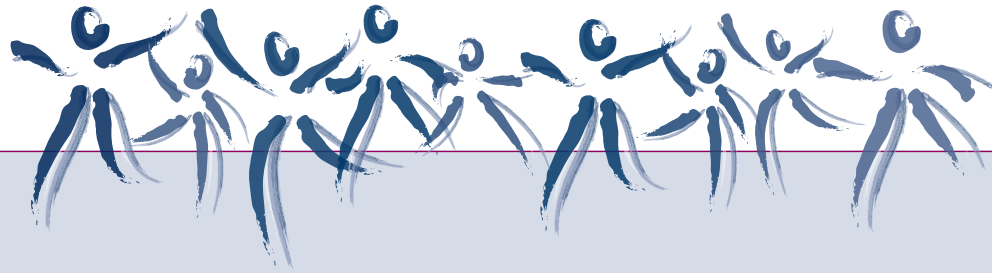


## 2. Asthma in Aboriginal and Torres Strait Islander Australians



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## Key points

- Asthma represents the second most common self-reported illness affecting the Indigenous population.
- Compared with non-Indigenous Australians, Aboriginal and Torres Strait Islander Australians:
  - have a higher prevalence of asthma, particularly among older people, children and those living in non-remote localities
  - have a higher rate of mortality due to asthma
  - have higher rates of hospitalisation for asthma
  - have almost double the rate of smoking
  - have relatively high rates of exposure to passive smoke as children, both before and after birth
  - are less likely to use inhaled corticosteroids for asthma, at least among children
  - are more likely to have diabetes and mental and behavioural disorders as a comorbid condition with asthma
  - have poorer self-assessed health.

## Introduction

The gap in mortality and morbidity between Aboriginal and Torres Strait Islander peoples and non-Indigenous Australians is glaringly obvious (Oxfam Australia 2007). In terms of life expectancy, this gap (17 years) is increasing in Australia, which is in contrast to Indigenous populations in other affluent countries where the gap is narrowing (Oxfam Australia 2007). Poor health outcomes in Indigenous communities reflect the combined impact of specific diseases, such as asthma, and adverse socioeconomic circumstances (Oldenburg et al. 2000).

For Indigenous communities, the problem of asthma exists within a broader public health context in which appropriate delivery of health-care services is an important issue. A consensus view on this, included in a statement on the management of bronchiectasis, is that successful management of any chronic disease amongst Indigenous populations will only be achieved by delivering comprehensive health care accompanied by improvements in housing, education, employment and poverty levels (Chang et al. 2002). No single model of health-care delivery can be used for all Indigenous communities. However, there are some common principles underlying most models. A comprehensive and competent primary health-care service is a prerequisite for the effective delivery of any treatment and disease control program. Delivering optimal health care in a setting of entrenched poverty and major social disadvantage is difficult for both primary and hospital-based health providers. Nevertheless, the limited but definite benefits of optimal care cannot be underestimated. The challenge for health service systems is to find ways to deliver effective, competent and high-quality health care despite problems that include remoteness, endemic poverty, poor housing, severe educational disadvantage, dysfunctional communities and comorbidities in children, adults and their carers.

Asthma is a designated National Health Priority Area and as such, national policies on asthma form part of the national policy framework for chronic disease care which consists of the National Chronic Disease Strategy (NHPAC 2006a) and the National Service Improvement Framework (NSIF) (NHPAC 2006b). The NSIF pays particular attention to the health service delivery needs of Indigenous Australians, stating as its guiding principle:

*All health services need to provide effective and appropriate services to Aboriginal and Torres Strait Islander people using the Australian Health Ministers' Advisory Council's Aboriginal and Torres Strait Islander Cultural Respect Framework as a guide. Particular attention needs to be given to physical, economic, cultural or other barriers which may limit equitable access. The needs of Aboriginal and Torres Strait Islander people need to be addressed at all levels of health policy development and implementation. Health service providers should consider the development of effective data systems that enable monitoring and improvement of both accessibility and effectiveness of health care provided to Aboriginal and Torres Strait Islander Australians. (DoHA 2006)*

The purpose of this chapter is to focus on the impact of asthma on Aboriginal and Torres Strait Islander peoples in Australia. Here we bring together data on the prevalence, health service utilisation and management of asthma specifically relating to Indigenous Australians. Information on quality of life, mortality and comorbidities is also presented. Comparisons, where available, are made with non-Indigenous Australians.

## 2.1 Prevalence

The 2004–05 National Aboriginal and Torres Strait Islander Health Survey provides the most recent nationwide data on the prevalence of asthma among Indigenous Australians. This survey found that asthma (defined as a doctor- or nurse-diagnosed long-term condition) was the second most common illness affecting 26% of the Indigenous population (ABS 2006d). The most common illness was eye or sight problems, which affected 30% of Indigenous Australians.

### Ever diagnosed with asthma

The prevalence of ever being diagnosed with asthma is higher in Indigenous adults than non-Indigenous adults (Table 2.1).

**Table 2.1: Prevalence of ever being diagnosed with asthma by Indigenous status, Australia, 2004–05 (per cent)**

Age group	Indigenous (95% CI)	Non-Indigenous (95% CI)
0–17 years	24.0 (21.5–26.6)	21.3 (19.9–22.7)
18 years and over	27.1 (24.6–29.6)	19.8 (19.1–20.6)
<b>All ages</b>	<b>26.4 (24.4–28.3)</b>	<b>20.2 (19.6–20.8)</b>

Note: Age-standardised to the Australian population as at June 2001; CI = confidence interval.

Source: Australian Bureau of Statistics (ABS) National Aboriginal and Torres Strait Islander Health Survey (NATSIS) and National Health Survey (NHS) 2004–05, expanded confidentialised unit record files, Remote Access Data Laboratory.

However, most estimates of the prevalence of ever being diagnosed with asthma among Indigenous children are similar to those observed in non-Indigenous children (Table 2.1 and Table 2.2). In 2004–05, the National Aboriginal and Torres Strait Islander Health Survey (NATSIS) estimated that the prevalence of ever being diagnosed with asthma was 24.0% among Indigenous Australian children, which was not significantly different to the prevalence (21.3%) among non-Indigenous Australian children ( $p = 0.15$ ).

**Table 2.2: Prevalence of ever being diagnosed with asthma among Aboriginal and Torres Strait Islander children, 1999–2003**

Location (source)	Year	Population	Age range	No. in survey	Rate (%)	95% CI
<b>Ever had asthma</b>						
Western Australia (1)	2001–2002	Indigenous	0–3 years		16.8	14.3–19.5
			4–11 years		25.6	23.2–28.0
			12–17 years		24.4	21.4–27.6
			<b>0–17 years</b>	<b>5,513</b>	<b>23.2</b>	<b>21.6–24.9</b>
Australian Capital Territory (2)	1999–2001	Indigenous primary school entrants <sup>(a)</sup>	4–6 years	203	27.6	21.8–34.2
<b>Ever had wheezing or whistling in chest</b>						
Western Australia (1)	2001–2002	Indigenous	0–3 years		32.5	29.5–35.8
			4–11 years		28.4	25.9–31.1
			12–17 years		24.0	21.0–27.3
			<b>0–17 years</b>	<b>5,513</b>	<b>28.0</b>	<b>26.2–29.9</b>
<b>Ever had asthma ('short wind')</b>						
Remote communities, North Queensland (3)	1999	Indigenous	0–17 years	1,650	15.8	14.0–17.6
<b>Ever had short wind (asthma)</b>						
Torres Strait region, Qld (4)	2003	All persons <sup>(b)</sup>	5–17 years	315	12.2	8.5–15.8

(a) In comparison, the prevalence of 'ever had asthma' among non-Indigenous primary school entrants was 23.5% (95% CI = 22.7–24.3%).

(b) 95.3% of the sample population were Indigenous and the remaining 4.7% were non-Indigenous.

Sources: (1) Western Australian Child Health Survey, Zubrick et al. 2004; (2) Glasgow et al. 2003; (3) Valery et al. 2001; (4) Valery et al. 2008.

## Current asthma

The prevalence of current asthma among Aboriginal and Torres Strait Islander Australians in the 2004–05 NATSIHS was 16.5% (Table 2.3), with a lower prevalence in males (12.5%) than females (19.9%) ( $p < 0.0001$ ).

The age-adjusted prevalence of current asthma was higher among Indigenous Australians (16.5%) than other Australians (10.2%) in 2004–05 (Table 2.3).

**Table 2.3: Prevalence of current asthma by Indigenous status, Australia, 2004–05 (per cent)**

Age group	Indigenous (95% CI)	Non-Indigenous (95% CI)
0–17 years	13.5 (11.9–15.1)	11.2 (10.1–12.3)
18 years and over	17.5 (15.4–19.5)	9.8 (9.3–10.4)
<b>All ages</b>	<b>16.5 (14.9–18.1)</b>	<b>10.2 (9.7–10.7)</b>

Note: Age-standardised to the Australian population as at June 2001; CI = confidence interval.

Source: Australian Centre for Asthma Monitoring (ACAM) analysis of the Australian Bureau of Statistics (ABS) National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) and National Health Survey (NHS) 2004–05, expanded confidentialised unit record files, Remote Access Data Laboratory.

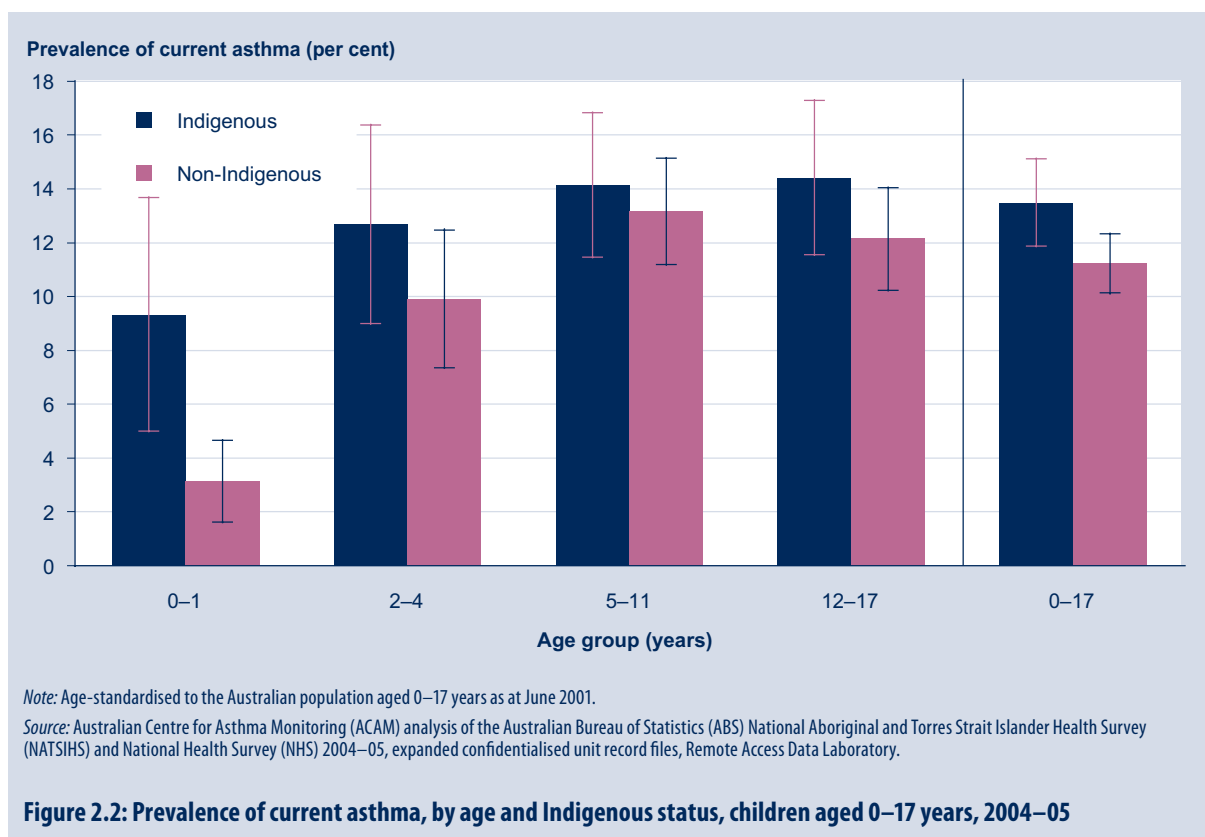
Indigenous males had a higher prevalence of current asthma (12.5%) than non-Indigenous males (9.0%), and Indigenous females reported a higher prevalence (19.9%) than their non-Indigenous counterparts (11.4%) (ABS 2006c).

Although the difference in prevalence of current asthma exists across all age groups, it is more prominent in older adults, especially females. Among those aged 35 years and over, the prevalence of asthma among Indigenous Australian females was double that observed for other Australian females in the same age group (22% versus 11%). In contrast to the age trend in non-Indigenous people, among Aboriginal and Torres Strait Islander Australians, the prevalence of current asthma was considerably higher in older adults than in children (Figure 2.1; see also Appendix 2, Table A2.1).



The explanation for the relatively high prevalence of asthma among older Indigenous people, compared with non-Indigenous people of the same age and compared with younger Indigenous people, is not certain. Possible factors include the cumulative impact of life-long exposure to environmental factors adversely affecting the airways (such as tobacco smoke and infections) and long-term under-treatment of asthma. Misdiagnosis of other chronic respiratory diseases, such as chronic obstructive pulmonary disease and bronchiectasis, may also play a role.

Overall, the prevalence of current asthma was similar among Indigenous children (13.5%) and other children (11.2%) ( $p = 0.1$ ) in the NATSIHS (see also Appendix 2, Table A2.2). However, among infants aged 0–1 year, the prevalence of asthma was higher among Indigenous infants than non-Indigenous infants (Figure 2.2). This is an age at which the diagnosis of asthma is uncertain. It is possible that some of these infants have been diagnosed with asthma and treated for asthma when they are, in fact, suffering from bronchiolitis. Indigenous populations are known to have significantly higher rates of bronchiolitis (Bolisetty et al. 2005; Whitehall et al. 2001). Furthermore, the number of Indigenous respondents included in the survey was small. Hence, conclusions on the prevalence of asthma in Indigenous children, based on the NATSIHS, need to be treated with some caution.



Several other surveys have measured the prevalence of asthma in Indigenous children (Table 2.4). These have used various definitions and age groups and have been conducted in a variety of settings, which makes it difficult to draw confident conclusions about the prevalence of asthma in Indigenous children. Most estimates are at least as high if not higher (ABS 2006d; Zubrick et al. 2004) than those observed in non-Indigenous children.

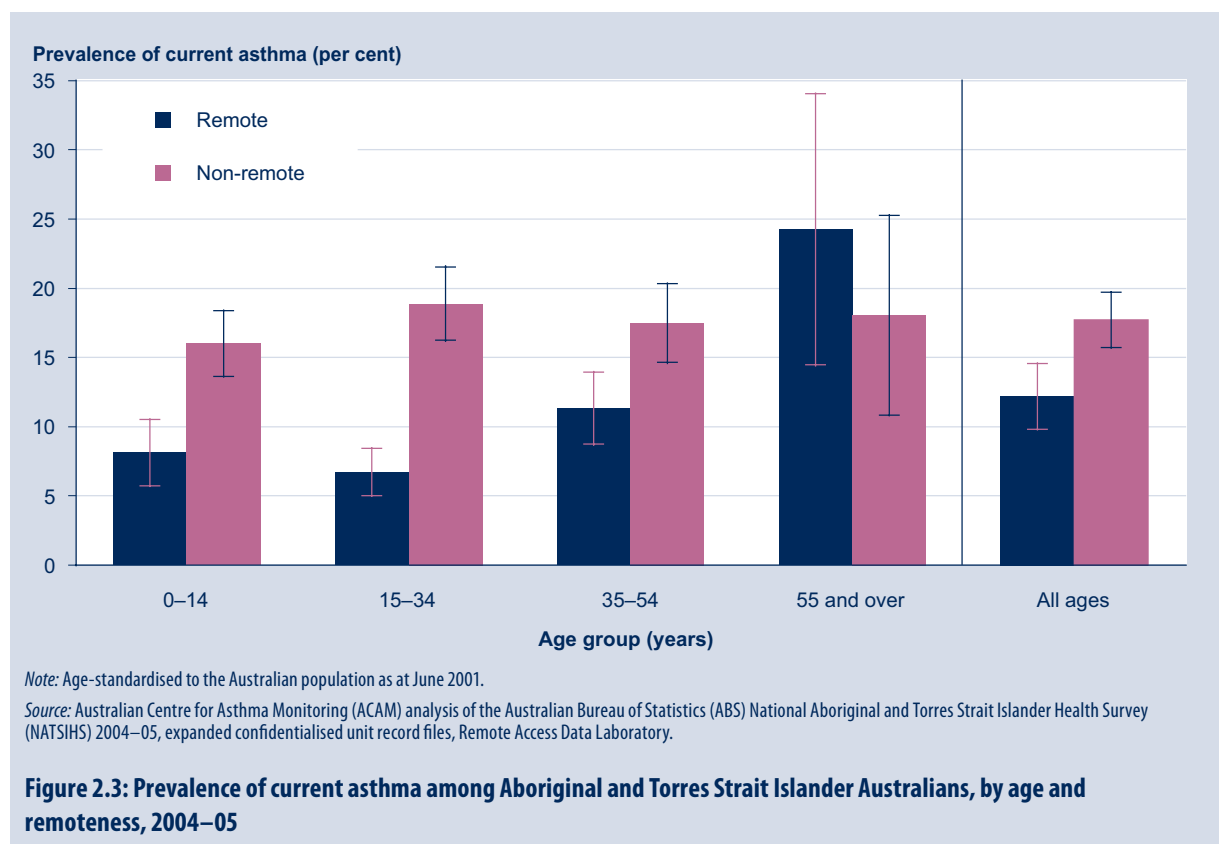
**Table 2.4: Prevalence of current asthma among Aboriginal and Torres Strait Islander children, Australia, 1999–2004**

Location (source)	Year	Age range	Indigenous		Non-Indigenous	
			No. in survey	Rate (95% CI)	No. in survey	Rate (95% CI)
<b>Does your child have asthma?</b>						
Australian Capital Territory (1)	1999–2001	4–6 years	204	24% (18.1–29.9)	10,070	15.1% (14.4–15.8)
Victoria, School Entrant Health Questionnaire (2)	1998–2004	4–6 years	6,657	26.5% (25.4–27.6)	363,207	20.0% (19.9–20.1)
<b>Wheeze in the past 12 months</b>						
Remote communities, North Queensland (3)	1999	0–17 years	1,650	12.4% (10.8–14.0)	n.a.	n.a.

n.a. Not available

Sources: (1) Glasgow et al. 2003; (2) Griffin et al. 2006; (3) Valery et al. 2001.

Among Aboriginal and Torres Strait Islander Australians aged less than 55 years, the prevalence of current asthma was significantly lower among those living in remote areas than among those living in non-remote areas (Figure 2.3). This regional difference was not evident among Aboriginal and Torres Strait Islander Australians aged 55 years and over. Overall, the prevalence of current asthma among Indigenous Australians was higher in those living in non-remote areas (17.7) than in remote areas (12.2%) of Australia.





Similar findings have been reported in a Western Australian study of 5,513 children, where the prevalence of asthma was four times as high among those living in non-isolated areas, such as the Perth metropolitan areas, compared with those living in extreme isolation within Western Australia (Zubrick et al. 2004).

Among Aboriginal and Torres Strait Islander Australians, the prevalence of current asthma has remained relatively constant in recent years. In contrast, the prevalence in non-Indigenous Australians has reduced significantly (Robertson et al. 2004). The overall prevalence of current asthma among Aboriginal and Torres Strait Islander Australians was 16.5% in 2004–05 compared with 17.7% in 2001 ( $p = 0.4$ ). Using the same methodology over 2 time periods, a North Queensland study described that asthma prevalence in school age children remained high but stable (Valery et al. 2008).

## 2.2 Mortality

While, in general, the Australian population enjoys good health on an international scale, there is a disparity in mortality rates among Indigenous Australians compared with other Australians (ABS 2005). Between 1999 and 2003, there were almost three times more deaths among Indigenous males and females than expected, based on the rates for non-Indigenous Australians (ABS 2005). Furthermore, the estimated life expectancy for Indigenous Australians is low and attributed to relatively high and early adult mortality, more so than high infant mortality (ABS & AIHW 2008). Between 2001 and 2005, 71% of deaths of Indigenous Australians occurred among those aged less than 65 years compared with 21% of all deaths among other Australians (AIHW 2008a). The life expectancy for Indigenous Australians is 17 years less than that observed for all Australians (ABS & AIHW 2008).

Data from a Northern Territory study showed that the gap in life expectancy between Indigenous and non-Indigenous residents was wide and had not narrowed between 1981 and 2000 (Zhao & Dempsey 2006). However, the contribution of asthma and chronic obstructive pulmonary disease to the gap in life expectancy had halved in females and was reduced by two-thirds among males during the study period.

We examined mortality due to asthma among Indigenous Australians using data from the National Mortality Database (AIHW). The analysis was limited to Queensland, Northern Territory, Western Australia and South Australia because these are the only jurisdictions in which the completeness of recording of Indigenous status on death certificates is considered to be adequate for reporting statistics on Indigenous mortality (ABS 2005). Rates in Indigenous Australians were compared with rates in other Australians. This latter group comprised people who were classified as non-Indigenous as well as those for whom Indigenous status was not stated. Of all deaths from asthma between 2002 and 2006, 95% occurred among other Australians, including 1.7% among people whose Indigenous status was not known. Rates were compared after adjusting for differences in the age structure of the two populations.

Mortality due to asthma is higher among Indigenous Australians than other Australians. Over the five-year period between 2002 and 2006, there were 3.15 (95% confidence interval [CI] 2.09–4.56) times more deaths due to asthma among Indigenous Australians than expected, based on age-specific mortality rates among other Australians.



## 2.3 Use of health services

Approximately 30% of Aboriginal and Torres Strait Islander Australians usually access their health care through state or federally funded Aboriginal Medical Services while 60% usually go to a private GP (AHMAC 2006). Of the Aboriginal Medical Services, about half are Aboriginal community controlled health services (ACCHSs) funded directly by the Australian Government and half are funded by states and territories. All GPs in ACCHSs are able to bill Medicare Australia for asthma care under normal Medicare Benefits Schedule (MBS) attendance items, and they are able to bill the MBS chronic disease management items for asthma care. ACCHSs are primary health-care services which are governed, planned and managed by local Indigenous communities. Their aim is to deliver holistic and culturally appropriate health and health-related services to the Aboriginal community.

There were earlier reports of limited uptake of the Asthma 3+ Visit Plan (now the Asthma Cycle of Care) in the Indigenous community. The importance of this barrier was confirmed in a 2004 National Aboriginal Community Controlled Health Organisation survey of barriers experienced by ACCHSs, conducted as part of a national evaluation of the Asthma 3+ Visit Plan (Couzos & Davis 2005). The survey found that Aboriginal people were limited in their capacity to benefit from the Asthma 3+ Visit Plan because of significant barriers for ACCHSs to access the funding initiative. Around one-third of ACCHSs were ineligible for the Practice Incentive Program since many ACCHSs did not employ a medical practitioner and only medical practitioners (and not Aboriginal health workers) could claim the incentive payments. Only half of eligible services reported using this initiative (Couzos & Davis 2005). This evaluation has not been repeated since the replacement of the Asthma 3+ Visit Plan with the Asthma Cycle of Care.

### Hospitalisations

This section presents data on hospitalisations for asthma from the National Hospital Morbidity Database, maintained and held at the AIHW. The quality of data relating to Indigenous status in this database is variable. From 1998–99 onwards, the information provided for Indigenous status from the Northern Territory (public hospitals only), South Australia, Queensland and Western Australia is considered acceptable for analytical purposes. From 2004–05 onwards, data from New South Wales and Victoria are also considered acceptable for analytical purposes. We have included data for these periods for these six states and territories in the analyses presented here.

In 2006–07, the rate of hospital separations for asthma was 2.1-fold higher among Aboriginal and Torres Strait Islander Australians (384.4 per 100,000 population; 95% CI 362.6–406.9) than other Australians (179.3 per 100,000 population; 95% CI 177.4–181.2).

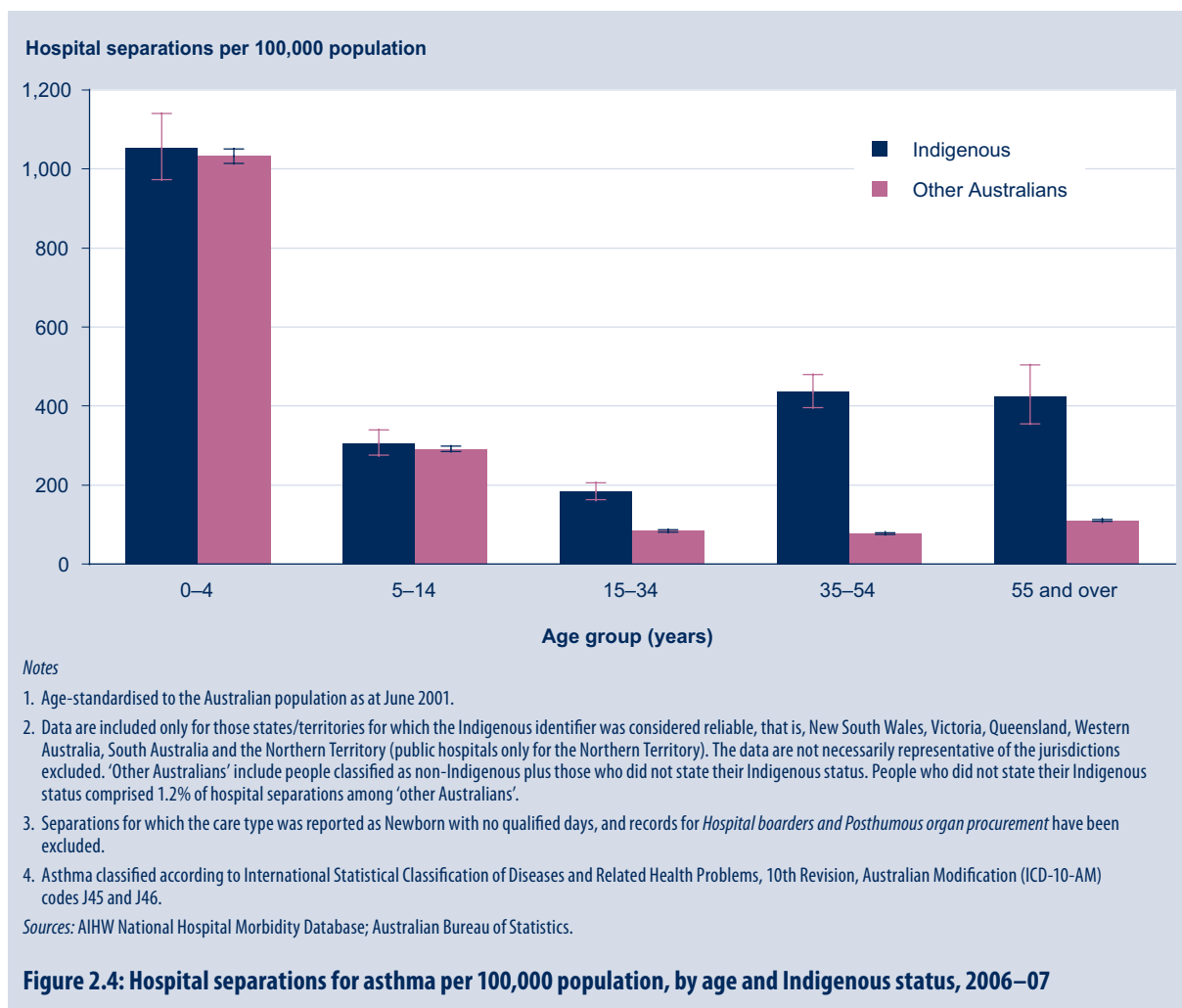
In comparison, admissions with a principal diagnosis of diabetes in 2004–05 were 6 times higher among Indigenous Australians than other Australians (AIHW 2008c). Furthermore, in 2006–07, diseases of the circulatory system accounted for 3.2% of all Indigenous Australian separations and 6.3% of all hospital separations for other Australians, while diseases of the respiratory system accounted for 6.0% of all Indigenous separations and 4.3% of all hospital separations among other Australians (AIHW 2008b).

The higher rate of asthma separations among Indigenous Australians (2.1 times) is similar to the 2.8-fold excess in hospital separations for all causes in 2006–07. However, the finding that hospital separations for asthma represented a higher proportion of all admissions among Indigenous Australians (0.74%) compared with other Australians (0.48%) indicates that asthma or asthma-like symptoms contributed disproportionately to excess admissions in Aboriginal and Torres Strait Islander Australians.



Among Aboriginal and Torres Strait Islander Australians, the rate of hospital separations for asthma was highest in children aged 0–4 years (Figure 2.4). Indigenous Australians had higher rates of hospital separations for asthma than other Australians across all age groups but the difference was most pronounced in those aged 35 years and over (see also Appendix 2, Table A2.3). Data for hospital patient-days for asthma reflected a similar pattern (see Appendix 2, Table A2.4).

The relatively high rate of hospital separations for asthma among Indigenous adults compared to other Australian adults aged 35 years and over is consistent with the high rates of all-cause hospitalisation in this community (AIHW 2007a). In fact, all-cause hospitalisation rates are higher among Aboriginal and Torres Strait Islander Australians than other Australians across every age group and for both sexes.



The median length of stay (length of hospital stay for 50% of people) was the same for Indigenous and other Australians (2 days).

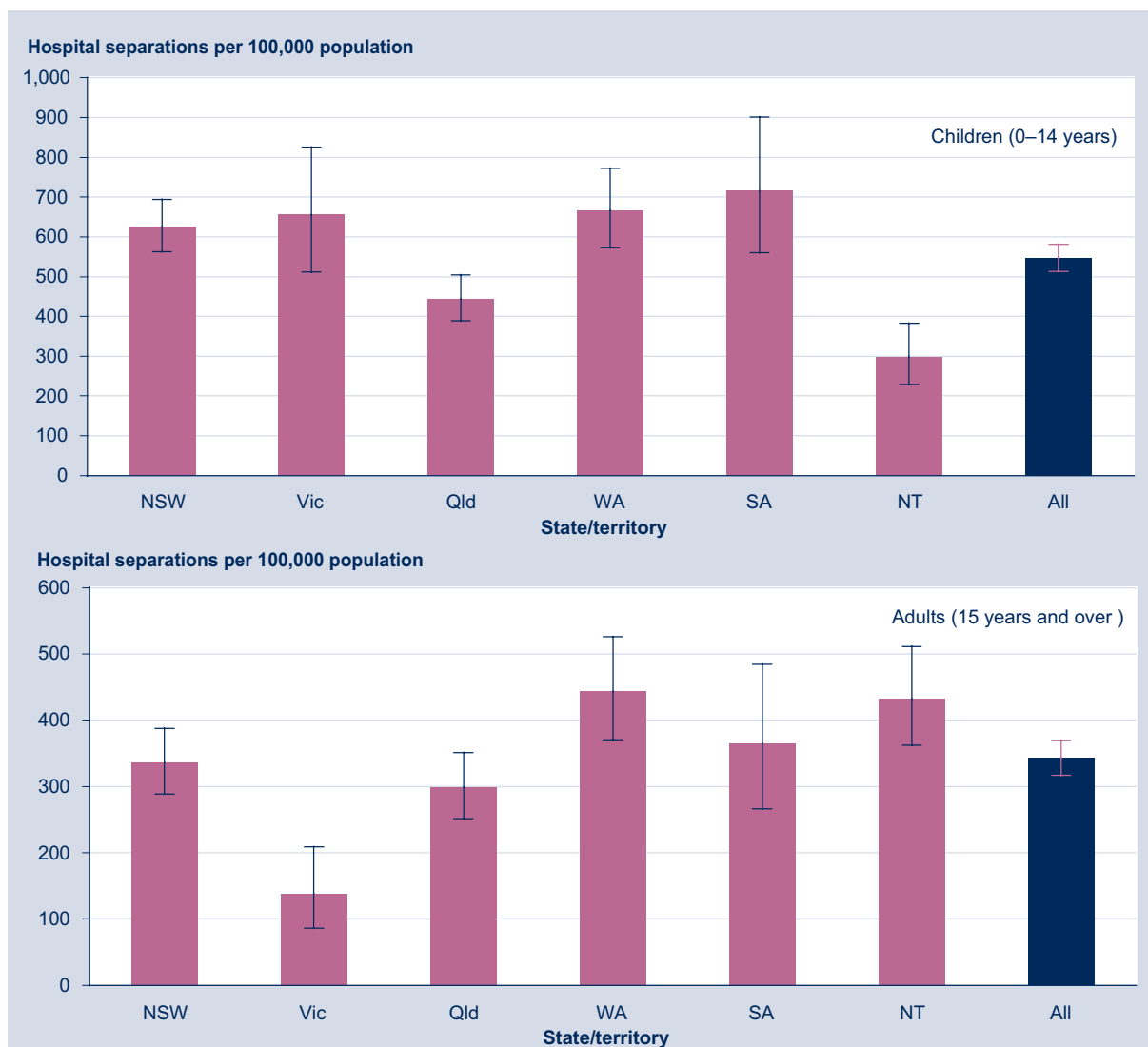
Indigenous children aged 0–18 years had a higher hospital separation rate for asthma (485.9 per 100,000 population; 95% CI 456.8–516.3) than other Australian children (436.3 per 100,000 population; 95% CI 430.4–442.3) ( $p < 0.0001$ ). While hospital separation rates for asthma were higher among Indigenous children than other Australian children across most age groups (Figure 2.5), the disparity was greatest amongst those aged 0–1 year where the rate was 1,068.0 per 100,000 population among Indigenous children versus 895.1 per 100,000 population among other Australian children ( $p < 0.01$ ).





In 2006–07, Indigenous children under 15 years from the Northern Territory had a lower hospital separation rate for asthma than the average of the six jurisdictions (Figure 2.6). This may reflect the lower prevalence of asthma as a long-term condition in the Northern Territory compared with the other states (ABS 2006d).

Among Indigenous Australians aged 15 years and over, the rate of hospital separations for asthma in Western Australia was significantly higher than the average and the rate in Victoria was significantly lower than the average of the six jurisdictions.



**Notes**

1. Age-standardised to the Australian population as at 30 June 2001.
2. Asthma classified according to International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM) codes J45 and J46. Data are included only for those states/territories for which the Indigenous identifier was considered reliable, that is, New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory (public hospitals only). The data are not necessarily representative of the jurisdictions excluded.
3. Separations for which the care type was reported as Newborn with no qualified days, and records for *Hospital boarders and Posthumous organ procurement* have been excluded.
4. Different scale for each age group.

Sources: AIHW National Hospital Morbidity Database; Australian Bureau of Statistics.

**Figure 2.6: Hospital separations for asthma per 100,000 population among Indigenous Australians, by broad age group and state and territory, 2006–07**

### Comorbid conditions in people hospitalised with asthma

Comorbidity among Indigenous and other Australians hospitalised with a principal diagnosis of asthma—according to the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM) codes J45 and J46—in Queensland, South Australia, Western Australia and the Northern Territory (public hospitals only) over the period 2003–04 to 2005–06, and in New South Wales and Victoria between 2004–05 and 2005–06, was examined by investigating additional diagnoses of other respiratory conditions as well as other chronic conditions.

Among Indigenous Australians hospitalised with a principal diagnosis of asthma in the period 2003–04 to 2005–06, after adjusting for age, 56.1% had at least one comorbidity associated with their hospital stay. For other Australian patients with asthma, the corresponding proportion was 52.7%.

Among children, Aboriginal and Torres Strait Islander Australians were just as likely as other Australians to have respiratory infections, non-infectious upper respiratory conditions or mental and behavioural problems while being hospitalised for asthma (Table 2.5). Among people aged 15 years and over hospitalised with asthma, the likelihood of having diabetes listed as an additional diagnosis was 2.4 times as high among Aboriginal and Torres Strait Islander Australians than other Australians. Indigenous Australian adults hospitalised with asthma also experienced more heart, stroke and vascular disease than other Australians, but less arthritis, osteoporosis and mental and behavioural disorders than other Australian adults hospitalised with asthma.



**Table 2.5: Selected comorbidities among patients admitted to hospital with a principal diagnosis of asthma, by Indigenous status and age, 2003–04 to 2005–06**

Age group/comorbidity	Proportion of all asthma separations (%) (95% CI)		Rate ratio (95% CI)
	Indigenous	Other	Indigenous vs other
<b>0–14 years</b>			
Respiratory infections	33.6 (30.9–36.4)	35.1 (34.4–35.8)	1.0 (0.9–1.0)
Chronic obstructive pulmonary disease (COPD) and bronchiectasis	..	..	..
Non-infectious upper respiratory conditions	0.6 (0.2–1.3)	0.6 (0.5–0.7)	1.1 (0.5–2.4)
Diabetes mellitus	n.p.	0.2 (0.1–0.2)	n.p.
Heart, stroke and vascular disease	n.p.	n.p.	n.p.
Arthritis and osteoporosis	n.p.	n.p.	n.p.
Mental and behavioural disorders	0.7 (0.3–1.4)	0.5 (0.4–0.6)	1.5 (0.6–3.4)
Cancer	n.p.	n.p.	n.p.
<b>15 years and over</b>			
Respiratory infections	27.1 (24.9–29.4)	28.7 (28.2–29.3)	0.9 (0.9–1.0)
COPD and bronchiectasis	2.3 (1.7–3.0)	2.3 (2.2–2.5)	1.0 (0.7–1.3)
Non-infectious upper respiratory conditions	n.p.	1.3 (1.2–1.5)	n.p.
Diabetes mellitus	19.7 (18.0–21.6)	8.3 (8.0–8.6)	2.4 (2.1–2.7)
Heart, stroke and vascular disease	5.0 (4.0–6.1)	3.2 (3.1–3.4)	1.5 (1.2–2.0)
Arthritis and osteoporosis	0.7 (0.4–1.2)	1.9 (1.8–2.0)	0.4 (0.3–0.5)
Mental and behavioural disorders	2.3 (1.8–3.0)	4.1 (3.9–4.3)	0.6 (0.5–0.7)
Cancer	n.p.	0.4 (0.4–0.5)	n.p.

n.p. Not published (numbers too small to produce a reliable estimate)

.. Not applicable

*Notes*

1. Data are included only for those states/territories for which the Indigenous identifier was considered reliable, that is, Queensland, Western Australia, South Australia and the Northern Territory (public hospitals only) (all years) and New South Wales and Victoria (2004–05 and 2005–06 only).
2. Asthma was classified according to International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM) codes J45 and J46.
3. Separations for which the care type was reported as Newborn with no qualified days, and records for *Hospital boarders and Posthumous organ procurement* have been excluded.
4. Comorbidities were classified as follows: respiratory infections (J0–J22); COPD and bronchiectasis (J40–J44, J47); non-infectious upper respiratory conditions (includes rhinitis, sinusitis, laryngitis) (J30–39); diabetes mellitus (E10–E14); heart, stroke and vascular disease (I20–I25, I60–I69, I50, I70–I79); arthritis and osteoporosis (M00–M25, M80–M82); mental and behavioural disorders (F30–F39, F40–F48, F90–F98); and malignant neoplasms (i.e. cancer) (C00–C96).
5. 'Other' includes both non-Indigenous persons and persons for whom Indigenous status was not stated or was inadequately described. Indigenous status was not stated or was inadequately described for 1.9% of hospital separations among other Australians in 2003–04 to 2005–06 where asthma was the principal diagnosis.
6. CI = confidence interval.

Source: AIHW National Hospital Morbidity Database.

## 2.4 Management and care

### Asthma action plans

In 2004–05, 24.9% of Aboriginal and Torres Strait Islander Australians with current asthma possessed an asthma action plan, which was similar to the corresponding proportion for non-Indigenous Australians (22.5%) ( $p = 0.15$ ) (ABS 2006c). Of those Aboriginal and Torres Strait Islander Australians who had a plan, 91.8% were obtained from a doctor.

The Australian Government Department of Health and Ageing recently developed an asthma action plan specifically for Indigenous Australians living in remote areas. The plan incorporates the images from the Short Wind educational materials, developed by the Asthma Foundation of the Northern Territory. Also, terms such as ‘whistle breathing’, ‘blue puffer’, ‘send someone to health clinic for help’ describe symptoms and actions to take in response to these symptoms. It cannot be ascertained from the current data whether or not the plans that survey participants stated that they possessed were tailored to the Indigenous community.

### Use of medication for asthma

According to the NATSIHS conducted in 2004–05, 59.2% (95% CI 52.3–66.1%) of Indigenous Australians aged 5 years and over with current asthma reported using pharmaceutical medications for their condition in the last 2 weeks (ABS 2006c). This proportion was similar to the proportion of non-Indigenous Australians with asthma who reported using pharmaceutical medications (56.9%; 95% CI 53.2–60.6%).

Among Aboriginal and Torres Strait Islander Australians, the proportion of people using pharmaceutical medications in the last 2 weeks for their asthma increased with age, from 38% among those aged 5–14 years to 79% among those aged 55 years and over.

However, there is evidence of relative under-use of treatments for asthma among Indigenous children. In a study of children beginning kindergarten in the Australian Capital Territory, 8% of Indigenous children compared with 17% of non-Indigenous children with parent-reported respiratory symptoms in the previous 12 months or asthma diagnosis were using inhaled corticosteroids ( $p = 0.03$ ) (Glasgow et al. 2003). In the Western Australian Aboriginal Child Health Survey, it was found that 42.0% (95% CI 37.6–46.3%) of children with asthma in the state were managing it without medication (Zubrick et al. 2004). One study in Far North Queensland found a high level (55–88%) of suboptimal asthma therapy and a higher level of persistent symptoms in Aboriginal and Torres Strait Islander Australian children (30%) than non-Indigenous Australian children (5–7%) (Chang et al. 2000). Couzos & Davis (2005) reported that 80% and 48% of ACCHSs indicated a problem in patient access to spacer devices and patient access to asthma medications, respectively. In response to this, the Australian Government introduced the Asthma Spacers Ordering System (ASOS) in July 2006. The system provides spacers to Indigenous communities at a significantly discounted cost (Abbott 2006).



## Access to culture-specific asthma education programs

There are no data on the availability of culture-specific asthma education programs for Indigenous Australians with asthma. Asthma education is regarded as an important management step in national asthma guidelines (Coughlan et al. 1999). Racial and socioeconomic factors influence asthma severity and recurrent acute presentations to emergency health facilities (de Oliveria et al. 1999; Sin et al. 2002). The reasons for this are unclear, but contributing factors are likely to include broad health service delivery issues rather than a reflection of intrinsic asthma severity (Enarson & Ait Khaled 1999). Other cultural influences on the management of asthma include symptom perception and understanding of disease and self-management (Enarson & Ait Khaled 1999). An appropriate model of care is important in the successful delivery of services to improve care of people with asthma (Partridge 2000). The model of care should be culturally appropriate (Enarson & Ait Khaled 1999) and one review found that involving trained health workers in asthma programs targeted to their own ethnic group is beneficial and cost-effective, with a cost saving of more than 50% in the Indigenous health worker intervention group (Chang et al. 2007).

Several local and national barriers to effective management of asthma in a rural Aboriginal medical service setting were identified in the Pika Wiya Asthma Innovative Management (AIM) project (Dawson et al. 2003). Local barriers included lack of health worker training, poor patient attendance and lack of management infrastructure. The national barriers identified in the study were inaccessibility of government financial incentive structures, lack of culturally appropriate asthma resources, lack of MBS items that health workers can provide directly and lack of high-quality research.

A recent study funded through the Australian Government's Asthma Management Program (Asthma Community Grants Program) used 'music therapy' to manage asthma in an Indigenous community in Queensland (Eley & Gorman 2008). School-aged boys were taught how to play the didgeridoo and girls had singing lessons in an effort to improve the health of people with asthma and also to increase knowledge of asthma in the local Indigenous community. Respiratory function (measured as peak flow) improved significantly in the boys. Furthermore, high school boys and girls had a noticeable improvement in asthma symptoms.

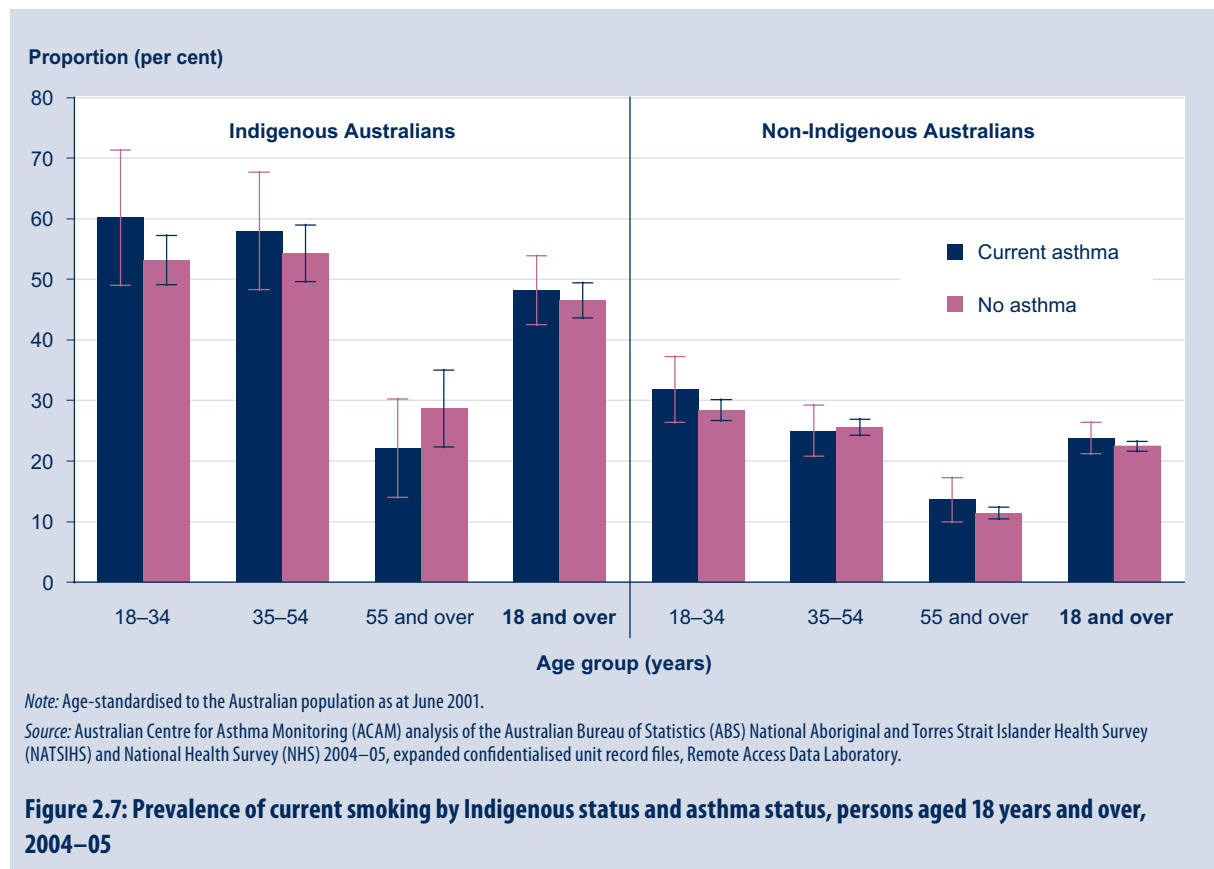


## 2.5 Smoking

### People with asthma who smoke

Among Indigenous Australian adults aged 18 years and over, 48.2% (95% CI 42.5–53.9%) of those with current asthma and 46.5% (95% CI 43.6–49.4%) of those without asthma reported being smokers (ABS 2006c). These rates were twice as high as those reported for non-Indigenous Australians with (23.8%; 95% CI 21.2–26.4%) and without (22.4%; 95% CI 21.5–23.2%) current asthma.

Up to 60% of young Indigenous Australian adults with asthma reported being current smokers compared to 32% of their non-Indigenous counterparts (Figure 2.7).



Although the rate of smoking among Indigenous Australians with asthma is high, health workers appear unaware of the adverse effects of smoking in people with asthma. In a study of a group of Aboriginal health workers in Adelaide, it was found that most were aware of the association between smoking, lung disease and cancer, but only few were conscious of the links with asthma, diabetes and stroke (Adams & Briggs 2005).



## In-utero and passive exposure to smoking among children with asthma

In-utero smoke exposure, that is, exposure to smoke before birth, is a risk factor for the development of asthma and other respiratory problems in children and adults (Skorge et al. 2005). In-utero smoke exposure is higher in Indigenous Australians than non-Indigenous Australians, both in urban (Chan et al. 2001; Eades & Read 1999) and remote areas (ABS 2002). A South Australian study found that Aboriginal women had a higher rate of smoking in pregnancy than non-Aboriginal women (58% versus 24% at the first antenatal visit) (Chan et al. 2001; see Table 2.6). In another large study of Aboriginal children in Western Australia, almost half of the children aged 0–17 years (46%) were exposed to smoking by their birth mother in utero (Zubrick et al. 2004).

**Table 2.6: Exposure to passive smoke and in-utero exposure to smoking in Aboriginal and Torres Strait Islander children, 1999–2002**

Location (source)	Year	Age range	Indigenous		Non-Indigenous	
			No. in survey	Rate (95% CI)	No. in survey	Rate (95% CI)
<b>Birth mother smoked tobacco during pregnancy</b>						
Western Australia (1)	2001–2002	0–17 years	n.a.	46.5% (43.9–49.0)	n.a.	n.a.
<b>Smoked during pregnancy</b>						
South Australia (2)	Had singleton births in 1998–1999	n.a.	851	57.8% (54.5–61.1)	35,208	24.0% (23.6–24.5)
<b>Anyone living in the house smokes (children with parent-reported asthma or recent respiratory symptoms)</b>						
Australian Capital Territory (3)	1999–2001	4–6 years	67	63.7% (52.2–75.2)	2,292	32.2% (30.3–34.1)

n.a. Not available

Sources: (1) Western Australian Aboriginal Child Health Survey, Zubrick et al. 2004; (2) Chan et al. 2001; (3) Glasgow et al. 2003.

Exposure to environmental tobacco smoke during early childhood is associated with an increased risk of asthma symptoms or the worsening of pre-existing asthma symptoms among children (Alati et al. 2006; Landau 2001; Peat et al. 2001). Exposure to passive smoke is also an important issue among Indigenous children since the prevalence of smoking in Indigenous Australians is relatively high (see previous section). Furthermore, a survey of pregnant women in South Australia found that Indigenous women were heavier smokers than non-Indigenous women (Chan et al. 2001). A study in a remote region of Queensland found that 48% of the children with asthma were exposed to parental tobacco smoke (Chang et al. 2000). Indigenous children with respiratory symptoms in the Australian Capital Territory had a significantly higher rate of passive smoke exposure (64%) than non-Indigenous children (32%) (odds ratio 3.5; 95% CI 2.1–5.9) (Glasgow et al. 2003).

## 2.6 Self-assessed health status

Among Aboriginal and Torres Strait Islander Australians aged 15 years and over with current asthma, 26% rated their health as excellent/very good, 34% rated it as good and about 41% rated their health as fair/poor (Figure 2.8) (NATSIHS 2004–05). In contrast, more Indigenous Australians without asthma rated their health as excellent/very good (38%) and fewer rated their health as fair/poor (27%).

In general, Indigenous Australians rated their health worse than non-Indigenous Australians. In fact, slightly fewer Indigenous Australians *without* asthma rated their health as excellent/very good than non-Indigenous Australians *with* the condition.



## 2.7 Prevalence of comorbidities in the community

Having both asthma and another chronic condition is associated with worse quality of life (Adams et al. 2006). This section investigates the prevalence of selected comorbid conditions among Indigenous Australians with and without asthma using data from the 2004–05 NATSIHS. Comparisons of the prevalence of these comorbidities among Indigenous and non-Indigenous people with asthma are also presented.

Compared with Indigenous Australians *without* asthma, the prevalence of chronic obstructive pulmonary disease (that is, emphysema or bronchitis) was 3.6 times as high, the prevalence of sinusitis or rhinitis was 2.6 times as high, the prevalence of mental and behavioural disorders was 1.9 times as high and the prevalence of arthritis or osteoporosis was 1.5 times as high among those with asthma (Table 2.7). Non-Indigenous Australians with asthma were also significantly more likely to have these comorbidities than their counterparts without asthma.

The prevalence of diabetes as a comorbid condition was 3.0 times as high and the prevalence of mental and behavioural disorders as a comorbid condition was 1.4 times as high among Indigenous Australians with asthma compared with non-Indigenous Australians with asthma (Table 2.7). Among Indigenous Australians with asthma in 2004–05, 35% also reported having sinusitis or rhinitis and 25% also reported having arthritis or osteoporosis (Table 2.7).

**Table 2.7: Comorbidities among people with and without asthma, by Indigenous status, 2004–05**

Comorbidity	Indigenous Australians			Non-Indigenous Australians			Rate ratio Indigenous versus non-Indigenous with asthma (95% CI)
	Current asthma % (95% CI) <sup>(a)</sup>	No asthma % (95% CI) <sup>(a)</sup>	Rate ratio asthma vs no asthma (95% CI)	Current asthma % (95% CI) <sup>(a)</sup>	No asthma % (95% CI) <sup>(a)</sup>	Rate ratio asthma vs no asthma (95% CI)	
Emphysema or bronchitis	12.5 (9.3–15.7)	3.5 (2.7–4.3)	3.6 (2.3–5.7)	10.0 (8.6–11.5)	2.2 (2.0–2.4)	4.6 (3.4–6.1)	1.2 (0.9–1.7)
Sinusitis or rhinitis	35.1 (29.4–40.9)	13.7 (12.0–15.5)	2.6 (2.0–3.3)	40.0 (36.9–43.1)	19.0 (18.3–19.7)	2.1 (1.9–2.4)	0.9 (0.7–1.0)
Other respiratory conditions (excluding asthma)	1.2 (0.6–1.8)	1.3 (0.9–1.7)	0.9 (0.5–1.6)	1.2 (0.7–1.8)	0.7 (0.6–0.8)	1.8 (1.0–3.2)	1.0 (0.5–1.8)
Heart, stroke, and vascular disease	7.4 (4.9–9.9)	5.6 (4.0–7.2)	1.3 (0.8–2.1)	4.9 (3.9–5.8)	3.6 (3.3–3.9)	1.4 (1.1–1.7)	1.5 (1.0–2.4)
Diabetes and high sugar levels	14.5 (10.0–18.9)	12.2 (10.6–13.8)	1.2 (0.8–1.7)	4.8 (3.8–5.8)	3.5 (3.2–3.8)	1.4 (1.1–1.8)	3.0 (1.8–5.1)
Arthritis and osteoporosis	24.9 (19.5–30.4)	17.2 (14.6–19.7)	1.5 (1.1–1.9)	22.4 (20.2–24.7)	15.4 (14.9–15.9)	1.5 (1.3–1.6)	1.1 (0.9–1.4)
Mental and behavioural disorders	19.0 (15.8–22.1)	10.2 (8.9–11.4)	1.9 (1.5–2.4)	13.6 (12.0–15.3)	8.1 (7.6–8.5)	1.7 (1.4–2.0)	1.4 (1.1–1.7)
Cancer	2.2 (1.1–3.4)	1.1 (0.7–1.6)	2.0 (0.9–4.3)	3.3 (2.4–4.2)	1.8 (1.6–2.0)	1.9 (1.3–2.7)	0.7 (0.4–1.2)

(a) Age-standardised to the Australian population as at June 2001.

Note: CI = confidence interval.

Source: Australian Centre for Asthma Monitoring (ACAM) analysis of the Australian Bureau of Statistics (ABS) National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) and National Health Survey (NHS) 2004–05, expanded confidentialised unit record files, Remote Access Data Laboratory.

The presence of one or more comorbid conditions, whether they are associated with asthma or unrelated to asthma, is likely to impact on disease management, treatment and outcomes. In Indigenous children, asthma is a common complication of chronic suppurative lung disease (Chang et al. 2003b). Indeed, acute asthma may be the first manifestation of chronic suppurative lung disease (Chang et al. 2003a) as cough is usually under-reported in Indigenous children (Chang et al. 2008). Comorbidities make asthma care more complex and chronic suppurative lung disease more difficult to manage. Obstructive sleep apnoea is also associated with asthma in Torres Strait Islander Australians (Valery et al. 2004). In adults, significant other comorbidities—such as diabetes, heart and kidney disease—result in reduced attention to and uptake of good asthma treatment (J Saunders, Asthma Foundation of Northern Territory, personal communication).

Obesity is associated with increased severity of asthma as well as persistence of asthma symptoms (Chinn 2003; Guerra et al. 2004). Obesity is a problem in Indigenous peoples aged over 15 years (ABS 2002) and this may contribute to increased morbidity due to asthma among Indigenous people.

## Conclusions and summary

Asthma has consistently remained the second most common self-reported long-term illness in Indigenous Australians. There are some discrepancies among the published survey data but, overall, it seems likely that asthma or asthma-like symptoms are more common in older Indigenous people and among young Indigenous children than their non-Indigenous counterparts. The differences are greater in those living in non-remote localities and, among adults, are greater in females than males. Smaller differences are seen in older children and young adults. As asthma is most difficult to diagnose accurately in young children and older adults, it is possible that the differences in the reported prevalence of asthma and asthma-like symptoms are, in fact, attributable to related diseases such as bronchiolitis, chronic obstructive pulmonary disease and chronic suppurative lung disease.

Rates of hospitalisation and impaired quality of life are worse for Indigenous Australians than for non-Indigenous Australians. Reasons for this are unclear although there is some evidence that Indigenous Australians with asthma have poorer access to health-care services and use medications suboptimally. In addition, they have increased exposure to risk factors for more severe disease including tobacco exposure (in-utero and ex-utero), obesity and socioeconomic disadvantage.

The recommended management of asthma in Indigenous Australians is identical to that in non-Indigenous Australians, that is, use of appropriate asthma medications and devices, education and an asthma action plan, as well as managing generic health-care issues such as mental health status and other comorbidities, reducing exposure to tobacco smoke and optimising a healthy diet. However, Indigenous programs need to be culturally appropriate in order to maximise effectiveness. Based on international data, it is most likely that specifically designed asthma programs are necessary in order to be effective for Aboriginal and Torres Strait Islander Australians with asthma.

