Tuberculosis notifications in Australia, 1999

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Abstract

Australia has one of the lowest incidence of tuberculosis in the world. The crude annual notification rate for tuberculosis (TB) has remained stable at between 5 and 6 per 100,000 population since 1991. In 1999, there were a total of 1,159 TB notifications in Australia of which 1,117 were new TB cases, and 42 were relapsed cases. The corresponding annual notification rate for new and relapsed TB was 5.9 and 0.2 per 100,000 population respectively. People born overseas accounted for 83 per cent of the notified cases. TB notification rates remain highest among overseas-born residents from high prevalence countries, and indigenous Australians. The lowest rates of disease are in the non-indigenous, Australian born population and data from the last 7 years indicate that the rate of tuberculosis in this population is continuing to fall. *Commun Dis Intell* 2001;25:254-260.

Keywords: tuberculosis; TB; surveillance

Introduction

There were 8.4 million new cases of tuberculosis (TB) worldwide in 1999, an increase from 8 million in 1997 due mainly to increases in the incidence of TB in the African countries most affected by the HIV/AIDS epidemic.[1] In 1998, 3.6 million cases (45% of all estimated TB cases) were reported to the World Health Organization (WHO) Global Surveillance Programme by 189 countries.[2]

The HIV pandemic continues to fuel the TB epidemic in many regions of the world, especially Asia and sub-Saharan Africa. An estimated 8 per cent of the global incident TB cases in 1997 occurred in people co-infected with HIV. While the global case fatality rate for TB was 23 per cent in 1997, case fatality rates for TB exceeded 50 per cent in African countries with high prevalence rates of HIV.[3]

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 lead to a progressive erosion in existing health infrastructure. 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). The current state of drug resistant TB in Australia is described in the following report in this issue of *CDI*.[4]

In response to the TB epidemic, the WHO has advocated Directly Observed Therapy Short-course (DOTS) as the most effective method of TB treatment. DOTS programs were accessible to 43 per cent of the world's population in 1998.[2] In Australia 3 States and Territories had implemented DOTS methods in their TB programs in 1999, which covered in total 37 per cent of the Australian population. In other Australian States, TB treatment programs appropriate to the local epidemiology and health infrastructures were implemented, which included the follow-up of all cases.

More than half of the world's TB occurs in South-east Asia and the Western Pacific regions, with Australia straddling both these regions. Despite this, 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 active TB over the last 8 years. Future enhancements to the national TB surveillance system will serve to better inform policy makers, public health practitioners and clinicians on the outcomes achieved from TB control efforts.

Methods

Notifications of TB are reported to State and Territory health authorities throughout the year, collated on an annual basis and sent to the NMSS at the Department of Health and Aged Care, Canberra, in computerised format. All reports are de-identified beforehand. Core data fields are shared with the National Notifiable Diseases Surveillance System (NNDSS). Variables reported in this core set include a unique identifier for each notification, disease code (to differentiate *Mycobacterium tuberculosis* infections from atypical mycobacteria infections), postcode of residence, date of birth, sex, dates of disease onset and report, indigenous status, and confirmation status of the report. A supplementary data set includes indigenous status, country of birth, length of residence in Australia for overseas born persons, pathogen species, 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.

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The case definitions used in 1999 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 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/Program Manager.

Tuberculosis (relapsed case)

- 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 Tuberculosis Director/Program Manager).

Mortality data for tuberculosis and denominator population data for the calculation of rates were obtained from the Australian Bureau of Statistics (ABS). Denominator data for age and sex are based on mid-year population estimates for 1999. Resident population by indigenous status and country of birth was based on estimates of the relevant populations as at 30 June 1999.

Results

Notification rates – new and relapsed cases

In 1999, 1,159 cases of active tuberculosis were notified nationally (6.11 per 100,000). Of these 1,117 (96.4%) were new cases and 42 (3.6%) were relapsed cases. The corresponding crude annual incidence rate was 5.89 per 100,000 for new cases and 0.22 per 100,000 for relapsed cases (Table 1 and Figure 1).

Crude incidence rates vary widely between jurisdictions (Table 2). Since 1991, rates of TB have been less than 5 per 100,000 in Tasmania, Queensland, South Australia and Western Australia. In the Australian Capital Territory rates have been less than 5 per 100,000 for all years except 1992, 1995 and 1999. The two most populous States, Victoria and

Figure 1. Incidence rates per 100,000 population for new tuberculosis notifications, Australia, 1948 to1999

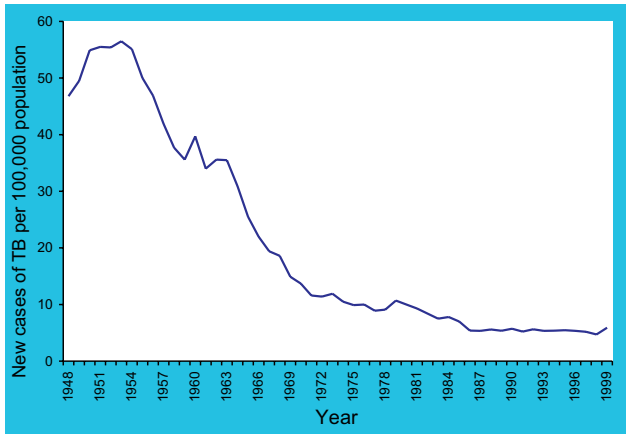


Figure 2. Notifications rates for new cases of tuberculosis, Australia, 1997 to 1999, by State and Territory

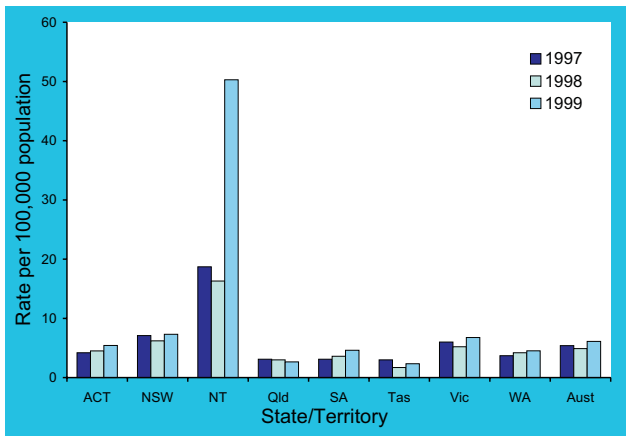


Table 1. Notifications of new and relapsed cases of tuberculosis, and rates per 100,000 population, Australia, 1986 to 1999, by year

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
1999	1,117	5.89	42	0.22	1,159	6.11

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. In 1999 all States and Territories with the exception of Queensland showed an increase in the rate of TB notifications (Figure 2). The Northern Territory had the largest increase, from 16.3 to 50.3 per 100,000, due to the large number of cases of tuberculosis among East Timorese refugees who were evacuated to Darwin in the latter part of 1999.

Age and sex

In 1999, sex was reported in all but one case. Information on age was available in over 99 per cent of cases with age data missing for only 3 cases (Table 3). Males accounted for 585 (50.5%) and females for 573 (49.5%) of the notifications with the corresponding incidence rate being 6.2 and 6.0 per 100,000 population respectively. There were 23 cases of tuberculosis notified in children under the age of 5, with a corresponding rate of 1.8 per 100,000 population. All notifications of relapsed TB were in persons aged over 30 years and 50 per cent were male.

Principal sites of disease

A principal site of disease was reported for all but 16 cases of new TB and all but one case of relapsed TB. Of the new cases, 735 (65.8%) had pulmonary and 117 (10.5%) had nodal disease (Table 4). Thirty-seven per cent (283 cases) of the new pulmonary cases were smear-positive.[1]

Table 2. Notifications of new and relapsed cases of tuberculosis and rates per 100,000 population, Australia, 1999, by State and Territory

State/Territory	New cases		Relapsed cases		Total cases	
	Number	Rate	Number	Rate	Number	Rate
Australian Capital Territory	16	5.11	1	0.32	17	5.43
New South Wales	444	6.92	25	0.39	469	7.31
Northern Territory	96	49.77	1	0.52	97	50.29
Queensland	86	2.45	7	0.20	93	2.65
South Australia	66	4.42	3	0.20	69	4.62
Tasmania	11	2.34	0	0.00	11	2.34
Victoria	314	6.66	5	0.11	319	6.77
Western Australia	84	4.51	0	0.00	84	4.51
Total	1,117	5.89	42	0.22	1,159	6.11

Table 3. Notifications of tuberculosis and rates per 100,000 population, Australia, 1999, by age group and sex

Age group (years)	Males		Females		Total	
	Number	Rate	Number	Rate	Number	Rate
0-4	13	2.0	10	1.6	23	1.8
5-9	4	0.6	4	0.6	8	0.6
10-14	6	0.9	8	1.2	14	1.1
15-19	21	3.1	27	4.2	48	3.6
20-24	52	7.5	44	6.6	96	7.1
25-29	64	8.6	80	10.9	144	9.7
30-34	53	7.5	71	10.0	124	8.8
35-39	37	4.9	63	8.3	100	6.6
40-44	50	7.1	43	6.0	93	6.5
45-49	39	5.9	31	4.7	70	5.3
50-54	27	4.4	24	4.0	51	4.2
55-59	32	6.9	25	5.5	57	6.2
60-64	27	7.1	25	6.6	52	6.9
65-69	31	9.3	25	7.2	56	8.3
70-74	36	12.4	32	9.7	68	11.0
75-79	46	21.6	21	7.4	67	13.5
80-84	27	24.4	22	12.4	49	17.0
85+	17	22.9	17	10.2	35*	14.5
Unknown	3		1		4	
TOTAL	585	6.2	573	6.0	1,159	6.1

* The gender of one case in the age group > 85 years was not identified

The rate of pulmonary tuberculosis in non-indigenous Australian-born persons was 0.9 per 100,000 compared to 13.6 per 100,000 in the overseas-born and 6.6 per 100,000 in indigenous Australians. The rate of extra-pulmonary tuberculosis in non-indigenous Australian-born persons was 0.18 per 100,000 compared to 5.1 per 100,000 in overseas born persons and 1.2 per 100,000 in indigenous Australians.

BCG status

BCG vaccination status was known in 376 (32%) of the 1159 TB notifications. Of these 92 (24.5%, [8% of total cases]) reported a history of BCG and 284 (75.5%, [24% of total cases]) had not received a BCG.

Antimicrobial therapy

An initial drug therapy comprised of the 4-drug combination of isoniazid, rifampicin pyrazinamide and ethambutol was given to 970 (81%) of patients.

HIV status

Information on HIV status was provided in only 110 (9.5%) of notified cases of TB. Of these, only 4 were positive.

Country of birth

The majority (955 cases, 82% of the total) of TB notifications was in people born overseas. The number of new TB cases reported in the Australian-born and overseas-born populations was 183 (16.4%) and 923 (82.6%) respectively. Eleven cases (0.9%) of new TB cases were in people whose country of birth was not recorded. The corresponding rate of new TB disease in the Australian-born and overseas-born populations was 1.2 and 20.6 per 100,000 population respectively (Figure 3).

The incidence rates of all TB notifications (new and relapsed) per 100,000 overseas-born resident populations in Australia, are shown in Figure 4. The highest rates of TB were in Australians born in Indonesia (142 cases; 229.4 cases per 100,000); Vietnam (124 cases; 71.4 per 100,000); the Philippines (85 cases; 70.3 per 100,000); China (82 cases; 51.4 per 100,000); and India (74 cases; 71.2 per 100,000). Together these countries accounted for 507 (53%) notifications in the overseas-born cases. The rates of TB per 100,000 overseas-born resident population in Australia for 1998 is presented together with WHO case incidence rates for TB in the country of origin for the same year (Table 5).

The age and sex distributions of Australian-born and overseas-born TB incidence rates are shown in Figure 5. 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.

Indigenous status

Indigenous status was reported for 1152 (99.6%) of all notifications of TB. All but one of the Australian-born TB cases had their indigenous status reported. Indigenous Australians accounted for 34 TB cases in 1999, of which 3

Figure 3. Incidence rates of tuberculosis, new disease in non-indigenous Australian and overseas born, 1991 to 1999

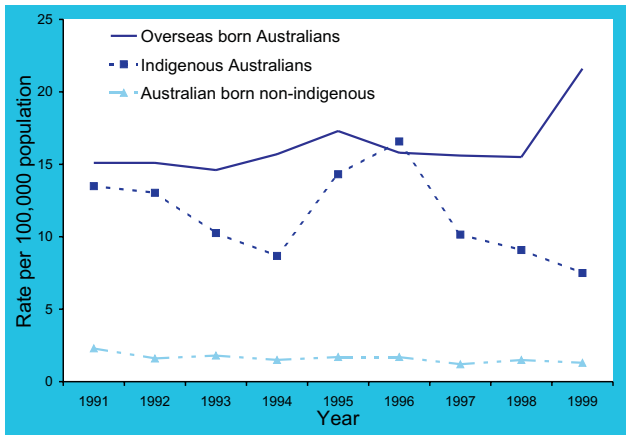


Figure 4. Incidence rates by country of birth, per 100,000 resident population in Australia, 1999

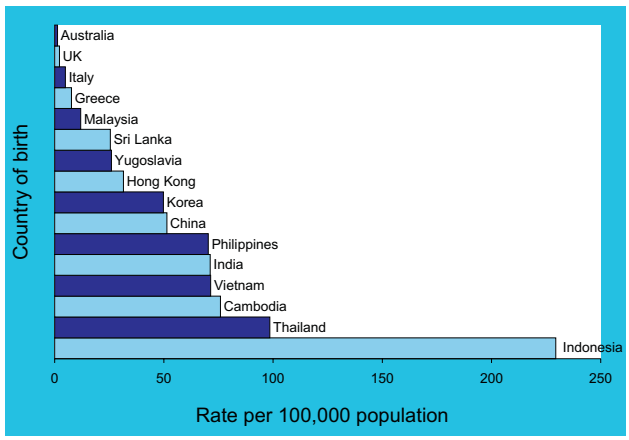


Table 4. Notifications of new and relapsed cases of tuberculosis in Australia, 1999, by site of disease

Site	New cases	Relapsed cases	Total cases	Total %
Pulmonary	735	32	767	66.2
Pleural	30	0	30	2.6
Lymph nodes	117	4	121	10.4
Bone/Joint	26	1	27	2.3
Genitourinary	37	0	37	3.2
Miliary	17	1	18	1.6
Meningeal	13	0	13	1.1
Peritoneal	14	0	14	1.2
Unspecified	128	4	132	11.4

Table 5. Tuberculosis notifications, Australia, 1999. Number and estimated rates per 100,000 for selected countries of birth *

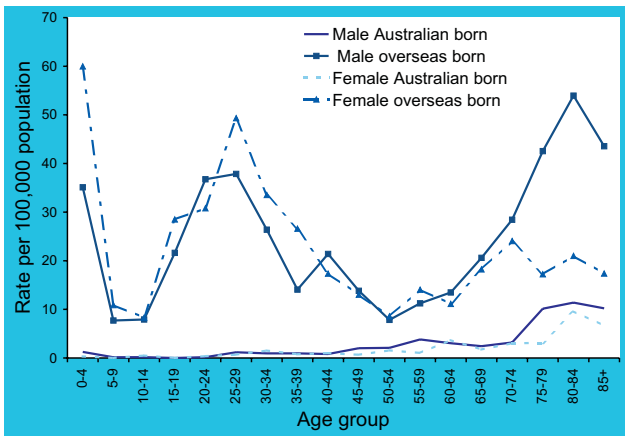
Country of birth	New cases	Relapsed cases	Total cases	Estimated Australian resident population by country of birth 1999	Rate per 100,000 population in Australia, by country of birth*	WHO incidence rate (per 100,000) for country, 1999
Indonesia (including East Timor)	141	1	142	61,900	229.4	107.1 (1995)
Vietnam	123	1	124	173,600	71.4	111.0
Philippines	81	4	85	120,800	70.3	294.5
China	75	7	82	159,400	51.4	33.7
India	74	0	74	103,900	71.2	118.3
Yugoslavia (NFD)	53	1	54	207,600	26.0	39.3
United Kingdom	22	5	27	1,215,000	2.2	10.1
Somalia	25	1	26	N/a	-	40.3
Thailand	20	2	22	22,327	98.5	51.2
South Korea	17	3	20	40,200	49.8	57.3
Cambodia	18	0	18	23,711	75.9	148.6
Hong Kong	16	0	16	50,800	31.5	111.7
Ethiopia	14	0	14	N/a	-	97.4
Sri Lanka	14	0	14	54,800	25.5	35.7
Italy	12	0	12	245,200	4.9	8.5
Greece	11	0	11	142,200	7.7	7.3
Malaysia	11	0	11	92,300	11.9	64.4
Total overseas born	923	32	955	4,482,014	21.3	-
Australian born	183	10	193	14,484,774	1.3	-
Unknown COB	11	0	11	-	-	-
Total	1,117	42	1,159	18,966,788	6.1	-

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

NFD 'Not further defined'

N/a Not available.

Figure 5. Age and sex-specific tuberculosis incidence rates in Australian-born and overseas-born individuals, per 100,000 resident population, 1999



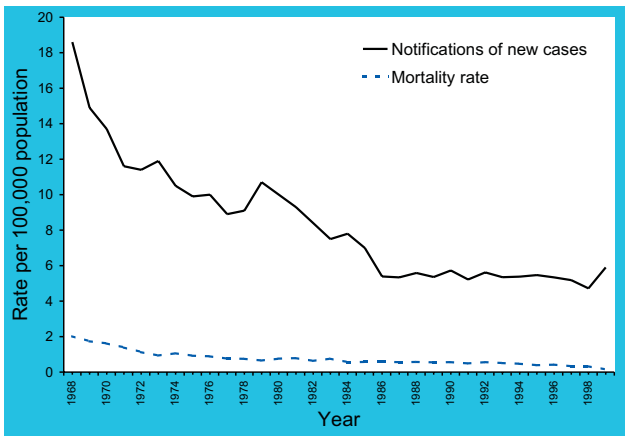
were relapses and 31 were new cases of TB. Fifteen (44%) notifications of TB in indigenous Australians were reported from the Northern Territory. The Australian Capital Territory reported no indigenous cases. The TB incidence rate was 8.3 per 100,000 indigenous population. The TB incidence rate in the Australian born, non-indigenous population was 1.1 per 100,000 population.

Among indigenous Australians with TB notified in 1999, 19 were male and 15 female. Ten (29%) of the notifications in indigenous people were aged over 60 years, and 2 cases (6%) were aged less than 14 years. The age and sex incidence rates for indigenous and non-indigenous Australian-born persons are given in Table 6. The age-specific rates for indigenous Australians show a similar pattern to non-indigenous Australians, with an increase in TB with increasing age.

Mortality

In 1999, the Australian Bureau of Statistics reported 29 deaths for which TB was the underlying cause. The crude mortality rate was 0.18 per 100,000, which is the same as the lowest rate reported for TB in 30 years and lower than 1998 (0.33 per 100,000 population, Figure 6). These were 18 (62%) male deaths and 11 (38%) female deaths from TB. Twenty-seven (93%) deaths occurred in persons aged 50 years or more, and two TB deaths were registered in persons under 50 years of age.

Figure 6. Incidence rates of new TB and crude TB mortality rates, Australia, 1968 to 1999



Discussion

Australia continues to report one of the lowest TB incidence rates in the world. Other developed countries that have reported incidence rates of less than 5 per 100,000 or less in 1998 include Sweden, Malta and Norway.[2] From 1986 to 1997 annual incidence rates for TB in Australia stabilised at between 5 and 6 per 100,000 and in 1998 dropped below 5 per 100,000 population.[5-12] In 1999, the crude rate has risen to 6.1 per 100,000. A major reason for an 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. The notifications from the Northern Territory included 61 cases among East Timorese evacuated to Darwin in September 1999,[13] boosting the Northern Territory caseload to 97 cases compared with the 1998 total of 31 cases. Significant numbers of Kosovar refugees given temporary residence in Victoria and New South Wales contributed to increased TB notifications in these States.[14,15] Since the ABS could not provide an estimate of the Australian resident population of people born in East Timor or Kosovo, the cases in nationals from these locations were included under Indonesia and Yugoslavia respectively. The rates per 100,000 in these communities rose from 73.9 to 229.4 for Indonesian-born Australian residents and from 5.4 to 22.6 for Yugoslavian-born residents (Table 5).

In 1999, 53 per cent of all TB notifications in overseas-born Australians were in those born in India, Indonesia, China, the Philippines or Vietnam. These 5 high-burden countries account for more than half of all new TB cases notified annually.[2] While the proportion of overseas-born cases represented in annual TB notifications in Australia has increased over the last decade, the national incidence rates of TB have not. In 1986, 60 per cent of TB notifications were overseas-born, compared to 70 per cent in 1990, 75 per cent in 1996, 77 per cent in 1998 and 83 per cent in 1999. For all years, with the exception of 1995, rates in the overseas-born have been between 15 and 17 per 100,000, but rose in 1999 to 21.3 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 1.3 per 100,000 in 1999.

Over the last 7 years, rates of TB have been significantly higher in indigenous Australians compared to the non-indigenous, Australian-born population. Reporting accurately on trends in indigenous Australians has been made difficult by the shifts in the census denominator estimates for these populations and the inconsistent reporting of indigenous status by some jurisdictions. Among the risk factors for TB in indigenous Australians are poor socio-

Table 6. Notifications of tuberculosis and rate per 100,000, Australia, 1999, by age and indigenous status

Age group (years)	Indigenous Australians		Non-indigenous Australian-born	
	Number	Rate	Number	Rate
0-4	1	1.8	9	0.7
5-9	0	0.0	1	0.1
10-14	1	2.0	3	0.3
15-19	0	0.0	0	0.0
20-24	2	5.5	1	0.1
25-29	3	8.4	8	0.7
30-34	3	9.7	10	1.0
35-39	1	3.7	8	0.8
40-44	2	9.2	7	0.7
45-49	5	29.5	7	0.8
50-54	1	8.0	13	1.7
55-59	3	34.5	11	1.9
60-64	6	97.4	10	2.1
65-69	1	21.9	8	1.8
70-74	1	36.7	12	2.9
75+	4	123.8	50	7.0
Total	34	8.3	158	1.1

* One case among Australian born did not have indigenous status reported

economic status, diabetes, renal disease, smoking, and alcohol abuse and poor nutrition.[16]

There are few indications that the global TB threat is abating and there is evidence that incidence is increasing in some countries due to HIV co-infection. These findings reinforce 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. In spite of our gains in the control of TB, Australia's geographical location within the WHO Western Pacific Region that includes 7 high burden countries, some with close links to Australia, means that we too must continue to invest in TB prevention and control.

Acknowledgments

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