notifications of TB in Indigenous Australians were reported from the Northern Territory. The Australian Capital Territory, South Australia, Tasmania, and Victoria reported no Indigenous cases. The annual crude incidence rate of new disease per 100,000 Indigenous population was between 8.8 and 9.4 based on upper and lower Indigenous population estimates for the year. Relapse rates were 0.23 and 0.25 per 100,000 population based on the same estimates. The comparative TB rate of new disease in the Australian born, non-Indigenous population was 1.2 per 100,000 population.

Twenty-two notifications were in males and 16 in females. Six (16%) of the Indigenous notifications were aged over 60 years, and 6 cases were aged less than 14 years.

The age and sex incidence rates for Indigenous and non-Indigenous Australian born persons are illustrated in Figure 5. Both show increase in age-specific rates with advancing age, with the Indigenous rates being up to thirty times higher in boys under the age of 5 years and in men aged 45-55 years compared with those of their non-Indigenous counterparts.

Mortality

In 1998, the Australian Bureau of Statistics³ reported 62 deaths for which TB was the underlying cause. The crude mortality rate was 0.33 per 100,000, which is the same as the lowest rate for TB in 30 years reported in 1997 (0.33 per 100,000 population). Of these deaths, 41 (66%) were in males and 21 in females. Fifty-four (89%) occurred in persons over the age of 60 years, and 2 TB deaths were registered in persons under 40 years of age (both males; one in the 10 to 14 year age group and one in the 20 to 24 year age group).

Discussion

Australia continues to report one of the lowest TB rates in the world. Other developed countries that have reported rates of 5 per 100,000 or less in 1998 include Sweden, Malta and Norway.¹ From 1986 to 1997 annual crude incidence rates for TB in Australia stabilised at between 5 and 6 per 100,000⁴⁻¹⁰ and in 1998 dropped below 5 per 100,000 population.

Over half (52%) of all TB notifications in the overseas born in 1998 were from India, Indonesia, China, the Philippines and Vietnam. WHO has indicated that these 5 countries account for more than 52 per cent of all new TB cases notified annually throughout the world.¹

While the proportion of overseas born cases represented in annual TB notifications has increased over the last decade, the rates of TB have not. In 1986, 60 per cent of all annual notifications were overseas born, compared to 70 per cent in 1990, 75 per cent in 1996 and 77 per cent in 1998.⁴⁻¹⁰ For all years, with the exception of 1995, rates in the overseas born have been between 15 and 17 per 100,000. In the Australian born population there has been a decline in the proportion of all TB notifications as well as a progressive decline in incidence rates, from 2.8 per 100,000 in 1986 to a low of 1.5 per 100,000 in 1998.

Over the last 7 years, rates of TB have been 10 to 15 fold higher in Indigenous Australians compared with the

non-Indigenous, Australian born population.⁴⁻¹⁰ Reporting accurately on trends in this group has been made difficult by the shifts in the census denominator estimates for this population, and also because of the inconsistent reporting of Indigenous status by some jurisdictions. Among the risk factors for TB in Indigenous Australians are poor socioeconomic status, diabetes, renal disease, smoking, alcohol abuse, and poor nutrition.¹¹

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 facilitates appropriate action.

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