

# Tuberculosis notifications in Australia, 2001

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## Abstract

**In 2001, there were 997 cases of tuberculosis (TB) reported to the National Notifiable Diseases Surveillance System, of which, 967 were new cases of TB and 30 cases were relapses. The incidence rate of TB in Australia in 2001 was 5.1 cases per 100,000 population. The highest incidence of TB was reported in people born overseas (19.3 cases per 100,000 population), followed by Indigenous Australians (9.8 cases per 100,000 population). In contrast, the incidence rate of TB in the non-Indigenous Australian-born population was 1.0 cases per 100,000 population. This pattern of TB incidence rates amongst the sub-populations of Australia has been observed for over 10 years. Eighty-six per cent of TB cases completed treatment in 2001. Treatment was unsuccessful in 7 cases and only 22 cases defaulted. The National Tuberculosis Advisory Committee has published a National Strategic Plan with performance indicators to ensure that this enviable record of TB control is maintained and improved. *Commun Dis Intell* 2002;26:525–536.**

*Keywords: tuberculosis, surveillance, Mycobacterium tuberculosis*

## Introduction

Tuberculosis (TB) represents one of the most significant public health threats to the global population. In 2000, 3.7 million cases of TB were notified to the World Health Organization (WHO) Global Surveillance Programme, of which 42 per cent were sputum-smear positive,<sup>1</sup> however, these are underestimates of the global TB burden. The Western Pacific Region (WPR), of which Australia is a member, accounted for 22 per cent of all cases notified to the WHO in 2000. Four countries from the WPR were among the top 23 countries with a high TB burden. In contrast, Australia has one of the lowest incidence rates for TB in the world. There remain two sub-populations within Australia who have high incidence rates of TB; Indigenous Australians and Australian residents born overseas.

The targets for global TB control, set by the WHO, are to successfully treat 85 per cent of detected sputum smear-positive TB cases and to detect 70 per cent of all active TB cases. To meet the treatment target, the WHO has recommended

the Directly Observed Treatment — Short-course (DOTS) program. The five major components of the DOTS program are political commitment and resources, the use of microscopy to diagnose TB, standardised observed treatment for all patients with active TB, uninterrupted supplies of anti-TB drugs and a standardised reporting system for monitoring treatment and progress of TB patients.<sup>2</sup> The major principles that underpin the DOTS program guide the treatment of TB patients throughout Australia.

In order to minimise the burden and human impact of TB on the Australian population, the National TB Advisory Committee (NTAC) has prepared the *National Strategic Plan for TB Control in Australia Beyond 2000*, which was endorsed by the Communicable Diseases Network Australia.<sup>3</sup> The Strategic Plan consists of three key elements: (1) case finding; (2) treatment; and (3) TB surveillance. Performance Indicators have been developed to allow regular review of the progress of the Strategic Plan. This annual report is the first to match national surveillance data to the Performance Indicators.

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In the past, TB notifications in Australia have been reported to the National Mycobacterial Surveillance System. Enhanced surveillance for TB notifications was commenced in 2001 as a part of the National Notifiable Diseases Surveillance System. Although the enhanced TB data set also makes provision for the reporting of drug susceptibility, the Australian Mycobacterium Laboratory Reference Network will publish its report on trends in multi-drug resistant TB in the next edition of *Communicable Diseases Intelligence*.

## Methods

### Data collection

Each jurisdiction in Australia has legislation that requires medical practitioners, public health laboratories and other health professionals to report cases of TB to the State or Territory health authority. Notifications of TB for 2001 were collated by jurisdictions and sent electronically to the Commonwealth Department of Health and Ageing. All records were in a de-identified format to ensure confidentiality. Data fields in the enhanced TB data set that are relevant to this report are listed in Table 1 with a brief description of each variable.

The National Tuberculosis Advisory Committee, as a sub-committee of Communicable Diseases Australia Network, was responsible for determining the dataset collected in 2001.

**Table 1. Description of the data fields in the enhanced tuberculosis data set of the National Notifiable Diseases Surveillance System**

Data field	Description
Country of birth	The country in which the patient was born
Microscopy	Whether acid fast bacilli were identified by microscopy from sputum or other body fluid at the time of diagnosis
Culture	Whether <i>M. tuberculosis</i> was identified by culture from sputum or other body fluid at the time of diagnosis
Nucleic acid testing	Whether <i>M. tuberculosis</i> was detected by nucleic acid testing at the time of diagnosis
Histology	Whether histological changes consistent with TB were observed at diagnosis
Pulmonary site	Details of pulmonary site involved
Extrapulmonary sites	Details of extrapulmonary diagnostic site
Selected risk factors	Selected risk factors including close contact with a TB patient, residing in a correctional facility, residing in an aged care facility, employed in an institution, employed in the health industry, HIV status or past residence in a high risk country
Anti-TB therapy	List of all of the anti-TB drugs given to the patient
New or relapse case	Whether the case was a new case (without previous treatment), relapse following full treatment in Australia, relapse following partial treatment in Australia, relapse following full treatment overseas or relapse following partial treatment overseas
TB outcomes	Whether the case was cured (bacteriologically confirmed), completed treatment, interrupted treatment (but still completed), died of TB, died of other cause, defaulter (failed to complete treatment), failure (completed treatment but failed to be cured), transferred out of Australia or still under treatment
Age	Age of patient at diagnosis
Indigenous status	Whether patient is self-identified Indigenous (Aboriginal and/or Torres Strait Islander) Australian or not
Sex	Male or female

### Data processing and quality control

Data on all TB notifications reported in 2001 were received by September 2002. Each variable was examined for data completeness and only variables where data completeness was above 50 per cent for any given jurisdiction, were analysed. Data were also checked for validity, whereby any invalid entries were returned to the jurisdictions for review and correction.

Most cases of TB in Australia are reported to the surveillance system.<sup>4</sup> Reasons for the high level of reporting include, the presence of an effective TB screening program, a high standard of health care for all TB patients, and specialised and multi-disciplinary TB services in each jurisdiction. The terms 'notification rate' and 'incidence rate', are used interchangeably throughout this report.

### Case definition

In 2001, cases were either defined as new or relapsed. A new case required a diagnosis accepted by the Director of TB Control (or equivalent) in the relevant jurisdiction, based on laboratory or clinical evidence. Laboratory evidence includes either the isolation of *Mycobacterium tuberculosis* complex (*M. tuberculosis*, *M. bovis* or *M. africanum*) from a clinical specimen by culture; or nucleic acid testing indicating *M. tuberculosis* complex except where it is likely to be due to previously treated or inactive disease.

Clinical evidence is a diagnosis made by a clinician experienced in tuberculosis and includes clinical follow-up assessment.

A relapsed TB case was defined as a case of active tuberculosis diagnosed bacteriologically, radiologically or clinically, having been considered inactive or quiescent following previous treatment (as deemed appropriate by the State or Territory Director of Tuberculosis). Relapses refer to retreatment cases and some of these may be reinfections rather than a true relapse of prior disease.

### Population estimates for 2001

The rates presented in this report were calculated using population data produced by the Australian Bureau of Statistics (ABS). The estimated resident population<sup>5</sup> in each state and territory and in Australia as a whole, as at 30 June 2001, was used as the denominator in crude rate calculations.

Estimates of the Indigenous Australian population were based on projections from the 30 June 1996 census estimate of the Indigenous population in Australia.<sup>6</sup> The ABS calculated the projections based on assumptions about future births, deaths and migrations in the Indigenous population and a 'low' and a 'high' estimate were reported. Throughout this report, the 'low' estimate has been used, which is consistent with previous annual reports for TB notifications in Australia.

Two different data sources were used to calculate incidence rates of TB in people born overseas, depending on data availability. The two data sources were preliminary results from the 2001 census and the estimated resident population in 2000 based on 1996 census results. Footnotes have been added to tables to indicate which data source was used. The estimated resident population of overseas-born people in 2000 (based on 1996 census data) was used as the denominator in rates in relevant analyses.

The population estimates of non-Indigenous Australian-born people were calculated by subtracting the Indigenous population estimate and the overseas-born population estimate from the total Australian population. Some notifications in this report may include people who were visitors or non-permanent residents of Australia during 2001. Therefore, some of the rates in this report may be overestimated.

## Results

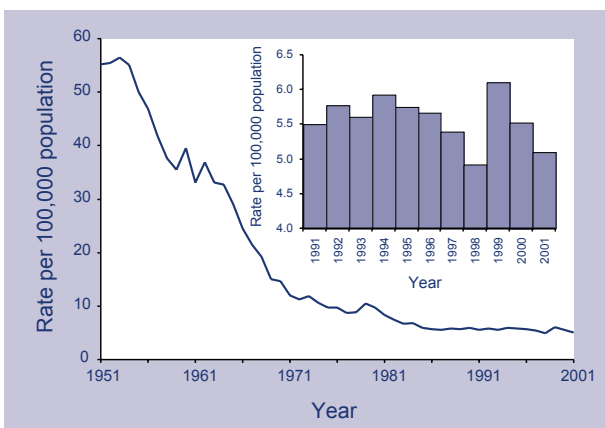
### Data quality

In 2001, 18 of the 24 data fields relevant to the analysis from the enhanced TB data set were more than 50 per cent complete. Information on age and sex were reported for all TB notifications. Indigenous status was reported for 198 of the 204 (97%) people born in Australia and country of birth was recorded for 990 (99%) of all TB notifications. The site(s) of TB disease was reported for 945 cases (98%) and the method of diagnosis was reported for 992 (99%) of the cases for each method of diagnosis (i.e. culture, microscopy, histology and nucleic acid testing). The anti-TB drug regimen undertaken by cases was recorded for 960 cases (96%). Some of the data fields that were not well reported in 2001 include HIV status (4.2% complete), BCG vaccination status (53% complete) and sputum smear conversion at 3 months (23% complete).

**TB notification rates**

The number of cases of TB reported in Australia in 2001 was 997 (5.1 cases per 100,000 population). The notification rate of TB in 2001 was the second lowest rate on record (Figure 1). The national notification rate of TB has remained relatively stable since 1985, except for an increase in 1999, which was attributable to the number of TB cases amongst the East Timorese refugees who were evacuated to Darwin in the Northern Territory.

**Figure 1. Incidence rates per 100,000 population for tuberculosis notifications, Australia, 1951 to 2001**



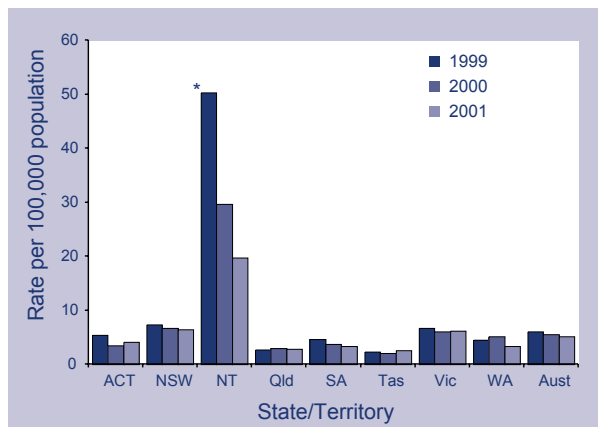
**TB notifications by jurisdiction**

New South Wales reported the most notifications (416 cases) of TB in 2001, however, the highest notification rate was recorded in the Northern Territory (19.7 cases per 100,000 population)

(Table 2). This rate was lower than the rate reported in 2000 (29.7 cases per 100,000 population) and 1999 (50.3 cases per 100,000 population) (Figure 2). The lowest notification rates in 2001 were reported in Tasmania (2.6 cases per 100,000 population) and Queensland (2.9 cases per 100,000 population).

Of the 997 cases reported in 2001, 967 (97%) were new cases of TB and 30 (3%) were relapsed cases (Table 2). Of the 30 relapsed cases reported in Australia, 14 relapsed after full treatment overseas, five had relapsed after full treatment in Australia, nine relapsed after partial treatment and two relapsed TB cases had unknown treatment histories.

**Figure 2. Notifications rates for tuberculosis, Australia, 1999 to 2001, by State or Territory**



\* Includes the 61 cases of tuberculosis in East Timorese evacuees.

**Table 2. Notifications of new and relapsed cases of tuberculosis and rates per 100,000 population, Australia, 2001, by State or Territory**

State/Territory	New cases		Relapsed cases		Total cases	
	Number	Rate	Number	Rate	Number	Rate
Australian Capital Territory	13	4.1	0	0.0	13	4.1
New South Wales	397	6.1	19	0.3	416	6.4
Northern Territory	39	19.7	0	0.0	39	19.7
Queensland	100	2.8	6	0.2	106	2.9
South Australia	50	3.3	0	0.0	50	3.3
Tasmania	11	2.3	1	0.2	12	2.6
Victoria	296	6.1	2*	0.1	298	6.2
Western Australia	61	3.2	2	0.1	63	3.3
<b>Australia</b>	<b>967</b>	<b>5.0</b>	<b>30</b>	<b>0.2</b>	<b>997</b>	<b>5.1</b>

\* Likely to be an underestimate as relapse status was poorly reported.

### *TB notifications in the Australian-born population*

In 2001, 198 cases of TB occurred in the Australian-born population, of whom, 156 (79%) were non-Indigenous Australian-born and 42 (21%) were Indigenous Australian. There were 9 cases where Indigenous status or country of birth were unknown.

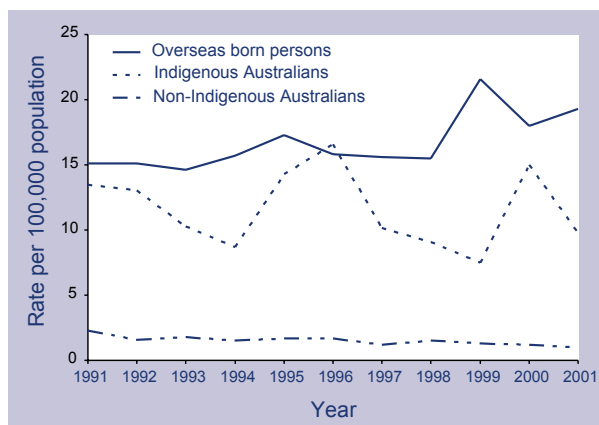
The highest notification rate of TB in the Australian-born population was reported in the Northern Territory (16.6 cases per 100,000 population) and the lowest rate was recorded in the Australian Capital Territory (0.4 cases per 100,000 population) (Table 3). The majority (25/42 cases; 59%) of cases in Indigenous Australians were reported in the Northern Territory (44.4 cases per 100,000 population), however, this is a considerable decrease from the 37 cases in 2000 (66.7 cases per 100,000 population). Queensland reported 9 cases of TB in the Indigenous population (7.6 cases per 100,000 population) and Victoria reported 3 cases (12.2 cases per 100,000 population).

The more populous states of New South Wales, Victoria and Queensland reported 67, 36 and 25 cases of TB, respectively, in the non-Indigenous Australian-born population, while the Northern Territory had 3 cases but the highest rate (2.7 cases per 100,000 population).

The incidence of TB in Indigenous Australians has fluctuated considerably over the past 10 years. In 2001 the incidence rate was 9.8 cases per 100,000 population, which is one of the lowest rates reported amongst this population since 1991. The non-Indigenous Australian-born population had the lowest incidence rate of TB (1.0 case per 100,000 population) and this rate has remained relatively stable over the past 10 years.

The rate of notifications of TB in 2001 was highest in overseas-born people (19.3 cases per 100,000 population), which was a slight increase from the rate in 2000 (18.0 cases per 100,000 population), but lower than the rate reported in 1999 (21.6 cases per 100,000 population) (Figure 3).

**Figure 3. Trends of tuberculosis incidence rates, Australia, 1991 to 2001, by Indigenous status and country of birth**



**Table 3. Notifications of tuberculosis and incidence rates in Indigenous and non-Indigenous people born in Australia, 2001, by State or Territory**

State/Territory	Indigenous Australian-born		Non-Indigenous Australian-born		Total Australian-born	
	Number	Rate	Number	Rate	Number	Rate
Australian Capital Territory	0	0.0	1	0.4	1	0.4
New South Wales	1	0.8	67	1.4	68	1.3
Northern Territory	25	44.4	3	2.7	28	16.6
Queensland	9	7.6	25	0.9	34	1.1
South Australia	1	4.1	7	0.6	8	0.7
Tasmania	0	0.0	7	1.7	7	1.6
Victoria	3	12.2	36	1.0	39	1.0
Western Australia	3	4.9	10	0.7	13	0.9
<b>Australia</b>	<b>42</b>	<b>9.8</b>	<b>156</b>	<b>1.0</b>	<b>198</b>	<b>1.3</b>

*TB notifications in people born overseas*

Of the 997 cases of TB reported in 2001, 790 cases (79%) were in people born overseas. Table 4 shows the number of TB notifications and incidence rate of TB based on the estimated Australian resident population for each country. Approximately 30 per cent (234/787 cases) of TB cases in people born overseas were in people from Vietnam (127 cases) and India (107 cases).

The incidence of TB amongst the resident Australian population was the highest in people from Somalia (593 cases per 100,000 resident population), Afghanistan (159 cases per 100,000 resident population) and India (112 cases per 100,000 resident population). Some caution is required when interpreting these results, as high rates may be attributable to temporary residents who may not be representative of the baseline resident population.

**Table 4. Notifications of tuberculosis and estimated rate per 100,000 population for selected countries of birth, Australia, 2001**

Country of birth	New cases	Relapsed cases	Total cases	Estimated Australian resident population by country of birth, 2001	Rate per 100,000 population in Australia by country of birth, 2001	WHO incidence rate (per 100,000 population) for country, 2000 <sup>†</sup>
Vietnam	125	2	127	154,833	82.0	115
India	104	3	107	95,455	112.1	111
Philippines	57	4	61	103,942	58.7	170
China <sup>‡</sup>	58	1	59	142,778	41.3	36
Indonesia	42	2	44	47,156	93.3	32
Korea <sup>§</sup>	27	3	30	38,958	77.0	47 <sup>  </sup>
Somalia	22	0	22	3,713	592.5	65
United Kingdom	20	2	22	1,083,318	2.0	10
Papua New Guinea	18	2	20	23,618	84.7	252
Afghanistan	18	0	18	11,297	159.3	33
New Zealand	16	0	16	355,765	4.5	9
Thailand	13	0	13	23,599	55.1	54
Italy	12	1	13	218,718	5.9	6
Cambodia	13	0	13	22,979	56.6	144
Overseas	760	27	787	4,087,928	19.3	
Australia	201	3	204	15,298,735	1.3	
Not stated	6	0	6			
Total	967	30	997	19,386,663	5.1	

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

\* Country of birth for denominator is from the 2001 census.

† Rates from the World Health Organization 2002 Global tuberculosis report.

‡ China excludes SAR and Taiwan.

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

|| The WHO figure quoted is for the Republic of Korea, as virtually all of Korean-born people in Australia are from the Republic of Korea.

### TB notifications by age and sex

One of the key performance indicators of the National Strategic Plan is the incidence of TB among children aged less than 15 years. In 2001, there were a total of 34 cases of TB in individuals aged less than 15 years and the overall notification rate in this age range was 0.9 cases per 100,000 population. The notification rate was the highest in overseas-born children (6.0 cases per 100,000 population) when compared with Indigenous Australian children (2.4 cases per 100,000 population) and non-Indigenous Australian-born children (0.5 cases per 100,000 population) (Table 5).

The notification rates in Indigenous Australians were the highest in the age ranges 65–74 years (52.2 cases per 100,000 population) and 55–64 years (44.4 cases per 100,000 population). Amongst the non-Indigenous Australian-born population, the notification rates were highest in people aged 75+ years (5.8 cases per 100,000 population). The notification rates for people born overseas were the highest in the 15–24 year age range (28.5 cases per 100,000 population), 25–34 year age range (27.9 cases per 100,000 population) and the 75+ years age group (27.4 cases per 100,000 population).

The age- and sex-stratified incidence rates for TB in overseas-born and Australian-born (Indigenous and non-Indigenous) populations are shown in Figure 4. The pattern of distribution of TB cases by age group was quite different for overseas-born and Australian-born people. In the Australian-born population, there was a fairly stable rate of TB (approximately one case per 100,000 population) in people aged up to the 35–44 year age range for males and the 45–54 year age range for females, after which the incidence rate gradually increases. The highest rates of TB for the Australian-born population were in the 75+ age group for both males (8.5 cases per 100,000 population) and females (4.3 cases per 100,000 population). The overall rate of TB in Australian-born males was 1.6 cases per 100,000 population and 1.1 cases per 100,000 population in Australian-born females. The male:female ratio in Australian-born TB cases was 1.4:1.

**Table 5. Notifications and estimated incidence rate of tuberculosis per 100,000 population, Australia, 2001, by age group, Indigenous status and country of birth**

Age group (years)	Indigenous Australian-born		Non-Indigenous Australians Australian-born		Overseas-born	
	Number	Rate*	Number	Rate*	Number	Rate*
0–4	1	1.7	15	1.3	2	8.2
5–14	3	2.8	2	0.1	11	5.8
<i>Sub total for &lt;15 years</i>	4	2.4	17	0.5	13	6.0
15–24	7	8.4	13	0.6	134	28.5
25–34	8	11.7	17	0.8	187	27.9
35–44	4	7.8	16	0.8	125	14.2
45–54	8	24.9	13	0.7	100	11.4
55–64	7	44.4	17	1.5	65	10.3
65–74	4	52.2	18	2.1	78	17.4
75+	0	0.0	45	5.8	88	27.4
<b>Australia</b>	<b>42</b>	<b>9.8</b>	<b>156</b>	<b>1.0*</b>	<b>790</b>	<b>19.3*</b>

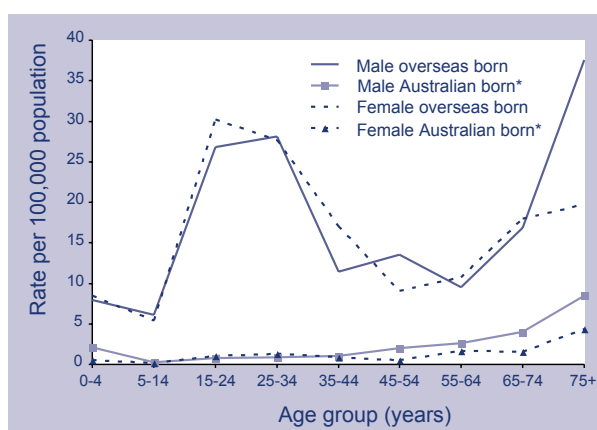
\* The denominator used for total non-Indigenous Australian-born population is from the 2001 census, whilst age group breakdowns use denominator from estimated resident population in 2000 based on the 1996 census results.

Note: There were 9 cases where country of birth or Indigenous status were unknown.

The age- and sex-stratified incidence rates for TB in overseas-born and Australian-born (Indigenous and non-Indigenous) populations are shown in Figure 4. The pattern of distribution of TB cases by age group was quite different for overseas-born and Australian-born people. In the Australian-born population, there was a fairly stable rate of TB (approximately one case per 100,000 population) in people aged up to the 35–44 year age range for males and the 45–54 year age range for females, after which the incidence rate gradually increases. The highest rates of TB for the Australian-born population were in the 75+ age group for both males (8.5 cases per 100,000 population) and females (4.3 cases per 100,000 population). The overall rate of TB in Australian-born males was 1.6 cases per 100,000 population and 1.1 cases per 100,000 population in Australian-born females. The male:female ratio in Australian-born TB cases was 1.4:1.

The highest rate of TB in overseas-born females was in the 15–24 year age range (30.2 cases per 100,000 population), but decreased to 9.0 cases per 100,000 population in the 45–54 year age range and then increased again to 19.7 cases per 100,000 population in the 75+ year age group (Figure 4). The pattern of TB rates by age group was similar for overseas-born males. The highest rates were in the 15–24 year age range (26.8 cases per 100,000 population), 25–34 year age range (28.1 cases per 100,000 population) and the 75+ year age group (37.6 cases per 100,000 population). The overall male:female ratio of TB cases in the overseas-born population was 1:1 and the overall incidence rate for overseas-born males and females was 17.5 and 17.4 cases per 100,000 population, respectively.

**Figure 4. Incidence rates of tuberculosis in Australian-born and overseas-born people, 2001, by age group and sex**



\* Includes Indigenous and non-Indigenous Australian-born populations

#### TB and HIV status

Information on HIV status was only provided for 42 of the 997 (4.2%) TB cases in Australia in 2001. Of the TB cases where HIV status was known, there were 5 people who were HIV positive, 4 of whom were born overseas and one born in Australia. The National Strategic Plan recommends that HIV status of all TB cases be collected. This is a goal which Australia is working towards in the future.

#### Sites of tuberculosis disease

In 2001, 558 (55%) of the TB cases had pulmonary disease. This was the only identified site of disease in 515 (92%) pulmonary cases of TB (Table 6). Forty-three cases reported the site of disease as 'pulmonary and other site of disease' where the other site of disease was not specified. Approximately 65 per cent of TB cases

**Table 6. New and relapsed cases of tuberculosis in Australia, 2001, by site of disease**

Site	New cases	Relapse cases	Total cases*	Total %
Pulmonary	538	20	558	55.0
Lymphatic	205	5	210	20.1
Pleural	74	0	74	7.3
Bone/joint	40	3	43	4.2
Peritoneal	15	0	15	1.5
Genitourinary	28	1	29	2.9
Miliary	15	1	16	1.6
Meningeal	3	0	3	0.3
Other	58	0	58	5.7
Unspecified	8	0	8	0.8

\* The total number of cases do not add up to 997 as some cases had multiple sites of infection.



amongst both the Indigenous and non-Indigenous Australian-born populations had pulmonary TB as a site of disease. In contrast, 48 per cent of the overseas-born cases had pulmonary TB as a site of disease. The second most common site of disease in TB cases in 2001 was the lymphatic system (210 cases; 20.1%), followed by pleurae (74; 7.3%).

#### Antimicrobial therapy

The antimicrobial drug regimen given to cases was reported for 959 (96%) cases of TB. In 2001, there were 72 cases on a two drug regimen, 104 cases on a three drug regimen, 761 cases on a four drug regimen and 22 cases on a regimen of five or more antimicrobial TB drugs. Of the 761 cases on a four drug regimen, 754 cases (76%) were prescribed the four drug regimen of isoniazid, rifampicin, pyrazinamide and ethambutol, which is generally the standard short course treatment for active TB in those aged 8 years and older. Ethambutol is not recommended for use in young children where visual testing cannot be assured and of the 17 cases under 8 years of age, 14 had the three drug regimen of isoniazid, rifampicin and pyrazinamide.

#### Treatment outcomes

The outcome from treatment of TB was reported for 827 cases (83%). In 2001, 648 cases (65%) had completed treatment, of whom 60 (7%) were still undergoing treatment and 22 (2.7%) had returned overseas prior to treatment completion (Table 7). Of the remainder, satisfactory outcomes were reported for 641 cases (86%), comprising 65 cured (bacteriologically confirmed) and 576 people who completed treatment (no bacteriological confirmation). Only 3 cases (0.4%) interrupted treatment for TB. Adverse treatment outcomes (excluding deaths) were reported in 29 cases (4.3%); 7 failures and 22 defaulters.

Excluding the cases still under treatment, there was no difference in the proportion of cases who completed treatment amongst Indigenous Australians (78%), non-Indigenous Australian-born people (81%) nor people born overseas (88%). Seventy-two deaths were recorded during treatment in 2001, with 30 cases dying of causes other than TB. The remaining 42 deaths attributable to TB is likely to be an overestimation. New South Wales does not make any distinction between 'died of TB' and 'died of other causes' and all deaths are recorded as 'died of TB'. The case fatality rate was 4.2 per cent when including deaths from New South Wales and one per cent when deaths from New South Wales were excluded.

**Table 7. Outcomes of treatment for tuberculosis, Australia, 2001, by Australian-born (Indigenous and non-Indigenous) and overseas-born individuals**

Treatment outcomes	Indigenous Australian-born	Non-Indigenous Australian-born	Overseas-born	Unknown	Total
Cured (bacteriologically confirmed)	4	14	47		<b>65</b>
Completed treatment	25	87	460	4	<b>576</b>
Interrupted treatment	–	1	2		<b>3</b>
Died of TB*	2	13	26	1	<b>42</b>
Died of other cause	4	6	18	2	<b>30</b>
Defaulted†	2	1	19		<b>22</b>
Failed‡	–	3	4		<b>7</b>
Transferred out of Australia	–	–	22		<b>22</b>
Still under treatment	4	6	50		<b>60</b>
Unknown	1	25	142	2	<b>170</b>
<b>Total</b>	<b>42</b>	<b>156</b>	<b>790</b>	<b>9</b>	<b>997</b>

\* This number is an overestimate, as New South Wales does not distinguish cause of death for tuberculosis data and each death recorded in this jurisdiction was reported as 'died of TB'.

† Defaulted means failed to complete treatment.

‡ Failed means treatment was completed but failed to be cured.

### National Performance Indicators

At the 2002 meeting of the National Tuberculosis Advisory Committee, performance criteria were set against the National Performance Indicators. This annual report is the first to address these performance indicators (Table 8) and is therefore a baseline to work from in the future.

The performance criteria for people born overseas applies only to people who have been living in Australia for more than 5 years. The 'year of arrival' variable was used to estimate the number of years a person born overseas has

been living in Australia. It was assumed that any given person born overseas had been living in Australia since the year of arrival. Based on this assumption, of the 790 people with TB who were born overseas, 415 cases had been living in Australia for more than 5 years. The incidence rate for people born overseas who have been living in Australia for more than 5 years was 10.2 cases per 100,000 population and for less than 5 years was 7.6 cases per 100,000 population.

**Table 8. National tuberculosis performance indicators, performance criteria and the current status of tuberculosis in Australia, 2001**

National TB performance indicator	Performance criteria	2001
<b>Annual incidence of TB (per 100,00 population)</b>		<b>%</b>
Crude incidence		
Indigenous Australians	<1	9.8
Non-indigenous Australian-born	<1	1.0
Overseas-born persons*	§	10.3
Relapse cases initially treated in Australia	<2% of total treated cases	NA <sup>†</sup>
Incidence in children less than 15 years by risk groups:		
Indigenous Australian children	<0.1	2.4
Non-indigenous Australian-born children	<0.1	0.5
Overseas-born children*	§	6.0
Collection of HIV status in TB cases <sup>‡</sup> (% of cases with data collected)	100% over next 3 years	4.2%
<b>Treatment outcome measures (%)</b>		
Sputum – smear positive cases that are sputum negative by the 3rd month	>90	NA <sup>†</sup>
Cases evaluated for outcomes	100	82.9
Cases that have treatment completed and are cured	>90	6.5
Cases recorded as treatment failures	<2	0.7

Note: Incidence is calculated using the number of newly diagnosed cases reported to the surveillance system.

\* The performance criteria for overseas-born is applied to people who have been living in Australia for more than 5 years. The denominator for this rate is the total overseas-born population living in Australia in 2001.

† NA Not available (data incomplete).

‡ Incidence of HIV in TB cases was reported with consent from the individual (i.e. there was no data linkage).

§ Performance indicators currently under review

## Discussion

Australia continues to report one of the lowest incidence rates of tuberculosis in the Western Pacific Region of the World Health Organization, and in the world.<sup>1</sup> In 2001, the incidence rate was 5.1 cases per 100,000 population, which was the second lowest rate ever recorded in Australia. The incidence of TB has remained between 5 and 6 cases per 100,000 population since the mid-1980s. The largest decrease in cases was observed in the Northern Territory. In late 1999, Darwin received 1,863 people evacuated from East Timor, 61 of whom had active TB,<sup>7</sup> and in 2000, there was a large outbreak of TB in a remote community in the Northern Territory. Screening for TB in the people evacuated from East Timor and effective management of the outbreak has meant that to date, no further cases of TB have resulted from the evacuation nor the outbreak, thus allowing the number of cases to decrease in the Northern Territory in 2001.

In 2001, the rate of TB in Indigenous Australians was nearly 10 times higher than in non-Indigenous Australian-born people, with nearly 60 per cent of the cases occurring in the Northern Territory. Plant *et al.*<sup>8</sup> have reported on some of the risk factors for TB in the Indigenous population, which include poor socio-economic status (reflected in overcrowding), co-morbidities (i.e. diabetes and renal disease), smoking, alcohol abuse and poor nutrition.

Incidence rates in Indigenous Australians should be interpreted with caution as the population fluctuates between years and identification of cases may be variable. Any small changes in the numerator when dealing with a small population can affect rates considerably. The highest rates of TB in Indigenous Australians were in older people aged 55–74 years, which was similar to the non-Indigenous Australian-born population. It is possible that the cases of TB in the ageing Indigenous and non-Indigenous population represent reactivation of previous TB infections. In contrast, the peak of TB in the overseas-born population occurred in persons aged 15–34 years, which is a pattern characteristic of areas where TB is endemic. Examination of the treatment outcomes also suggests that once Indigenous Australians gain access to anti-TB treatment, the proportion of people who complete treatment is the same as non-Indigenous Australians. The National Strategic

Plan has stated, as a goal, that the incidence of TB in the Indigenous Australian population should be the same as Australian-born non-Indigenous people. Addressing issues that affect TB transmission and assuring the basic standard of care is resourced will progress Australia towards achieving this goal.

The other sub-population in Australia in which the TB burden is high is those born overseas. In 2001, 40 per cent of all TB cases notified in Australia were in people born in Vietnam, India, the Philippines, China and Indonesia, all of which have been identified by WHO as high TB incidence countries.<sup>1</sup> Some of the possible reasons for the high rate of TB notifications in people born overseas are that people from high TB incidence countries are at much greater risk of exposure to TB in their country of birth and may have latent TB infection prior to arrival in Australia. Migration stress, co-morbidities and poor nutrition<sup>9</sup> may also contribute to the rate of notifications amongst people born overseas, through the progression of latent TB to active TB.

A recent study conducted in Denmark,<sup>10</sup> examined the incidence of TB in Somalian immigrants since the year of arrival. The annual incidence of TB in Somalian immigrants was found to decline only gradually over the first 7 years since arrival in Denmark. The authors concluded that the current Danish policy of screening only on arrival was not adequate for reducing the long term incidence of TB within this population. Australia has a policy of screening for TB before arrival. If a person has active TB that has been treated prior to arrival or non-active TB on a chest x-ray or on clinical review, they must sign a Health Undertaking, agreeing to contact the Health Undertaking Service upon arrival in Australia. The individual then reports to the State or Territory health authority for follow-up monitoring within the Australian health system.<sup>11</sup> This strategy at least allows migrants to become familiar with the health system and know places of contact for TB services. In 2001, approximately half of the people with TB amongst the overseas-born population had been living in Australia for more than 5 years. It is possible that some of these cases represent people with latent TB infections that were not found during the initial screening process<sup>10</sup> or local transmission from other overseas-born people living in Australia. Australia needs to continue effective active surveillance of recent immigrants through Health Undertakings and ensure

inexpensive, friendly and culturally appropriate access to TB diagnosis and antimicrobial TB treatment. Further steps such as programs to diagnose latent TB infections and to provide treatment to prevent TB infection from progressing to active communicable TB may also help reduce the disease burden amongst migrants with TB in Australia.

The *National Strategic Plan for TB Control* will help Australia maintain its low incidence of TB and to assist neighbouring countries with a high TB burden. This annual report presented the performance criteria that will be used to help identify the areas where Australia is meeting the standards set in the performance indicators and areas where TB control is most needed. In 2001, Australia was close to achieving four of the performance criteria; the incidence rate in non-Indigenous Australian-born population (1.0 case per 100,000 population), the incidence rate in non-Indigenous Australian-born children less than 15 years of age (0.5 cases per 100,000 population), the total number of TB cases evaluated for treatment outcomes (83%) and the number of cases recorded as treatment failures (1%).

The areas that require more effective TB control and access to treatment are in Indigenous Australians and overseas-born people. Access to the best TB control practices (e.g. contact tracing, appropriate high risk group screening, treatment of those with latent TB infection and ensuring easy access to anti-TB treatment) will help Australia meet its targets. Improvements in surveillance and data collection will ensure that Australia can monitor its progress towards the goals set in the Strategic Plan in the future.

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