Asthma in children

2

Key points

- Estimates of the prevalence of current asthma in children range from 14% to 16%, based on self-report. A higher proportion report recent wheeze and a lower proportion have objective evidence of the airway abnormality that is typical of asthma.
- The prevalence of asthma in children in Australia is high by international standards.
- The prevalence of current asthma is substantially higher among primary school-aged boys than girls. However, among infants, pre-school-aged children, and high-school-aged children, there is no difference between boys and girls in the prevalence of asthma.
- The proportion of GP encounters with children at which asthma is managed as a problem, and the rate of hospital admissions for asthma among children, have both declined since the late 1990s.
- There are large week-to-week fluctuations in the rate of emergency department visits for asthma among children. Rates are up to 50% below the annual average during some weeks of the summer school holiday period. They tend to peak among pre-school and primary school-aged children 2–4 weeks after the end of each school holiday period, particularly during late February. They are also above average during late autumn and winter. These fluctuations are primarily due to respiratory tract infections, the predominant trigger in young children.
- Among children with asthma, infants and pre-school-aged children are much more likely to be admitted to hospital with asthma than older children. However, the majority of admissions in these younger age groups last only 1 day.
- A minority of children with asthma state that they have a written asthma action plan.

Introduction

Compared with many other countries, the prevalence of asthma in Australian children is high. Asthma represents one of the most common reasons that children utilise health care, particularly through emergency department (ED) visits and hospitalisation. The Australian Burden of Disease study identified asthma as the leading cause of burden of disease and injury among children aged 0 to 14 years in 1996 (Mathers et al. 1999). Asthma is a major health issue for children in Australia.

This chapter brings together data on the prevalence, health service utilisation and management of asthma in Australian children. In some instances data presented in later chapters is re-presented here. However, in discussing the spectrum of asthma in childhood, this chapter applies a more developmentally focused age classification. Where possible, data are presented in four childhood age groups: infants (0 to 1 year), pre-school (2 to 4 years), primary school (5 to 11 years) and secondary school (12 to 18 years).

2.1 Prevalence of asthma in children

The 2001 National Health Survey provides the most recent nationwide data for the prevalence of asthma. From this survey it was estimated that 13.8% of children aged 0 to 17 years in Australia had current asthma defined as those who reported ever being diagnosed with asthma and responded 'Yes' to 'Do you still get asthma?' (ABS 2002a). In addition to this nationwide estimate, the prevalence of asthma has also been measured in a number of state, territory or local population-based surveys in Australia. Data on the prevalence of asthma in children from the National Health Survey and these other studies have been summarised in Tables 2.1 and 2.2.

The surveys have used different definitions to identify asthma and this is likely to influence the resulting prevalence estimates. The definition of current asthma applied in most state government surveys were those who reported being diagnosed with asthma and also reported either having had symptoms of, and/or had taken treatment for, asthma in the preceding year. Using this definition, the estimated prevalence of asthma in children in Western Australia (2004), New South Wales (2001), and South Australia (2003–04) was 14.6% (age 0 to 15 years), 15.7% (age 2 to 12 years) and 18.4% (age 2 to 15 years), respectively (Table 2.2).

The differences in prevalence estimates are also likely to be influenced by the different age ranges of survey participants.

The prevalence of wheeze was higher than the prevalence of asthma in children. The extent to which this higher prevalence of wheeze represented undiagnosed asthma, as opposed to non-asthma, viral-associated wheeze, cannot be ascertained from available data. There is some evidence to suggest that the combination of recent wheeze and airway hyperresponsiveness, an abnormal 'twitchiness' of the airways, identifies a population with more persistent features of asthma that is independent of diagnostic and labelling trends. The prevalence of this syndrome among children in the Belmont area of coastal New South Wales was 11.3% in 2002 (Toelle et al. 2004).

Time trends in the prevalence of asthma among children are illustrated in Figure 3.2 of this report. Evidence from repeated surveys consistently suggests that the prevalence of asthma in children increased in the 1980s and 1990s and has peaked in recent years.

Table 2.1
Prevalence of asthma ever being diagnosed in children, Australia, 1999–2004

Location	Survey	Year	Age range	Rates	95% CI
Ever doctor-diagnosed asthma					
Australia	(1)	2001	0 to 17 years	24.8%	23.7–25.9%
NSW	(2)	2001	2 to 12 years	26.4%	25.4–27.4%
Belmont, NSW	(3)	2002	8 to 11 years	31.0%	27.8–34.3%
SA	(4)	2003–04	2 to 15 years	25.0%	22.6–27.4%
		2002–03	2 to 15 years	23.3%	20.9–25.8%
Melbourne, Vic	(5)	2002	6 to 7 years	25.5%	23.7–27.4%
WA	(6)	2004	0 to 15 years	20.2%	17.2–20.8%
	(7)	2001	0 to 12 years	19.7%	17.2–23.3%
Ever had asthma					
ACT	(8)	1999–2001	4 to 6 years	23.5%	22.2–23.8%
Wheeze ever					
Melbourne, Vic	(5)	2002	6 to 7 years	37.1%	34.8–39.5%

Sources: These estimates were obtained from the following surveys and studies: (1) ABS National Health Survey (CURF); (2) NSW Child Health Survey 2001, (Centre for Epidemiology and Research (NSW Department of Health) 2002); (3) Belmont Cohort Study (Toelle et al. 2004); (4) South Australian Monitoring and Surveillance System, Population Research and Outcome Studies Unit, SA Department of Human Services (unpublished data) 2005; (5) International Study on Asthma and Allergies in Childhood (Robertson et al. 2004); (6) Health and Wellbeing Surveillance System, Health Information Centre WA Department of Health (unpublished data) 2005; (7) WA Child Health Survey 2001 (Daly & Roberts 2002); (8) ACT assessment of new primary school entrants (Glasgow et al. 2003).

Table 2.2
Prevalence of current asthma in children, Australia, 1999–2004

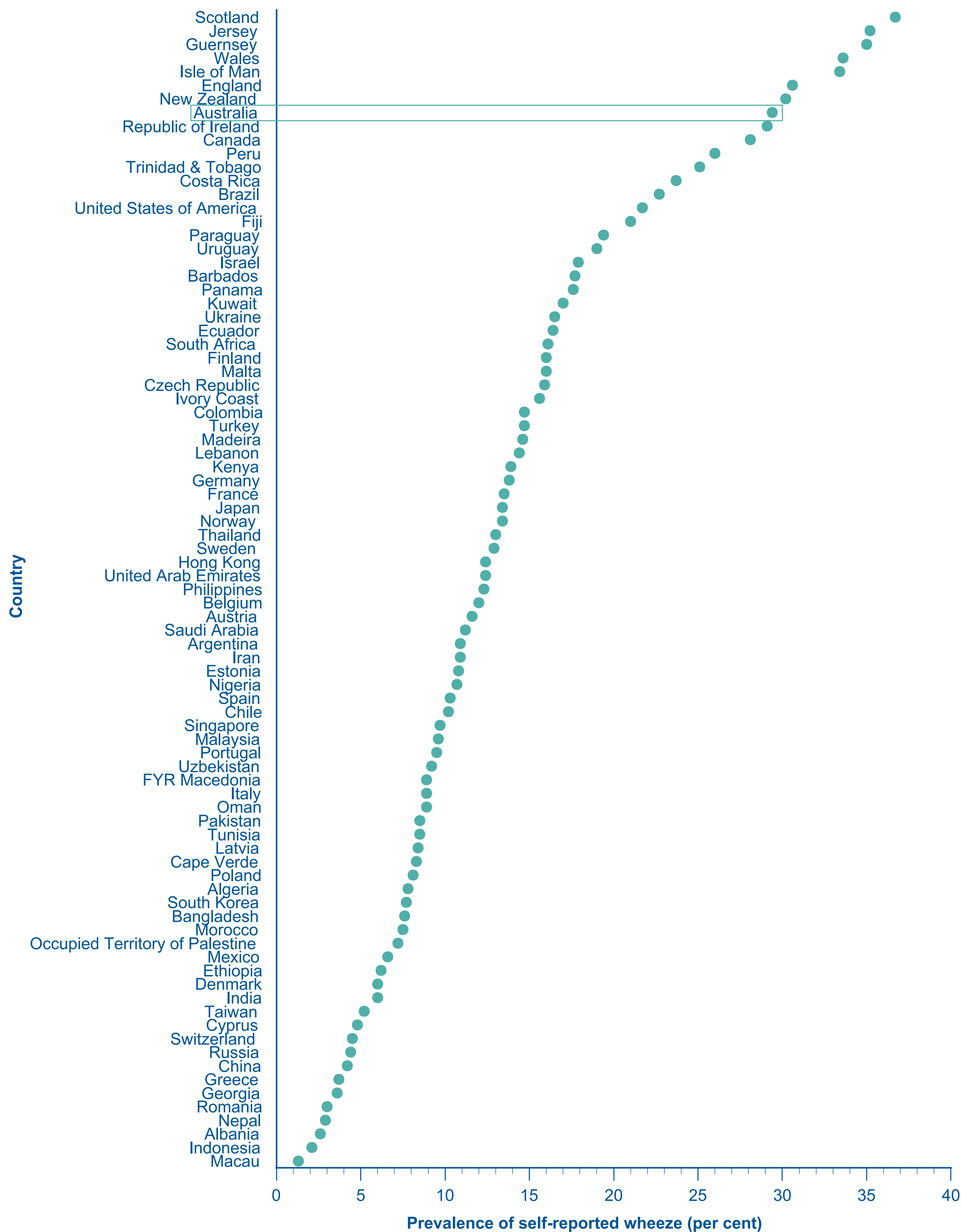
Location	Survey	Year	Age range	Rates	95% CI
Ever doctor-diagnosed asthma AND 'Yes' to 'Do you still have/get asthma'?					
Australia	(1)	2001	0 to 17 years	13.8%	12.9–14.7%
Melbourne, Vic	(5)	2002	6 to 7 years	20.0%	18.4–21.8%
Ever doctor-diagnosed asthma AND symptoms of asthma or taken treatment for asthma in last 12 months					
NSW	(2)	2001	2 to 12 years	15.7%	14.7–16.8%
SA	(4)	2003–04	2 to 15 years	18.4%	16.3–20.7%
		2002–03	2 to 15 years	18.0%	15.9–20.4%
WA	(6)	2004	0 to 15 years	14.6%	12.1–17.2%
Does your child have asthma?					
ACT	(7)	1999–2001	4 to 6 years	15.1%	14.4–15.8%
Wheeze or whistling in the chest in last 12 months					
ACT	(7)	1999–2001	4 to 6 years	15.3%	14.6–16.0%
Belmont, NSW	(3)	2002	8 to 11 years	23.7%	20.8–26.8%
Wheeze in last 12 months and airway hyperresponsiveness					
Belmont, NSW	(3)	2002	8 to 11 years	11.3%	8.8–14.3%

Sources: These estimates were obtained from the following surveys and studies: (1) ABS National Health Survey (CURF); (2) NSW Child Health Survey 2001 (Centre for Epidemiology and Research (NSW Department of Health) 2002); (3) Belmont Cohort Study (Toelle et al. 2004); (4) South Australian Monitoring and Surveillance System, Population Research and Outcome Studies Unit, SA Department of Human Services (unpublished data) 2005; (5) International Study on Asthma and Allergies in Childhood (Robertson et al. 2004); (6) Health and Wellbeing Surveillance System, Health Information Centre WA Department of Health (unpublished data) 2005; (7) ACT assessment of new primary school entrants (Glasgow et al. 2003).

International comparisons

The International Study of Asthma and Allergies in Childhood (ISAAC) applied standardised methods and definitions to the measurement of asthma in children. The survey was conducted in 464,000 children aged 13 to 14 years in 155 centres in 56 countries during the early 1990s (ISAAC 1995). There were four Australian centres (Robertson et al. 1998). The prevalence of self-reported wheeze among 13 to 14 year old children in Australia was high compared with most other countries participating in ISAAC (Figure 2.1).

Figure 2.1
World ranking for the percentage of children with self-reported wheeze in the previous 12 month period, age 13 to 14 years



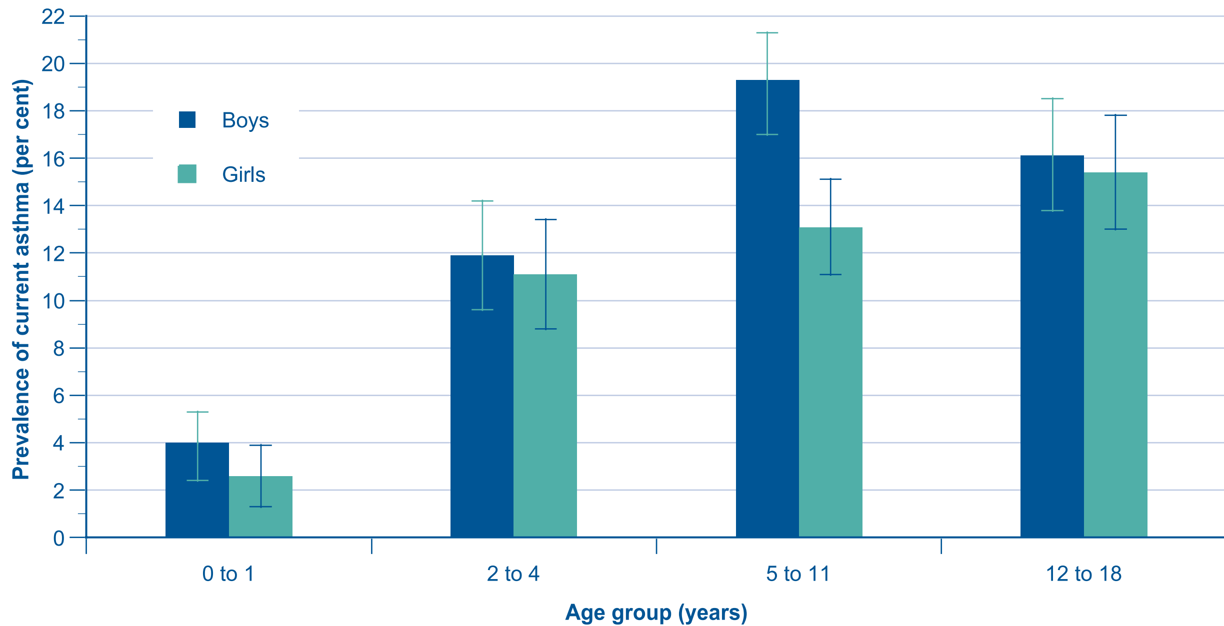
Source: GINA 2004. Copyright Global Initiative for Asthma (GINA). Reproduced with permission.

Differentials in the prevalence of current asthma among children

Age and sex

The prevalence of current asthma was substantially higher among primary school-aged boys (5 to 11 years) than girls ($p<0.001$). However, among infants, pre-school-aged children, and high-school-aged children, there was no difference between boys and girls in the prevalence of asthma (Figure 2.2).

Figure 2.2
Prevalence of current asthma, by age group and sex, children aged 0 to 18 years, Australia, 2001



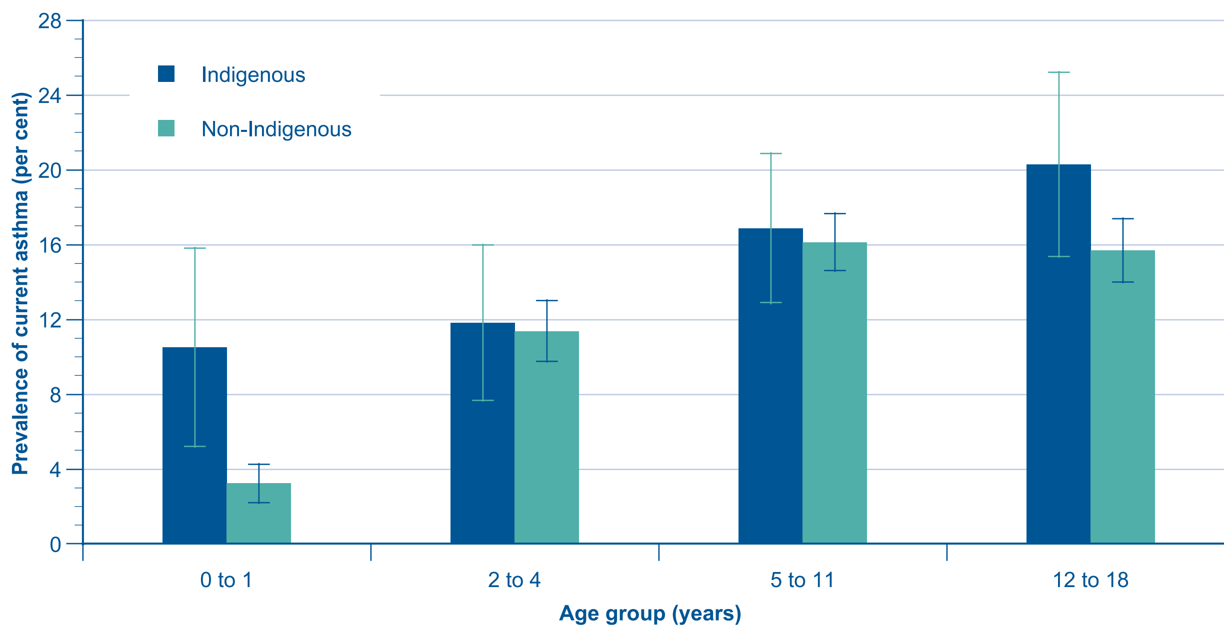
Source: ABS National Health Survey 2001.

Aboriginal and Torres Strait Islander children

Overall, the prevalence of current asthma was higher among Indigenous children (15.8%, Indigenous National Health Survey 2001) than other children (13.8%, National Health Survey 2001). However, this difference was highest among Indigenous infants (Figure 2.3). This is an age at which the diagnosis of asthma is uncertain. 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 Indigenous National Health Survey, need to be treated with some caution.

A number of other surveys have measured the prevalence of asthma in Indigenous children (Table 2.3). These have used various definitions and age groups and have been conducted in a variety of settings. The heterogeneity among the estimates makes it difficult to draw confident conclusions about the prevalence of asthma in Indigenous children, except that most estimates are at least as high as those in other children.

Figure 2.3
Prevalence of current asthma, by age group and Indigenous status, children aged 0 to 18 years, Australia, 2001



Source: ABS National Health Survey 2001.

Table 2.3
Prevalence of asthma in Aboriginal and Torres Strait Islander children, Australia, 1998–2003

Location	Source	Year	Age range	Rates	95% CI (number in survey)
Ever had asthma					
WA	(2)	2001–02	0 to 17 years	23.2%	21.6–24.9% (5,513)
			0 to 3 years	16.8%	14.3–19.5%
			4 to 11 years	25.6%	23.2–28.0%
			12 to 17 years	24.4%	21.4–27.6%
ACT	(3)	1999–01	4 to 6 years	27.6%	21.8–34.2% (203)
Ever diagnosed with asthma by a doctor					
Tropical North, WA	(4)	2000	5 to 17 years	14.7%	8.5–24.2% (90)
Central Desert, WA	(4)	1999	5 to 17 years	2.8%	0.15–17.0% (34)
Ever diagnosed with asthma by a doctor and 'Yes' to 'Do you still have/get asthma?'					
Australia	(1)	2001	0 to 17 years	15.8%	13.4–18.2% (1,828)
ACT	(3)	1999–2001	4 to 6 years	24%	18.1–29.9% (204)
Ever had wheeze					
Remote communities, North Qld	(5)	2003	School age children	12.5%	8.9–16.2% (315)
Ever had wheeze or whistling in the chest					
WA	(2)	2001–02	0 to 17 years	28.0%	26.8–29.2% (5,513)
Ever had asthma ('short wind')					
Remote communities, North Qld	(5)	2003	School age children	12.2%	8.6–15.8% (315)
Remote communities, North Qld	(6)	1999	0 to 17 years	15.8%	14.0–17.6% (1,650)
Wheeze in last 12 months					
Tropical North, WA	(4)	2000	5 to 17 years	18.7%	13.2–30.1% (90)
Central Desert, WA	(4)	1999	5 to 17 years	8.8%	2.3–24.8% (34)
Remote communities, North Qld	(5)	2003	School age children	5.4%	1.9–7.9% (315)
Remote communities, North Qld	(6)	1999	0 to 17 years	12.4%	10.8–14.0% (1,650)
Wheeze or whistling in the chest in last 12 months					
ACT	(3)	1999–2001	4 to 6 years	20.8%	15.5–26.6% (207)

Sources: (1) ABS, National Health Survey 2001 (Indigenous CURF); (2) Zubrick et al. 2004; (3) ACT assessment of new primary school entrants (Glasgow et al. 2003); (4) Verheijden et al. 2002; (5) Valery et al. 2005; (6) Valery et al. 2001.

2.2 Health service use for asthma among children

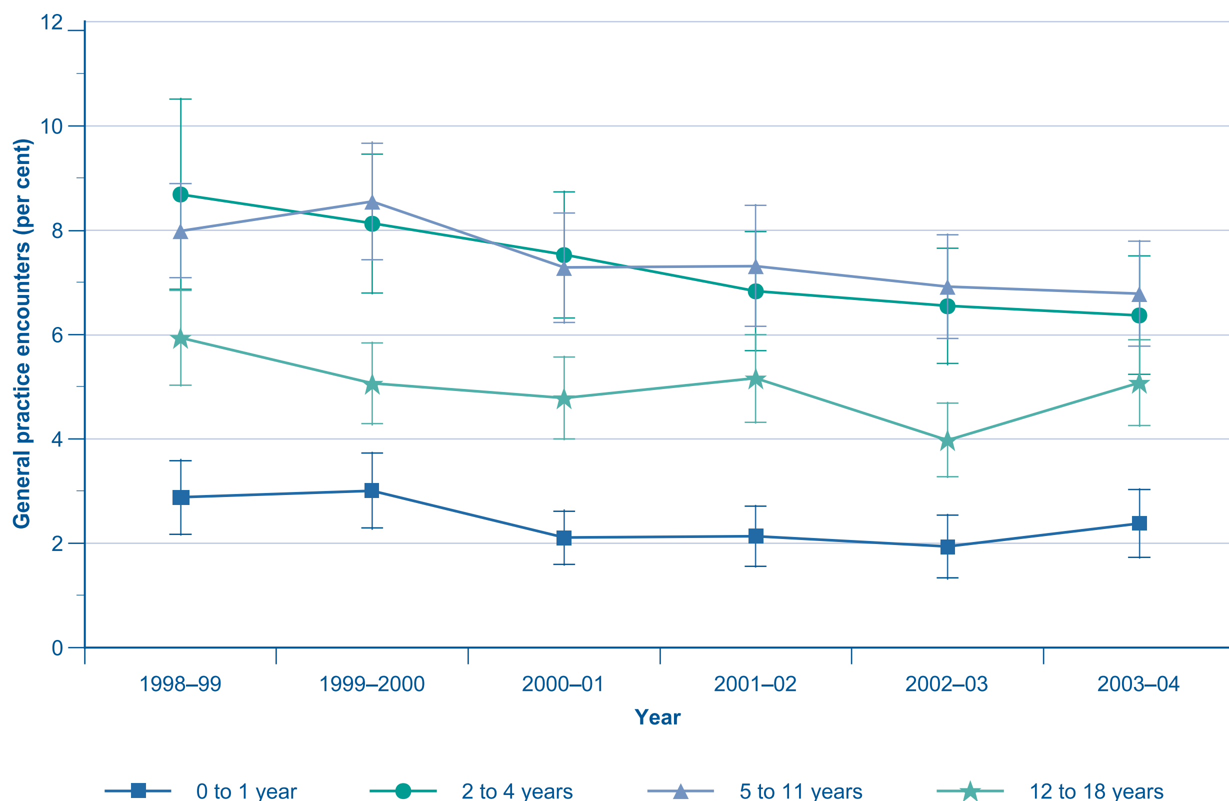
Health care utilisation for asthma commonly occurs as a consequence of an exacerbation of the disease. Less severe exacerbations of asthma are commonly managed at encounters with the patient's GP, while more severe exacerbations often result in visits to the emergency department and, sometimes, admission to hospital. Hence, data on the utilisation of these services for asthma can be used to monitor trends in the frequency and severity of exacerbations of asthma among children.

General practice encounters for asthma among children

General practice encounters include visits to GPs for routine review and the prescription of maintenance pharmaceutical therapy as well as the management of worsening asthma symptoms and asthma exacerbations. The estimates of asthma-related general practice encounters for children in this section are based on data from the Bettering the Evaluation and Care of Health (BEACH) survey (AIHW GPSCU 2002). These data do not distinguish visits for routine asthma care from those for exacerbations of asthma.

The proportion of general practice encounters for children where asthma was a problem managed gradually declined in all age groups during the period April 1998 to March 2004 (Figure 2.4).

Figure 2.4
Proportion of general practice encounters for asthma, by age group, children aged 0 to 18 years, Australia, April 1998 to March 2004

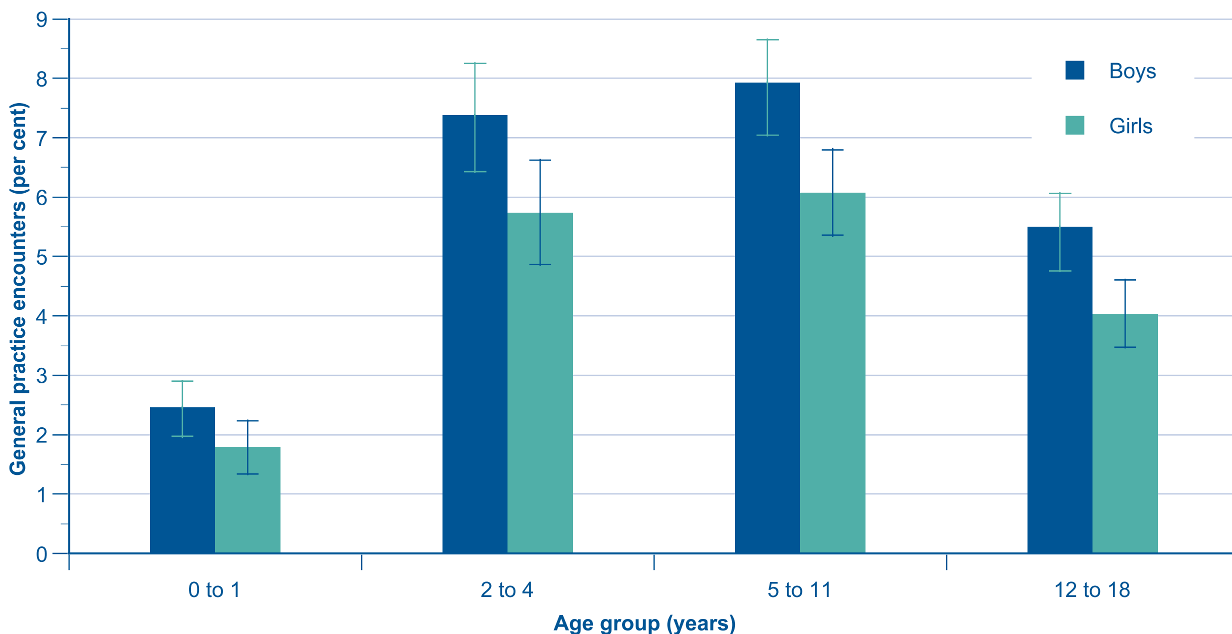


Note: Asthma classified according to ICPC-2 PLUS codes: R96001–R96005, R96007, R96008. BEACH data year is April to March.

Source: BEACH Survey of General Practice.

The proportion of GP encounters at which asthma was managed was highest in pre-school and primary school-aged children (Figure 2.5). Consistent with the prevalence of asthma, there were more GP encounters for asthma for boys than girls during the period 2001–04 (Figure 2.5). This difference was apparent in all childhood age groups and was most pronounced in school-aged children.

Figure 2.5
Proportion of general practice encounters for asthma, by age group and sex, children aged 0 to 18 years, Australia, April 2001 to March 2004

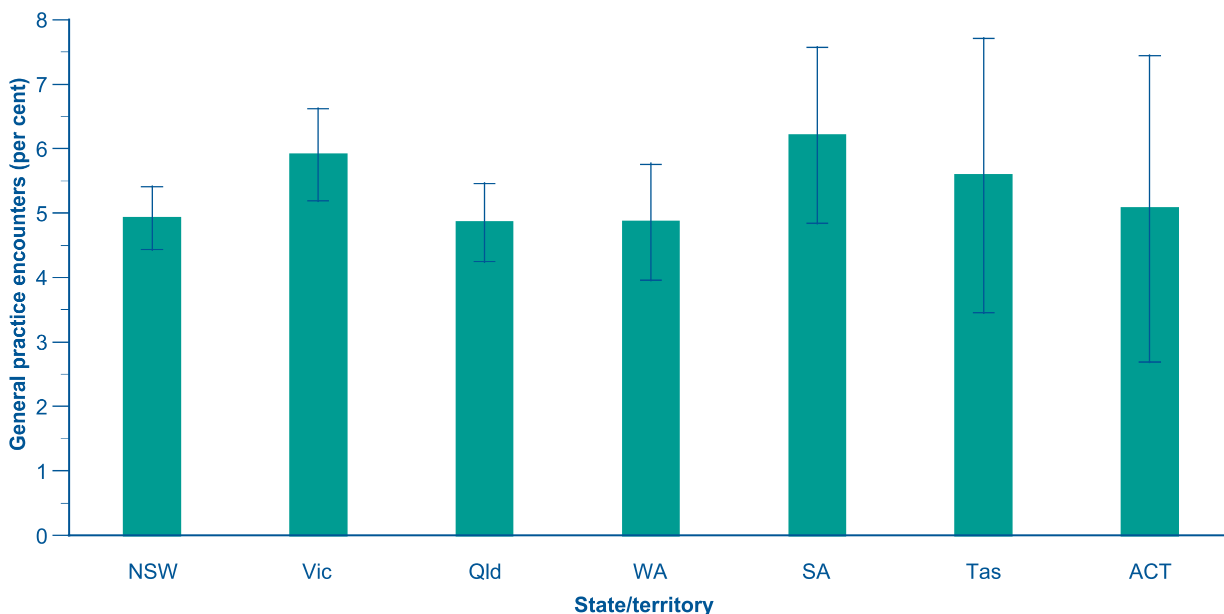


Note: Asthma classified according to ICPC-2 PLUS codes: R96001–R96005, R96007, R96008. BEACH data year is April to March.

Source: BEACH Survey of General Practice.

The rates of asthma-related GP encounters for children did not differ significantly between states (Figure 2.6; see also Appendix 2, Table A2.1).

Figure 2.6
Proportion of general practice encounters for asthma, by state and territory, children aged 0 to 18 years, Australia, April 2001 to March 2004

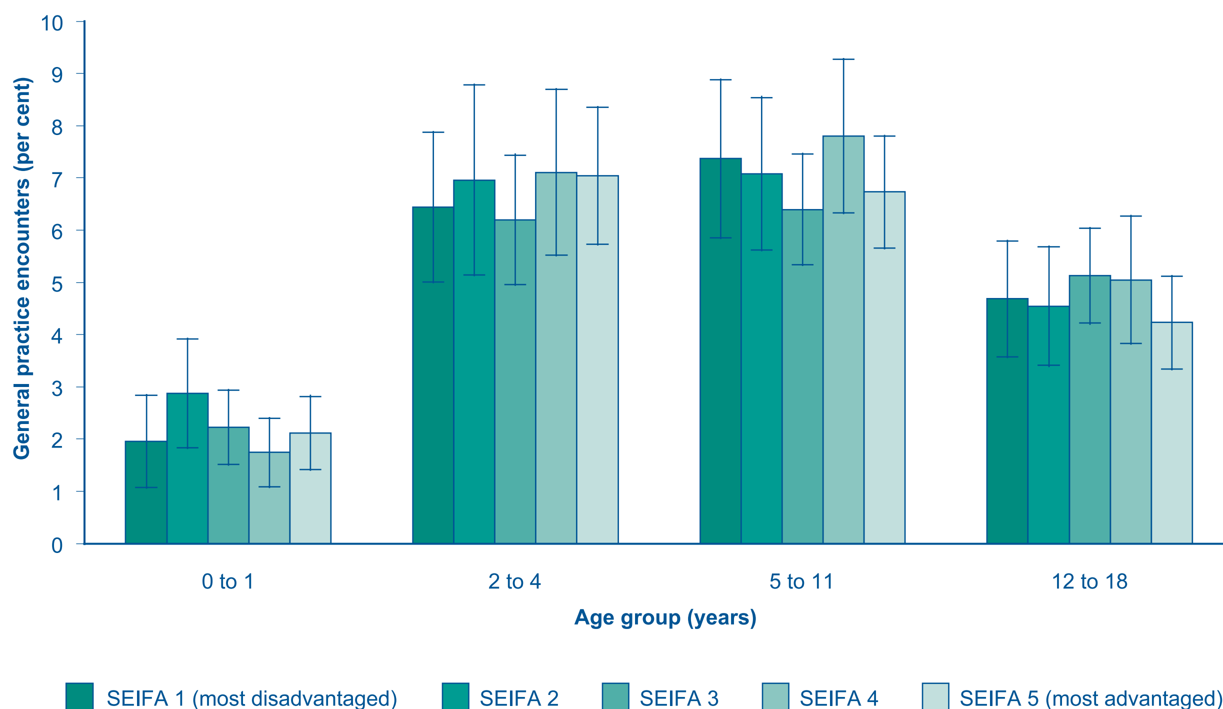


Note: Asthma classified according to ICPC-2 PLUS codes: R96001–R96005, R96007, R96008. BEACH data year is April to March. Northern Territory data excluded as the numbers are too small to produce reliable estimates.

Source: BEACH Survey of General Practice.

The proportion of GP encounters for asthma was not related to the level of socioeconomic disadvantage of the child's location of residence (Figure 2.7).

Figure 2.7
Proportion of general practice encounters for asthma, by age group and socioeconomic status, children aged 0 to 18 years, Australia, April 2001 to March 2004



Note: Asthma classified according to ICPC-2 PLUS codes: R96001–R96005, R96007, R96008. BEACH data year is April to March.

Source: BEACH Survey of General Practice.

Visits by children to hospital emergency departments for asthma

Emergency departments (EDs) are a key provider of urgent health care for children with exacerbations of asthma. In 2000–01, 67% of visits for exacerbations of asthma were among children aged 0 to 15 years (Kelly et al. 2003). Although most visits to EDs for asthma are precipitated by exacerbations, sometimes families use EDs as the major source of primary care. On the other hand, some families seek urgent care for exacerbations from their GP. Despite these limitations, rates of ED attendance are a good indicator of rates of moderate to severe exacerbations of asthma.

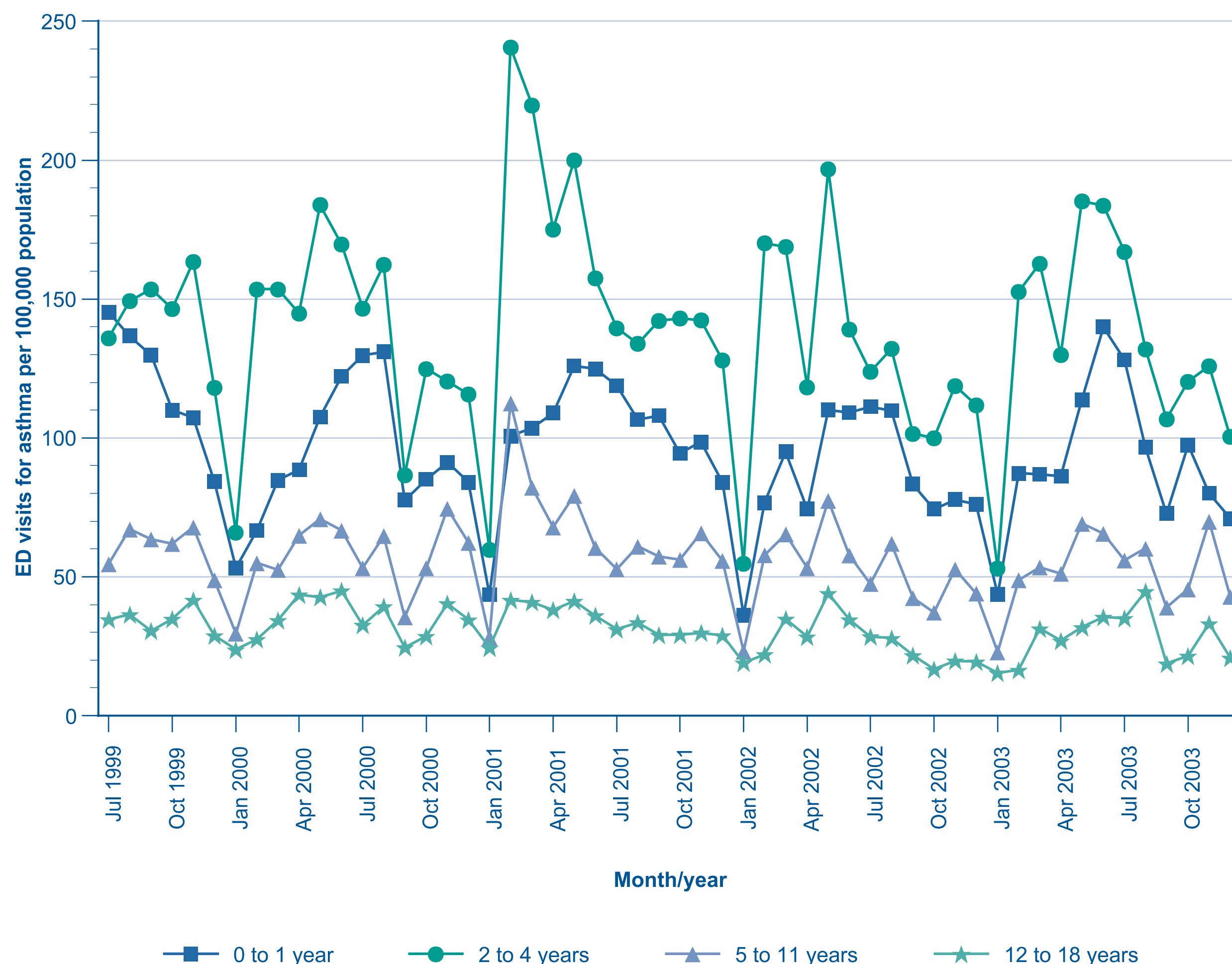
In this section, data on ED visits for children are derived from the New South Wales Emergency Department Data Collection and the Victorian Emergency Minimum Dataset. It should be noted that population coverage of the EDs included in these datasets is not complete. Hence, estimated population-based attendance rates, which are based on the total population of children in the two states, are an underestimate of the true attendance rates in the areas covered.

Trends over time

Despite very pronounced monthly fluctuations in asthma-related ED visits by children, there was no overall time trend evident over the period from mid-1999 to 2003 (Figure 2.8). A particularly notable peak occurred in February 2001 in all childhood age groups. It was most evident in pre-school and primary school-aged children. Less pronounced February peaks also occurred in other years and also in May and June of most years.

Figure 2.8

Emergency department visits for asthma per 100,000 population, by month and age group, children aged 0 to 18 years, New South Wales and Victoria, July 1999 to December 2003



Note: Data are aggregated from July 1999 to December 2003 for New South Wales and Victoria combined since population data for age 0 to 1 year were only available to December 2003.

Sources: NSW Emergency Department Data Collection (EDDC) (HOIST), Centre for Epidemiology and Research, NSW Department of Health; Victorian Emergency Minimum Dataset (VEMD), Victorian Department of Human Services; Australian Bureau of Statistics.

Seasonal variation

Weekly variation in the rate of ED visits for asthma does not show a strictly seasonal pattern (Figure 2.9). In all age groups the lowest rates of presentation were in December and January. However, February, the last month of summer, had the highest rate of ED visits for pre-school and primary school-aged children and this increased rate extended into early autumn. Rates of ED visits were also above average from mid-May (late autumn) to the end of August (end of winter), except for a brief period of lower rates in school-aged children during July, which coincided with school holidays. In fact, rates tended to be lower among school-aged children during, and immediately after, most school holiday periods. However, rates of ED visits were above average 2–4 weeks after each return to school. Apart from December and January and the school holiday periods, the other time of low rates of ED visits was early to mid-spring (September and October), in all childhood age groups.

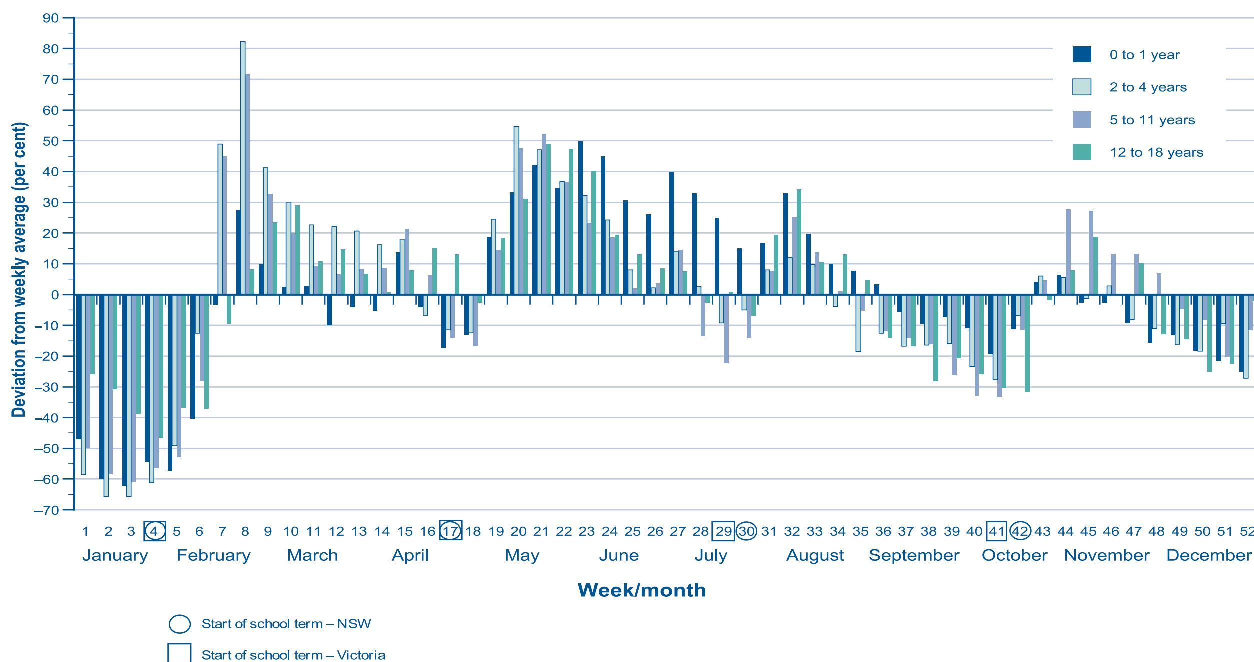
Among infants, the rate of ED visits for asthma was higher than average during the winter months and, unlike other age groups, this higher rate persisted for infants until the beginning of spring in September. There was also a smaller peak in February, which occurred a week or two after the peak observed in children aged 2 to 11 years.

Among adolescent children (12 to 18 years) the deviations from average were more moderate than among other age groups. Unlike other childhood age groups, the number of visits in February was not above average in this older age group, although a slightly later and more modest increase occurred in early March.

These findings are broadly consistent with other studies that report the lowest rates in summer months, and the highest in autumn and winter (Gergen et al. 2002; Silverman et al. 2003). In northern hemisphere countries, a peak in ED visits has also been reported in September (Garty et al. 1998; Johnston et al. 2005). In the northern hemisphere, September corresponds to the return to school for children after their summer holidays. In Australia, this event occurs in late January or early February. In New South Wales, peaks in ED visits for asthma in February have been previously noted (Lister et al. 2001). The predominant trigger for asthma symptoms in young children is viral respiratory tract infections (Johnston et al. 1995). It has been suggested that the return to pre-school and school could precipitate increased transmission of viral respiratory tract infections and a subsequent increase in exacerbations of asthma among susceptible children (Johnston et al. 2005). Direct evidence for this explanation is not yet available.

Figure 2.9

Average weekly deviation from average number of emergency department visits attributed to asthma, children aged 0 to 18 years, New South Wales and Victoria, 1999–2004



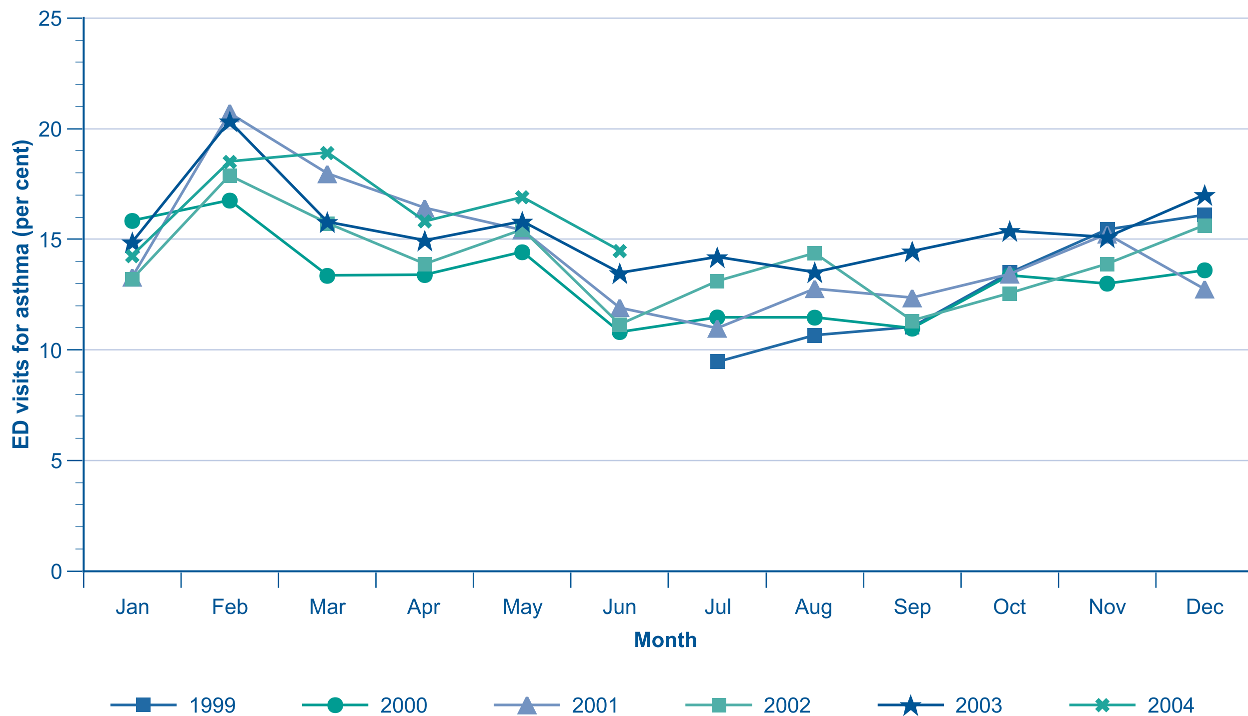
Sources: NSW Emergency Department Data Collection (EDDC) (HOIST), Centre for Epidemiology and Research, NSW Department of Health; Victorian Emergency Minimum Dataset (VEMD), Victorian Department of Human Services.

Previous analyses in New South Wales have used triage status to explore ED visits for severe asthma (Lincoln & Muscatello 2001). Triage status is the status assigned to patients at initial presentation to ED. It represents the nurse's assessment of the degree of urgency with which the patient should be medically assessed and, hence, broadly reflects the severity or acuity of the presenting problem. Using these data we have defined 'severe asthma' as cases that were assigned triage category 1: 'resuscitation' or 2: 'emergency'. These cases receive medical attention within 10 minutes. Some caution is required in interpreting triage status as a marker of severity. There is likely to be substantial variation in the way in which this label is applied, since it is based on preliminary assessment and is designed to prioritise care, not assess severity. Furthermore, the assignment of triage status may be influenced by the workload within the ED at the time the assignment is made. The monthly proportion of ED visits for severe asthma, as defined above, among children in New South Wales and Victoria, by year, during

the period 1999–2004 revealed no consistent difference between childhood age groups, in the proportion assessed as having severe asthma. The overall pattern was consistent in all years, and indicates that February, the month with the highest number of ED visits for asthma among children, also had the highest proportion of severe cases (Figure 2.10). Interestingly, the lowest proportion of severe cases, in all years, occurred during the winter months (June to August) despite this being a time when the rate of ED visits for asthma was higher than average. This indicates that the peak in asthma ED visits observed among children in February was higher in both rate and severity than at other times of the year. On the other hand, the higher rate of ED visits for asthma in winter months included a higher proportion of patients with less severe presentations, as assessed by triage status.

Figure 2.10

Monthly percentage of emergency department visits for asthma that were for severe asthma, children aged 0 to 18 years, New South Wales and Victoria, July 1999 to June 2004



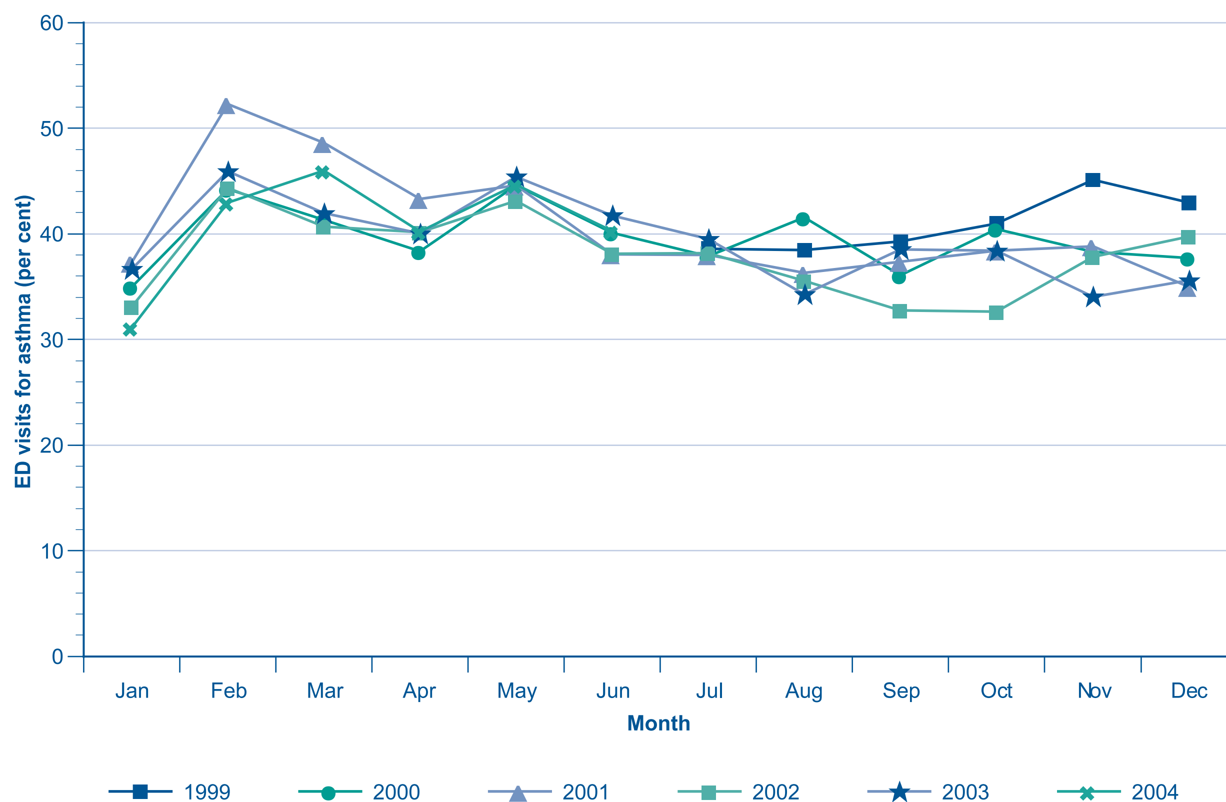
Note: 'Severe asthma' was defined as an ED visit assessed as triage category 1 (resuscitation) or 2 (emergency), and requiring medical attention within 10 minutes (Lincoln & Muscatello 2001).

Sources: NSW Emergency Department Data Collection (EDDC) (HOIST), Centre for Epidemiology and Research, NSW Department of Health; Victorian Emergency Minimum Dataset (VEMD), Victorian Department of Human Services.

An alternative means of identifying ED visits for more severe asthma exacerbations is to analyse those ED visits for asthma that resulted in hospital admission. Children whose outcome status from an ED visit is 'admission to hospital' are likely to have more severe asthma than children who are discharged home from the ED. Using admission to hospital as a marker for severe asthma it was observed that a higher proportion of ED visits for asthma resulted in admission in February of most years, and to a lesser extent in May (Figure 2.11). The lowest proportion occurred in January. This is consistent with data using triage status to identify ED visits for severe asthma (Figure 2.10).

Figure 2.11

Monthly percentage of emergency department visits for asthma that resulted in admission to hospital, children aged 0 to 18 years, New South Wales and Victoria, July 1999 to June 2004



Sources: NSW Emergency Department Data Collection (EDDC) (HOIST), Centre for Epidemiology and Research, NSW Department of Health; Victorian Emergency Minimum Dataset (VEMD), Victorian Department of Human Services

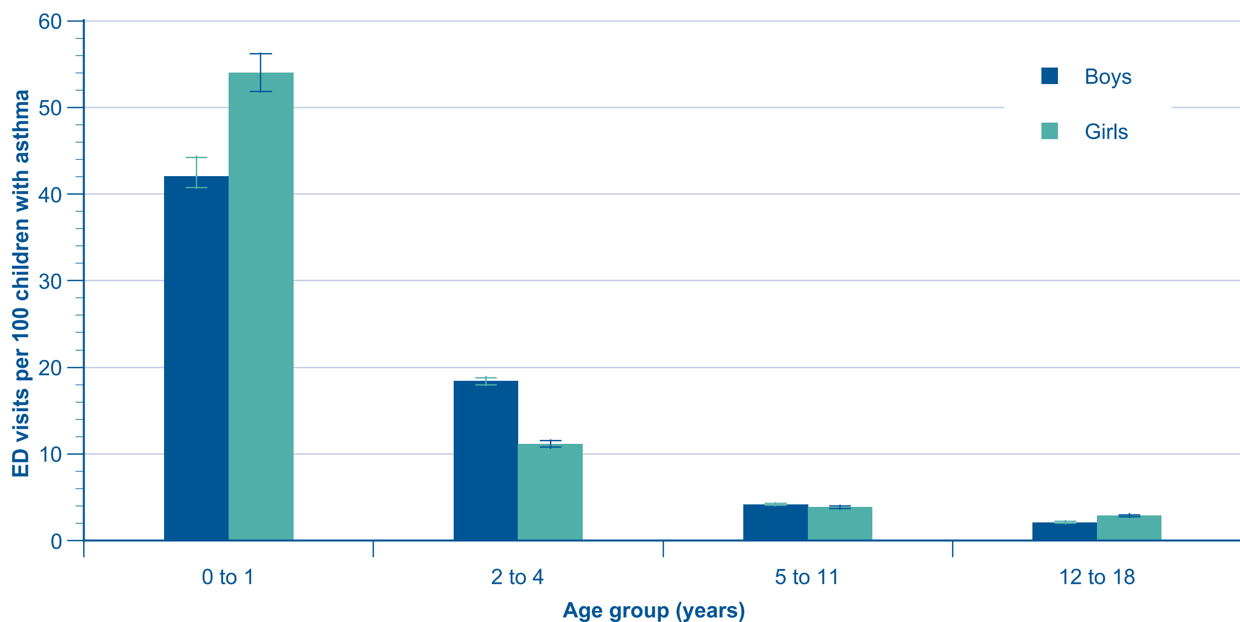
Age and sex

Relative to the prevalence of asthma in each age group, rates of ED visits for asthma were much higher in infants than in older children. Rates decreased with increasing age.

Among infants aged 0 to 1 year, the rate of ED visits for asthma, expressed as a proportion of the number of infants who have asthma, was higher for girls than boys. This was reversed among children aged 2 to 4 years. In this age group boys with asthma were more likely to visit EDs due to asthma. Among children with asthma who were aged 5 years and over, the likelihood of visiting EDs for asthma did not differ between males and females (Figure 2.12; see also Appendix 2, Table A2.2).

Figure 2.12

Emergency department visits for asthma per 100 children with asthma, by age group and sex, children aged 0 to 18 years, New South Wales and Victoria, 1999–2004

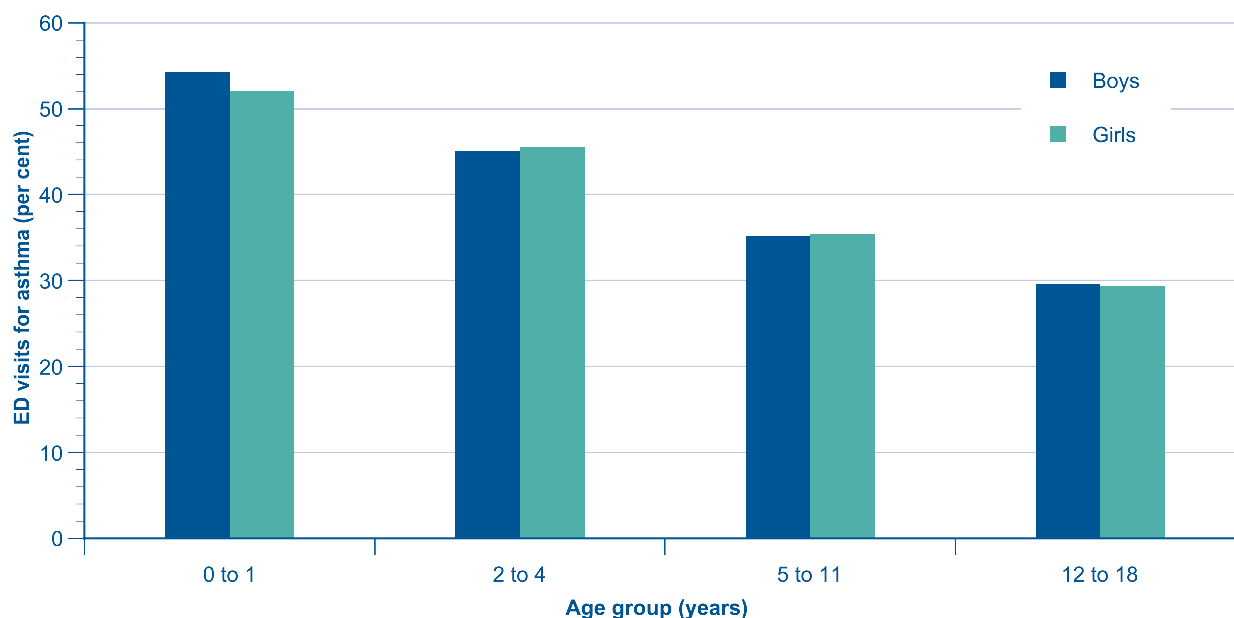


Note: Data are aggregated from July 1999 to June 2004 and include average ED presentations for asthma for New South Wales and Victoria combined.

Sources: NSW Emergency Department Data Collection (EDDC) (HOIST), Centre for Epidemiology and Research, NSW Department of Health; Victorian Emergency Minimum Dataset (VEMD), Victorian Department of Human Services; ABS National Health Survey 2001.

Infants visiting EDs due to asthma were more likely to be admitted to hospital than older children (Figure 2.13; p trend<0.001). During the period 1999–2004, 53.5% of infants aged 0 to 1 year who were taken to an ED for asthma were then admitted to hospital. Among children aged 12 to 18 years, around 29.5% were admitted to hospital as a result of the ED visit. This may reflect the fact that younger children are more likely to be presenting with their first episode of asthma. It may also reflect a greater sense of caution in dealing with younger children.

Figure 2.13
Emergency department visits for asthma resulting in admission to hospital, by age group and sex, children aged 0 to 18 years, New South Wales and Victoria, 1999–2004



Sources: NSW Emergency Department Data Collection (EDDC) (HOIST), Centre for Epidemiology and Research, NSW Department of Health; Victorian Emergency Minimum Dataset (VEMD), Victorian Department of Human Services.

Hospitalisations for asthma in children

Asthma represents one of the most common reasons for admission to hospital in childhood. Hospitalisation for asthma reflects severe exacerbations. Most admissions to hospital for asthma occur via the ED. As noted in the previous section, 30% to 50% of children who visit EDs for asthma are admitted to hospital (Figure 2.13). Admission rates from EDs are higher in the younger age groups.

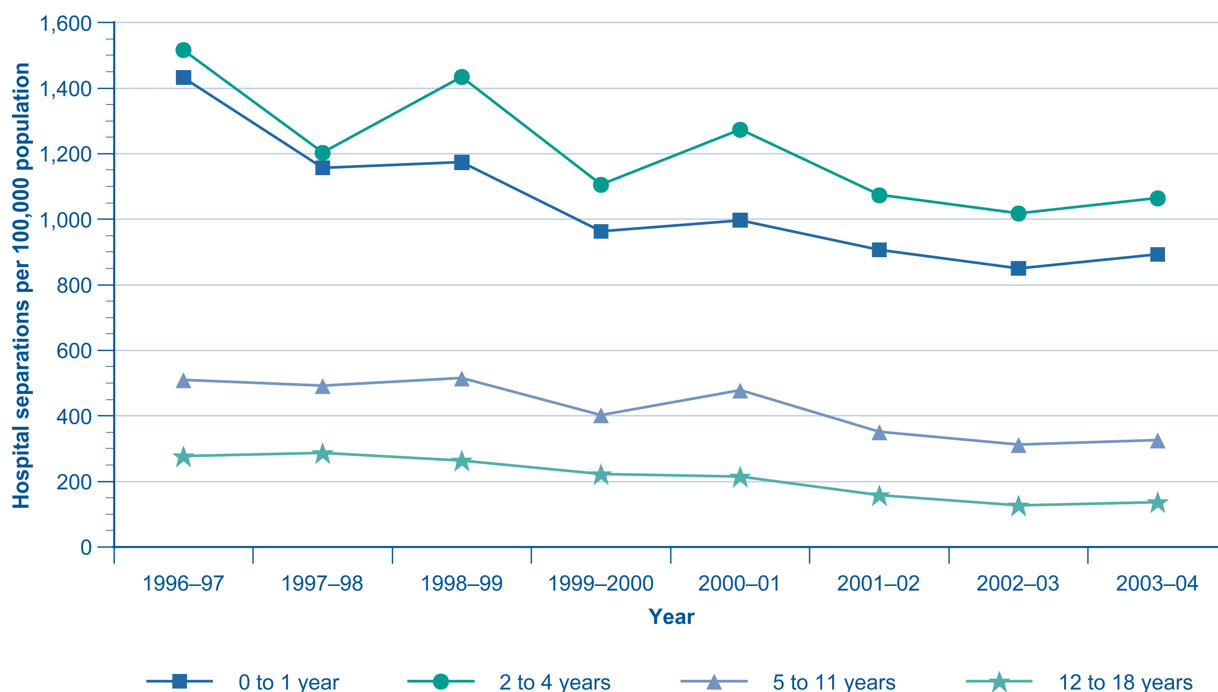
In this section, we use data from the National Hospital Morbidity Database (AIHW) to investigate hospital utilisation for asthma among children. The term 'hospital separation' is used to refer to the formal process by which a hospital records the completion of treatment and/or care for an admitted patient. Each separation represents one episode of hospitalisation (or admission).

In 2002–03, there were 20,466 hospital separations for asthma among children aged 0 to 18 years. This represents just over half of all separations for asthma (55%).

Trends over time

Overall, hospitalisations for asthma among children have been on a decreasing trend since 1996–97 (Figure 2.14). This trend was observed in all age groups and was steeper when hospital bed utilisation was expressed as patient-days hospitalised for asthma (see Figure 5.22), reflecting the coinciding reduction in average length of stay for children admitted with asthma.

Figure 2.14
Hospital separations for asthma per 100,000 population, children aged 0 to 18 years, Australia, 1996–2004



Note: Age standardised to the Australian population as at 30 June 2001. Asthma classified according to ICD-9-CM code 493 and ICD-10-AM codes J45 & J46.

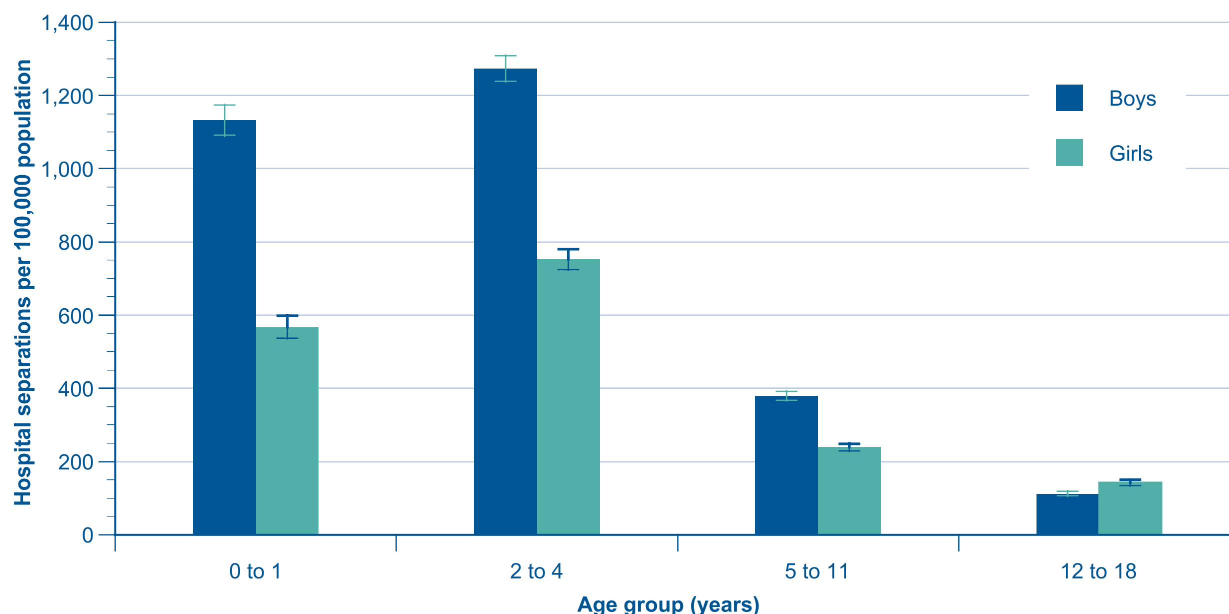
Sources: AIHW National Hospital Morbidity Database; Australian Bureau of Statistics.

Age and sex

Age and sex rates of hospital separation for asthma were much higher in infants and pre-school children than in school-aged children (Figure 2.15). In this younger age group, the rates were almost two times higher in boys than in girls. The male predominance was less marked in primary school-aged children. This pattern was reversed in the 12 to 18 year age group, with females having a slightly higher rate of hospitalisation than males.

Figure 2.15

Hospital separations for asthma per 100,000 population, by age group and sex, children aged 0 to 18 years, Australia, 2002–03

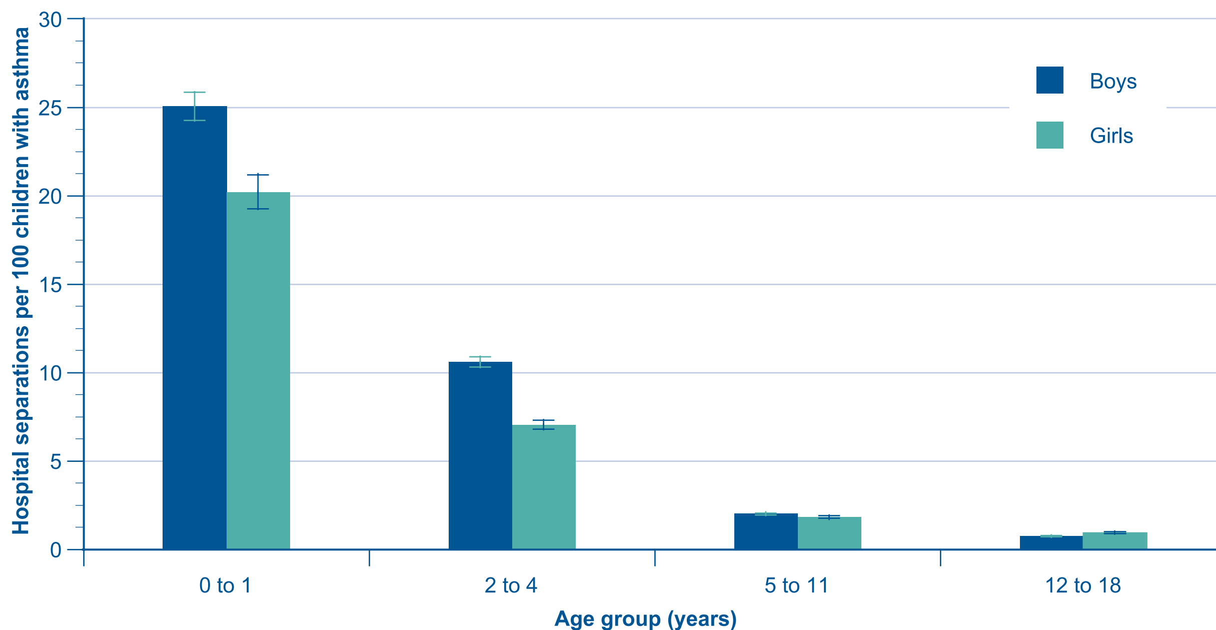


Note: Asthma classified according to ICD-10-AM codes J45 & J46.

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

The differences in hospitalisation rates for boys and girls are partially explained by differences in disease prevalence. As shown in Figure 2.2, a higher prevalence of current asthma was reported among boys than girls in the 2001 ABS National Health Survey. In Figure 2.16, hospitalisations for asthma have been expressed as a rate per 100 children with current asthma, as estimated by the 2001 ABS National Health Survey, for each age and sex group. Young children with asthma were much more likely to be admitted to hospital because of asthma than older children (Figure 2.16; see also Appendix 2, Table A2.3). Among infant boys there were an estimated 25 hospital separations per 100 boys with asthma in the 2002–03 financial year in this age group. This implies that most of the age-related differences in separation rates noted in Figure 2.15 were attributable to a higher case-admission rate (i.e. a higher likelihood of admission to hospital in those with asthma) in younger children. However, the gender differences are less marked when separation rates are adjusted for prevalence rates. Most of the higher rate of hospitalisation for asthma among pre-school-aged boys is attributable to the higher prevalence of asthma among boys in this age group. Nevertheless, there remains evidence of a higher case-admission rate in pre-school-aged boys. As noted previously, in relation to admission from EDs, high case-admission rates in young children may reflect the fact that many presentations with asthma in this age group are the first.

Figure 2.16
Hospital separations for asthma per 100 children with asthma, by age group and sex, children aged 0 to 18 years, Australia, 2002–03

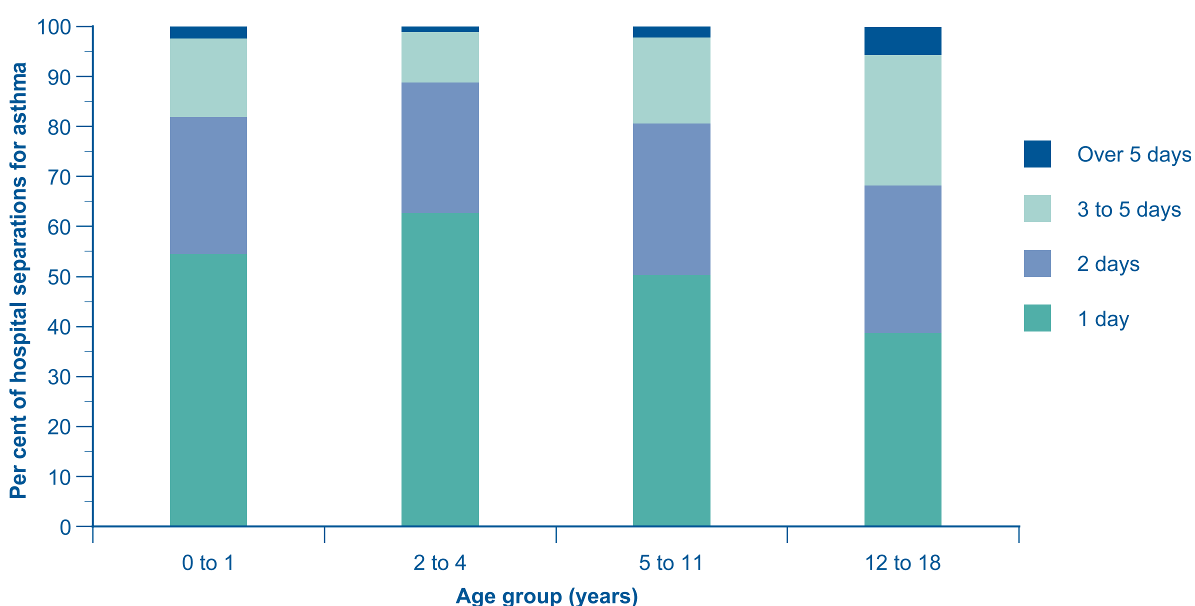


Note: Asthma classified according to ICD-10-AM codes J45 & J46.

Sources: AIHW National Hospital Morbidity Database; ABS National Health Survey 2001.

While children aged 12 to 18 years were less likely to be admitted to hospital, when they were admitted they tended to have longer hospital stays than children in younger age groups. Children aged 2 to 4 years had the highest rates of same day hospital episodes of care (Figure 2.17).

Figure 2.17
Relative frequency of length of stay for asthma, by age group, children aged 0 to 18 years, Australia, 2002–03



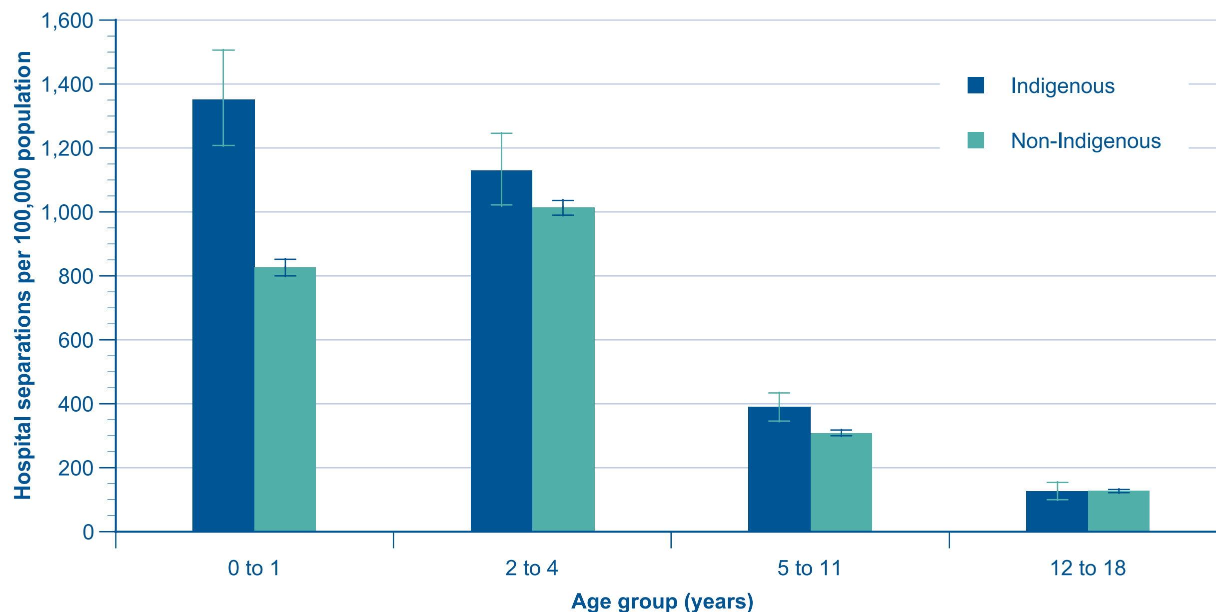
Note: Asthma classified according to ICD-10-AM codes J45 & J46.

Source: AIHW National Hospital Morbidity Database.

Aboriginal and Torres Strait Islander children

Indigenous children aged 0 to 1 year had a much higher rate of hospitalisation than other children, however, this difference was less evident in older children (Figure 2.18). It should be noted that hospitalisation rates for Aboriginal and Torres Strait Islander Children are likely to be an underestimate of the true hospitalisation rates due to under enumeration of Indigenous Australians in most states and territories. Only three jurisdictions are considered reliable; Northern Territory, Western Australia and South Australia.

Figure 2.18
Hospital separations for asthma per 100,000 population, by Indigenous status, children aged 0 to 18 years, Australia, 2002–03



Note: Asthma classified according to ICD-10-AM codes J45 & J46.

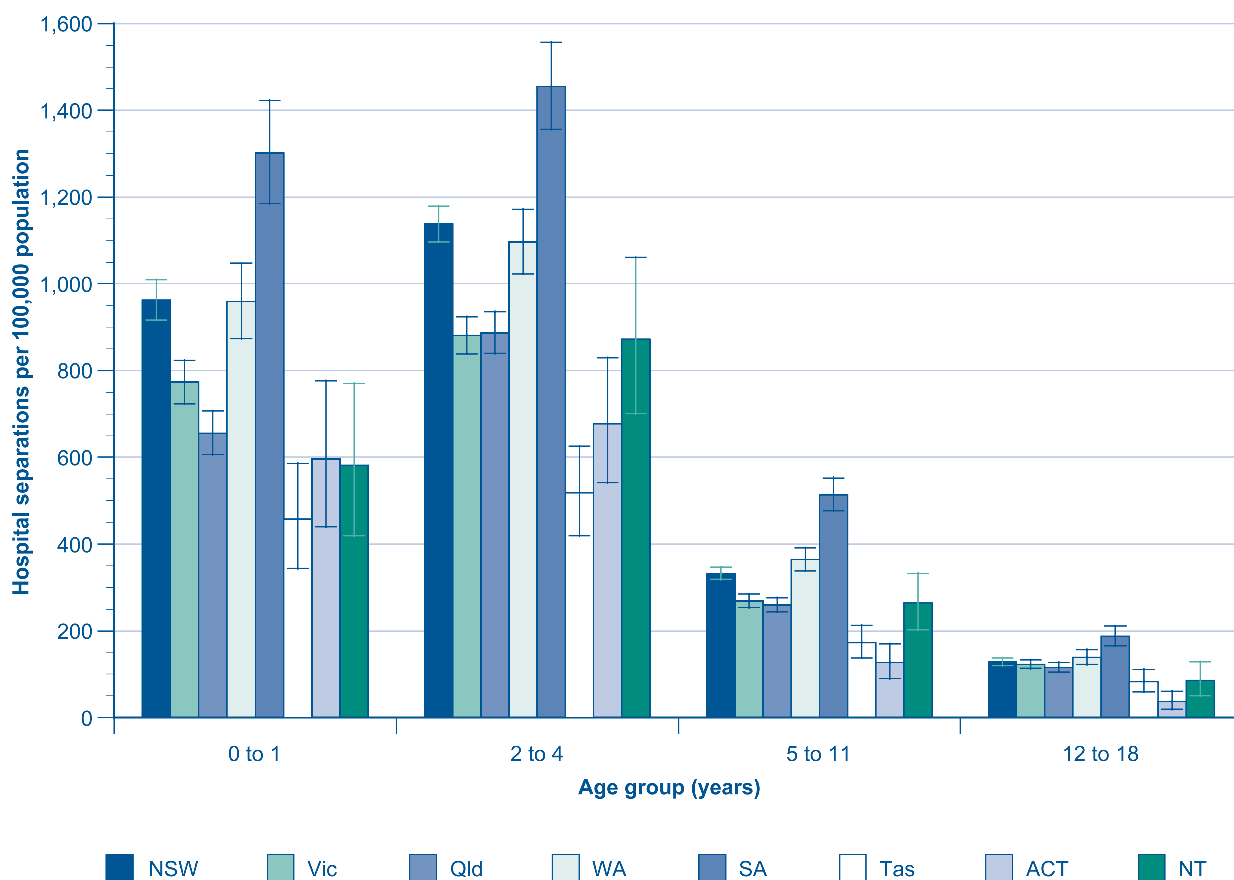
Sources: AIHW National Hospital Morbidity Database; Australian Bureau of Statistics.

States and territories

Rates of hospital separation for asthma were higher in South Australia and lower in Tasmania than in the other states and territories in all age groups. Rates were also lower in the Australian Capital Territory in school-aged children (Figure 2.19; see also Appendix 2, Table A2.4).

Figure 2.19

Hospital separations for asthma per 100,000 population, by age group, state and territory, children aged 0 to 18 years, Australia, 2002–03



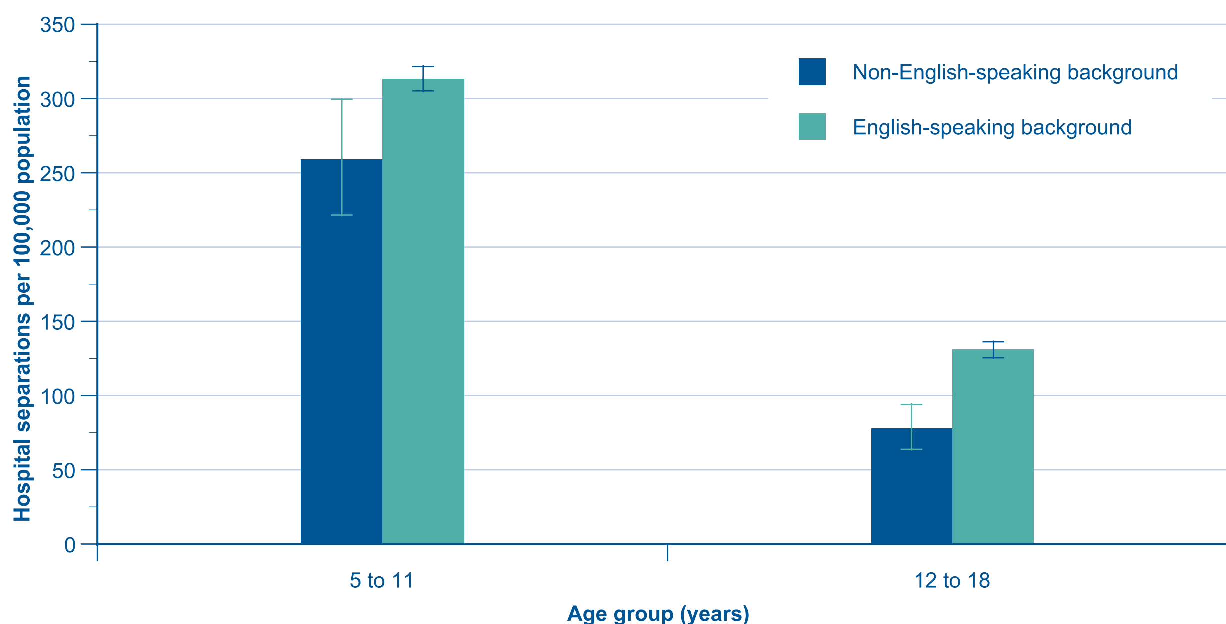
Note: Asthma classified according to ICD-10-AM codes J45 & J46.

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

Culturally and linguistically diverse background

Children from non-English-speaking backgrounds had slightly higher rates of hospitalisation than children from English-speaking backgrounds among those aged 2 to 4 years ($p=0.06$), and lower rates among those aged 5 years and over ($p<0.05$) (Figure 2.20).

Figure 2.20
Hospital separations for asthma per 100,000 population, by age group and English-speaking versus non-English-speaking background, children aged 5 to 18 years, Australia, 2002–03



Note: Asthma classified according to ICD-10-AM codes J45 & J46. For definition of non-English-speaking background and English-speaking background see Glossary.

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

2.3 Management of asthma in children

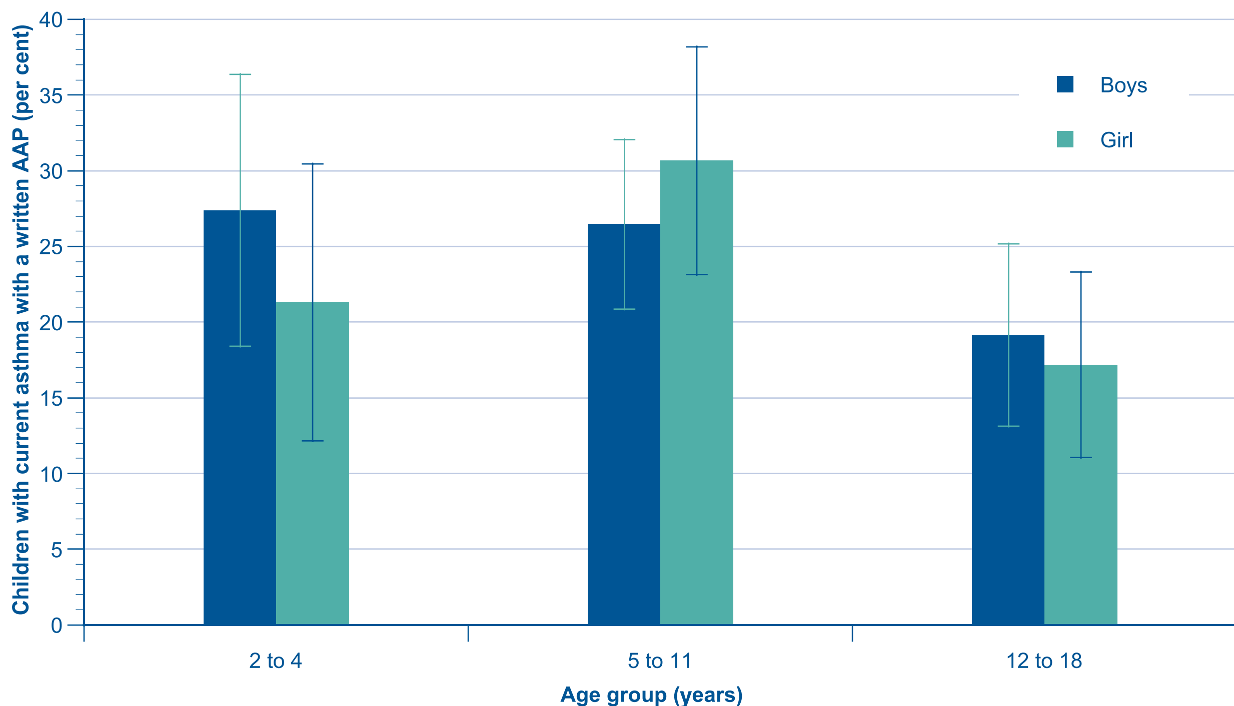
In this section, data from the Australian Bureau of Statistics 2001 National Health Survey have been analysed to investigate two aspects of the management of asthma in children: the possession of written asthma action plans and the use of asthma medications.

Written asthma action plans

Evidence from randomised controlled trials suggests that possession of written asthma action plans improves asthma outcomes, particularly if they have key components such as 2 to 4 action points and incorporate the use of inhaled and oral corticosteroid medication (Gibson & Powell 2004). A study conducted in Perth, Western Australia, found that the possession of a written asthma action plan was associated with a reduction in the number of ED visits or hospital admissions due to wheezing or asthma in schoolchildren aged 6 to 7 years (Palmer et al. 2004). Despite this, health survey data suggest that possession of written asthma action plans, while higher among children than adults, is quite low. According to data from the ABS 2001 National Health Survey, 23.6% (95% CI 20.8–26.4%) of children aged 0 to 18 years with current asthma possessed a written asthma action plan (National Health Survey 2001 (CURF)). In the Australian Capital Territory, 23.2% of new entrant primary school children aged 4 to 6 years with asthma reported that they had written asthma action plans (Glasgow et al. 2003). Rates from the New South Wales Health survey were higher, with 43.6% (95% CI 40.1–47.2%) of children aged 2 to 12 years with asthma reporting that they had written asthma action plans (Centre for Epidemiology and Research 2002).

Girls aged 5 to 11 years reported the highest rate of possession of written asthma action plans. However, this was only 30% of girls with asthma in that age group. Less than 1 in 5 of young people aged 12 to 18 years reported possession of a written asthma action plan (Figure 2.21).

Figure 2.21
Proportion with current asthma with a written asthma action plan (AAP), by age group and sex, children aged 2 to 18 years, Australia, 2001



Source: ABS National Health Survey 2001.

Medication use

In New South Wales, 59.4% of children aged 2 to 12 years with current asthma reported using a preventer medication (such as inhaled corticosteroids and cromones) in the last month. However, only 47.9% had used this medication every day or most days (Centre for Epidemiology and Research 2002). Among 6 to 7 year old children living in Melbourne in 2002, 14.1% of those with any recent wheeze and 40.9% of those with frequent wheeze were using inhaled corticosteroid as regular treatment (Robertson et al. 2004). These proportions had not changed significantly since a similar survey was conducted in 1993.

It is difficult to assess the importance of these findings without further information on the relation between treatment and the nature of asthma in individuals. Only a minority of children with asthma should be taking inhaled corticosteroids. Regular therapy with inhaled corticosteroids, leukotriene receptor antagonist or cromones is recommended for children with mild persistent asthma and children with frequent episodic asthma. Those with moderate or severe persistent asthma should be treated with inhaled corticosteroids.

Summary

Asthma is a common health complaint among Australian children. There is a substantial burden of health care utilisation attributable to asthma, especially in younger children. Fortunately, there is some evidence that this burden is decreasing slightly and, when hospital admission does occur, it is predominantly of pre-school-aged children and is almost always very brief. The marked week-to-week variation in rates of emergency department visits for asthma implies an important role for variable environmental triggers in causing disease exacerbations. High rates in winter and 2–4 weeks after return to school may be attributable to transmission of viral infections, which are the predominant cause of exacerbations of asthma in children. Potential strategies to prevent or control exacerbations, such as written asthma action plans and use of preventer medications, seem to be utilised by a minority of children with asthma. The potential benefit to be gained by optimising usage of these management strategies cannot be ascertained from the available data.