Key points

- There were 314 deaths attributed to asthma as the underlying cause in 2003. This represented 0.3% of all deaths in that year. In 2003, there was continuation of a declining trend in rates of death attributed to asthma since the most recent peak in 1989.
- Deaths due to asthma occur in all age groups. The risk of dying from asthma increases with age. However, although 62% of all deaths due to asthma occur in people aged 65 years and over, this is a smaller proportion than the proportion of all deaths that occur in this older age group (80%).
- The death rate due to asthma in Australia is moderately high, by international standards.
- People aged 35 to 64 years who live in outer regional and remote areas are more likely to die from asthma than people in cities and large towns.
- People living in more socioeconomically disadvantaged areas have a higher risk of dying from asthma than people who live in more advantaged areas.
- Older people with asthma have an increased risk of dying from asthma during winter.

Introduction

Death due to asthma is uncommon. The 314 deaths for which the underlying cause was asthma in 2003 represented only 0.3% of all deaths in that year. There is evidence that effective management of asthma can reduce the risk of death due to this disease (Suissa et al. 2000). Monitoring trends and differentials in rates of death due to asthma assists in the evaluation of existing measures to control the impact of asthma and, on occasions, has highlighted the need for investigation and management of rising death rates attributable to the disease (Beasley et al. 1990).

Interpreting trends and differences in rates of asthma mortality is complicated by a variable overlap with other diseases, particularly chronic obstructive pulmonary disease (COPD) (Guite & Burney 1996; Smythe et al. 1996). This is particularly a problem in older people in whom the attribution of death to asthma is less reliable than it is in younger people (Jones et al. 1999; Sears et al. 1986; Smythe et al. 1996). For the purposes of examining trends and differentials in asthma mortality, it is safest to limit comparisons to the 5 to 34 years age group, in whom the diagnosis of asthma as a cause of death is most reliable (Sears et al. 1986). However, as most deaths due to asthma occur in the elderly, it is also important to monitor older age groups.

Data specifying the underlying cause of death from the National Mortality Database held at the Australian Institute of Health and Welfare have been used to prepare this chapter. For a description of this dataset, refer to Appendix 1, Section A1.10.

4.1 Deaths due to asthma

Asthma as an underlying or associated cause of death

Asthma was the underlying cause of 314 deaths during 2003 (Table 4.1). The underlying cause is the disease considered to be most directly responsible for the death (AIHW 2004). However, there were an additional 934 deaths in which asthma was an associated cause of death, that is, asthma was listed on the death certificate but was not identified as the underlying cause of death.

There were only 45 deaths among persons aged 5 to 34 years in which asthma was regarded as an underlying or associated cause of death. In the majority of these instances (31), asthma was regarded as the underlying cause of death.

In the remainder of this chapter, analyses are limited to deaths in which asthma was listed as the underlying cause of death.

Table 4.1
Deaths where asthma was the underlying or an associated cause, Australia, 2003

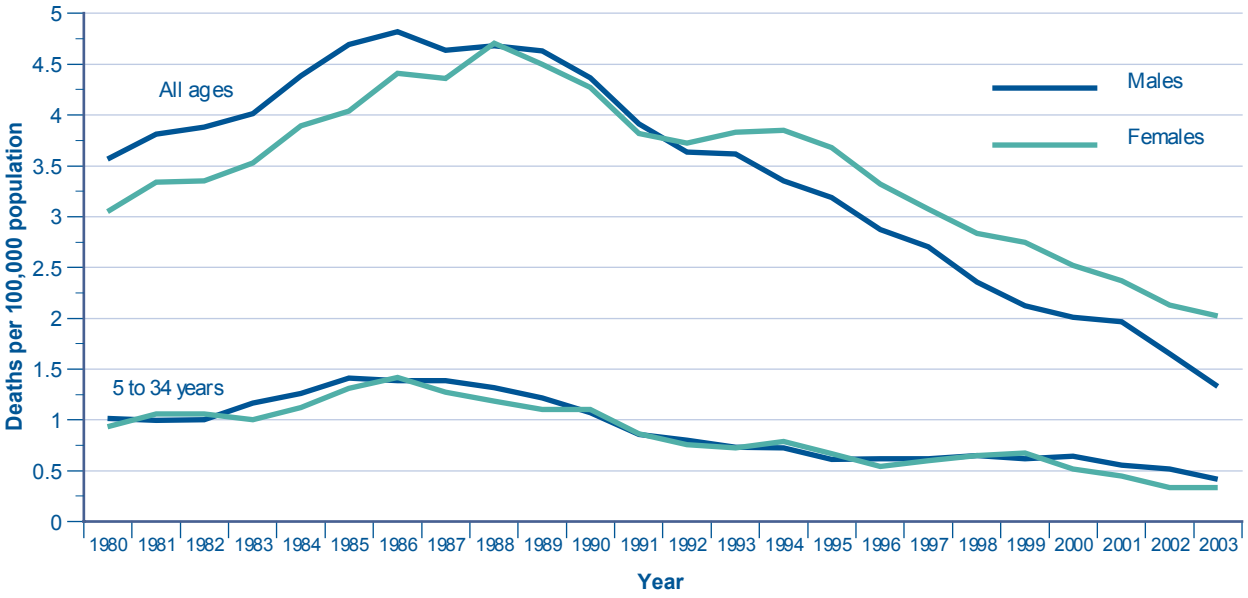
	Males		Females		Persons	
	Underlying cause	Underlying or associated cause	Underlying cause	Underlying or associated cause	Underlying cause	Underlying or associated cause
All persons						
Number of deaths	108	451	206	797	314	1,248
Deaths per 100,000 population (95% CI)	1.09 (0.91–1.33)	4.57 (4.16–5.01)	2.06 (1.79–2.37)	7.97 (7.43–8.55)	1.58 (1.41–1.77)	6.28 (5.94–6.64)
Age 5 to 34 years						
Number of deaths	19	26	12	19	31	45
Deaths per 100,000 population (95% CI)	0.45 (0.28–0.72)	0.62 (0.41–0.92)	0.29 (0.16–0.53)	0.46 (0.29–0.74)	0.37 (0.26–0.51)	0.54 (0.40–0.73)

Source: AIHW National Mortality Database.

Time trends in asthma deaths

There was a rise in deaths attributed to asthma during the early to mid-1980s, reaching a peak in 1989 with 736 deaths (4.4 per 100,000 population, 95% CI: 4.1–4.7), with a subsequent steady decline to 314 deaths (1.6 per 100,000 population, 95% CI: 1.4 to 1.8) in 2003 (Figure 4.1). This trend is confirmed, although less marked, among deaths that occurred in 5 to 34 year olds, in whom the attribution to asthma is more certain. In this latter group, the peak occurred slightly earlier, in 1986, with 117 deaths (1.5 per 100,000 population, 95% CI: 1.2–1.8).
In 2003 there were 31 deaths due to asthma in people aged 5 to 34 years (0.37 per 100,000 population, 95% CI: 0.26–0.51). After 1992, mortality rates were higher in females than males in the population as a whole. However, this gender difference was not observed in the 5 to 34 year old subgroup. See also Appendix 2, Table A2.11.

Figure 4.1
Deaths due to asthma per 100,000 population, three year moving average, by sex, all ages and people aged 5 to 34 years, Australia, 1980-2003



Note: Age standardised to the Australian population as at 30 June 2001. Asthma classified according to ICD-9 code 493 and ICD-10 codes J45 & J46. Deaths coded to ICD-9 (1979–1997) were converted to ICD-10 using conversion factors See Appendix 1, Section A1.10 for details.

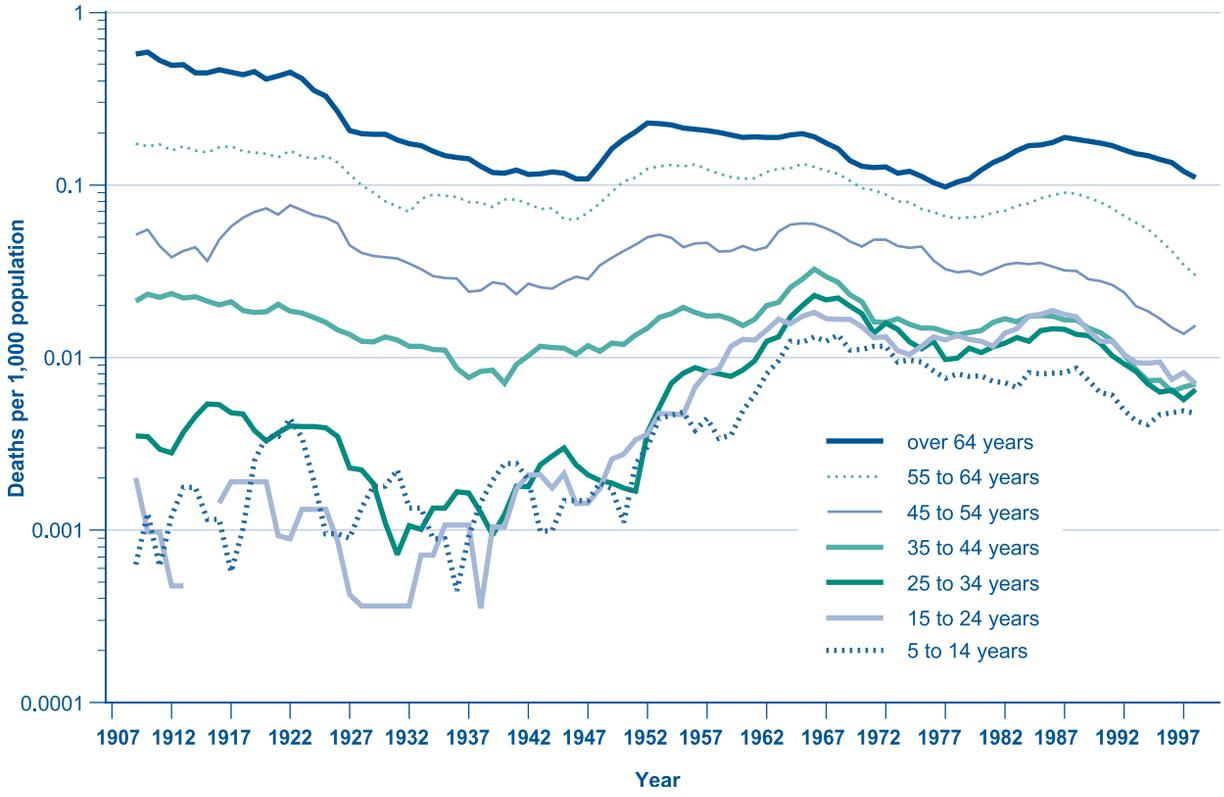
Sources: AIHW National Mortality Database; Australian Bureau of Statistics.

We cannot definitely attribute this reduction in death rates due to asthma to any specific cause. It is unlikely that the observed changes in death rates are explained solely by changes in diagnostic fashion, coding misclassification or other artefactual changes (see Appendix 1, Section A1.10). A fall in the prevalence of asthma, either due to reduced incidence or increased remissions, would be expected to cause a reduction in death rates. However, evidence about recent trends in the prevalence of asthma, while limited (see Chapter 3), provides little to support the view that this has declined substantially, particularly in adults. Hence, it is unlikely that the reduction in deaths due to asthma is caused by a reduction in the number of people who have asthma.

It seems most likely that at least part, if not all, of the reduction in deaths due to asthma is attributable to a reduction in the risk of dying among people who have asthma. Nationwide programs to improve asthma management, including the introduction of management guidelines, may have contributed to this successful outcome. However, other changes in treatment practices or environmental changes affecting the severity of asthma and the severity of exacerbations of asthma may also have played a role.

These relatively recent trends may be viewed in the context of long-term trends (Dobbin et al. 2004; Taylor et al. 1997). In the population as a whole there was an overall decline, over the 20th century, in the death rate attributed to asthma. Figure 4.2 and Figure 4.3 provide an overview of trends in recorded death rates for males and females by age for most of the 20th century. Asthma death rates for the 5 to 34 year age group were low in the early 20th century, and showed substantial fluctuations over time, most notably a marked increase from the mid-1940s to the mid-1960s, reaching a peak in approximately 1966. This was followed by a decreasing trend to a low in the late 1970s, then a more recent increase was recorded between 1979 and the late 1980s among those aged over 15 years, which then declined until the present.

Figure 4.2
Deaths due to asthma per 1,000 population, five year moving average, by year of death and age group, males aged 5 years and over, Australia, 1909–1998

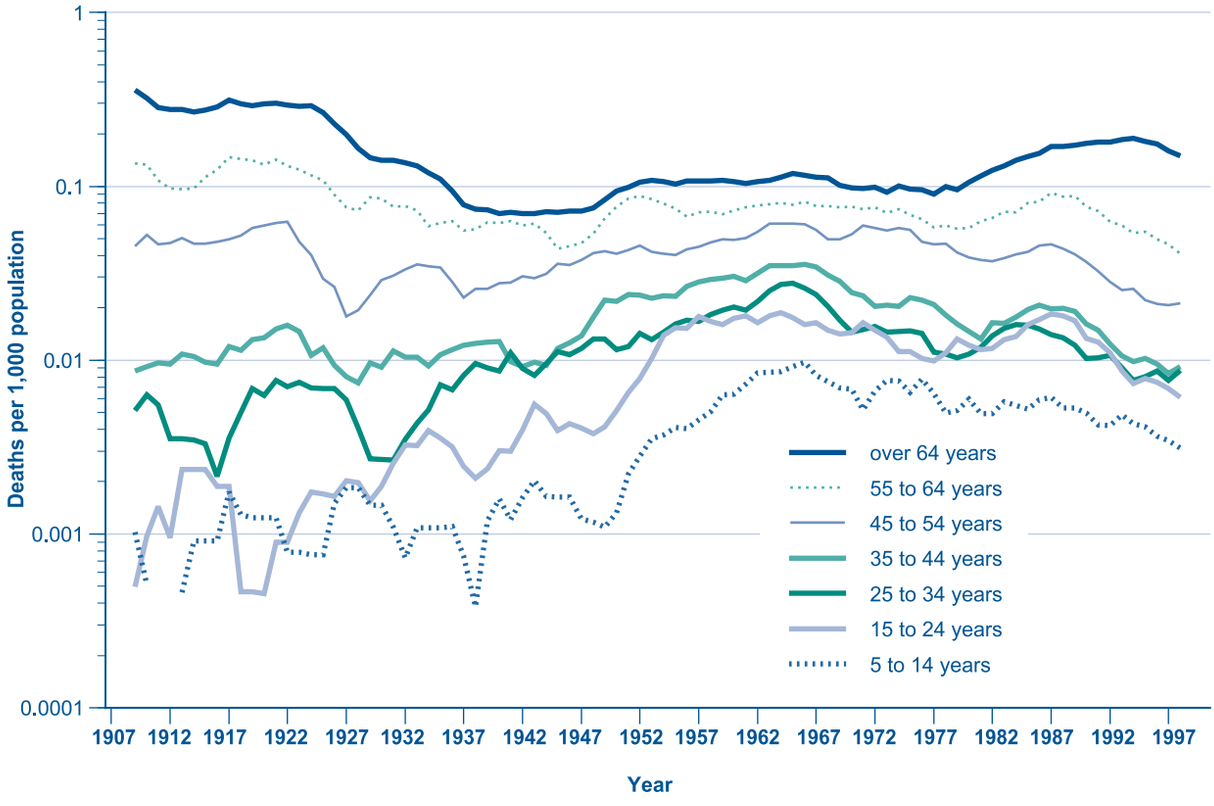


Note: y axis is on a logarithmic scale.

Source: Adapted from Dobbin et al. 2004. Reproduced with permission.

Figure 4.3

Deaths due to asthma per 1,000 population, five year moving average, by year of death and age group, females aged 5 years and over, Australia, 1909–1998



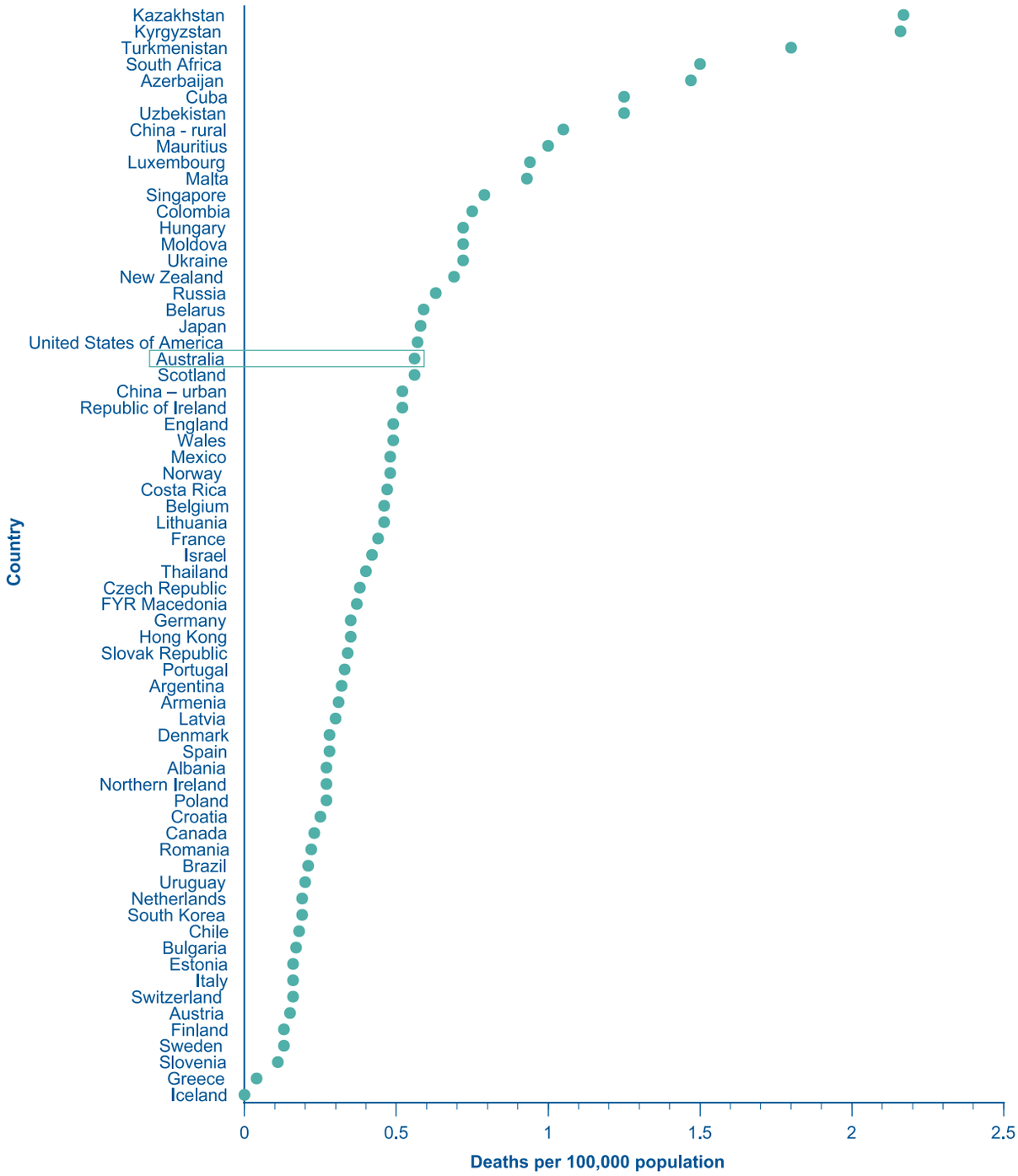
Note: y axis is on a logarithmic scale.

Source: Adapted from Dobbin et al. 2004. Reproduced with permission.

International comparisons

Figure 4.4 shows mortality rates for obstructive lung disease in people aged 5 to 34 years (GINA 2004). In this age group, most deaths classified in this way were due to asthma. The figure shows that the mortality rate due to asthma in Australia was moderately high, by international standards.

Figure 4.4
World ranking of asthma mortality per 100,000 population, people aged 5 to 34 years



Note: WHO country-specific mortality data for ICD codes 490 to 493 have been used. These codes incorporate asthma, emphysema, chronic bronchitis, and bronchitis not specified as acute or chronic. However in the 5 to 34 year age group, these mortality figures have been shown to be similar to the asthma mortality rates. For each country, the mean mortality rate from the two most recent years available was presented (mean 1996 to 1997); mortality data not reported if prior to 1992.

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

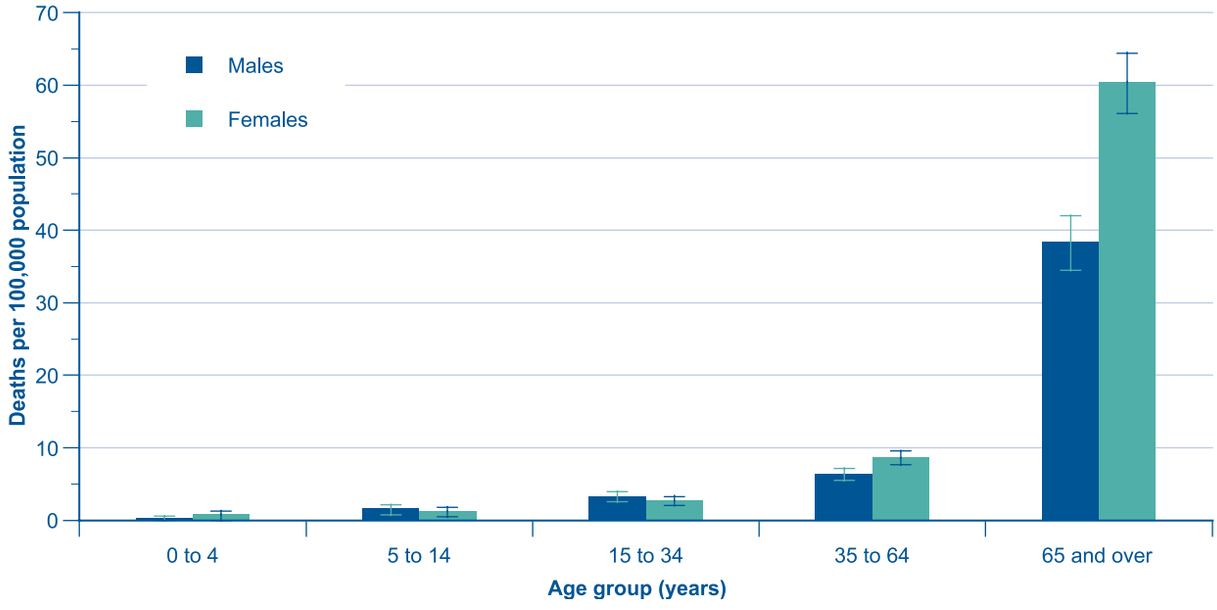
Differentials in asthma mortality

Factors affecting asthma mortality fall into four categories—underlying disease severity (Jalaludin et al. 1999), management and care (Abramson et al. 2001), health behaviours and compliance (Sturdy et al. 2002), and psychological and socioeconomic factors (Castro et al. 2001; Sturdy et al. 2002). Data for many of these characteristics are not available from routine surveys and require specific studies to investigate their contribution to asthma-related mortality. However, data are available on age and sex, geographical area, socioeconomic disadvantage and country of birth, which can be analysed to examine differences across these groups to assist in identifying opportunities for prevention.

Age and sex

Asthma mortality increased substantially with age in both males and females (Figure 4.5). This reflects a similar age trend in all-cause deaths (Dunn et al. 2002). Sixty-one per cent of all deaths attributed to asthma between 1999 and 2003 occurred in people aged 65 years and over. Among people aged 35 years and over, the risk of death due to asthma was significantly higher in females than males, especially for those aged 65 years and over. This is consistent with the higher prevalence of asthma reported in women than men (see Figure 3.4). However, this gender differential occurred predominantly in the age group in which misclassification between COPD and asthma is most problematic. Hence, the extent to which the higher death rate due to asthma among older women compared with older men was due to gender differences in diagnosis and labelling, as opposed to actual gender differences in prevalence and case-fatality rates, remains unknown.

Figure 4.5
Deaths due to asthma per 100,000 population, by age group and sex, Australia, 1999–2003

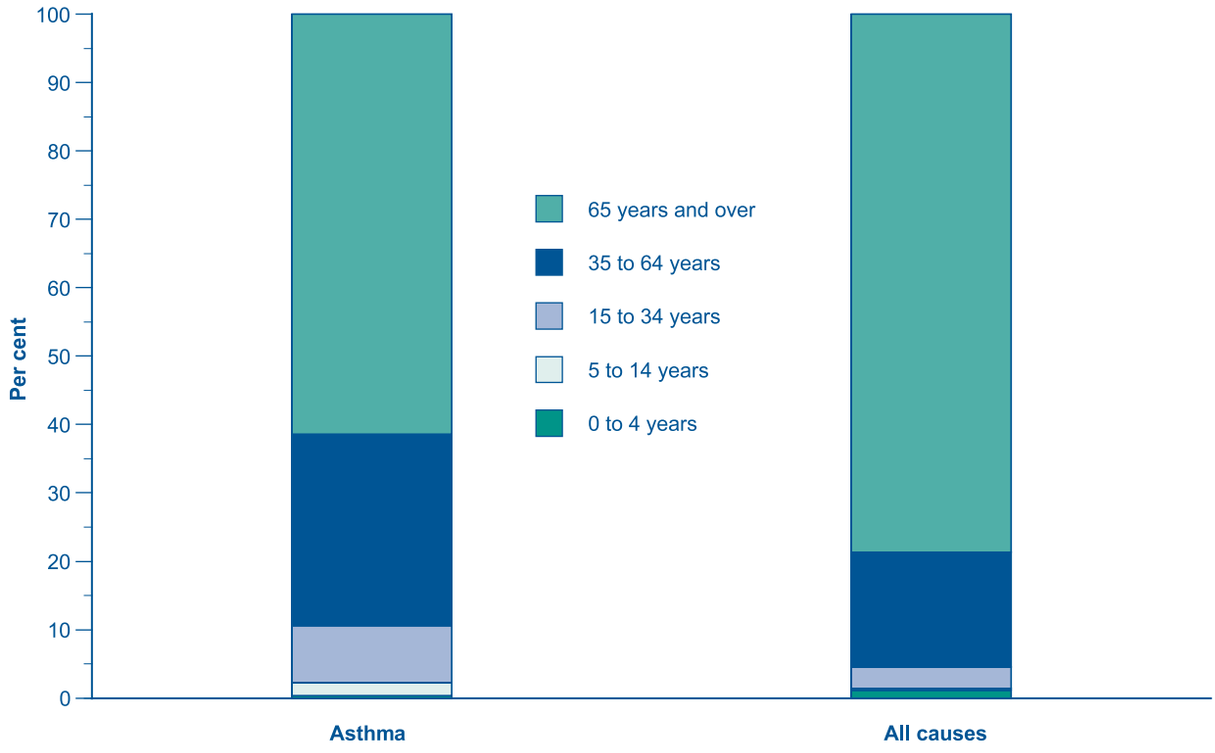


Note: Age-specific death rates for aggregated data from 1999 to 2003. Asthma classified according to ICD-10 codes J45 & J46.

Sources: AIHW National Mortality Database; Australian Bureau of Statistics.

During the period 1999–2003, most deaths due to asthma occurred in persons aged 65 years and over. However, the proportion of asthma-related deaths that occurred at this age was smaller than the proportion of deaths due to all causes in this age group (Figure 4.6). In contrast, deaths among people aged 5 to 64 years represented a larger proportion of asthma deaths than all-causes deaths (38% and 20%, respectively).

Figure 4.6
Age distribution for asthma and all cause mortality, Australia, 1999–2003



Note: Age-specific death rates calculated for aggregated data from 1999 to 2003. Asthma classified according to ICD-10 codes J45 & J46.

Sources: AIHW National Mortality Database; Australian Bureau of Statistics.

States and territories

Death rates due to asthma were slightly lower than average in Western Australia (Figure 4.7). However, the small numbers of deaths in the states and territories with smaller populations mean that the differences have to be interpreted with caution.

Figure 4.7
Deaths due to asthma per 100,000 population, by state and territory, Australia, 1999–2003

Sources: AIHW National Mortality Database; Australian Bureau of Statistics.

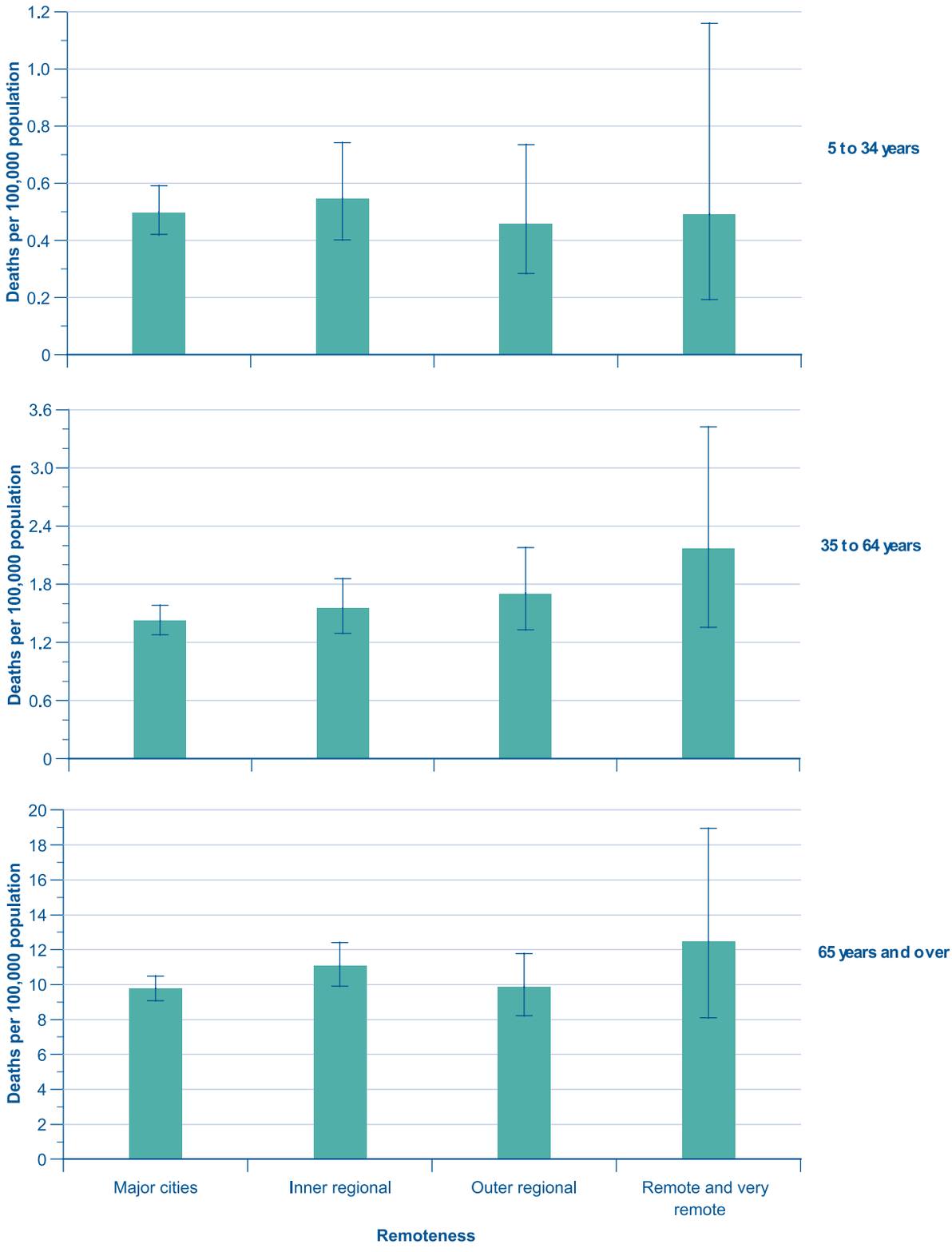
Urban, rural and remote areas

Death rates for asthma were slightly higher in outer regional and remote areas than in major cities among persons aged 35 to 64 years (p=0.02; Figure 4.8). In this age group, the death rate due to asthma among persons living in remote and very remote areas was 1.58 times higher than the rate among persons living in major cities (95% CI 1.00 to 2.48 times). This trend was independent of related variation in socioeconomic status. There was no significant relation between death rates due to asthma and level of remoteness among persons aged less than 35 years or 65 years and over (see Appendix 1, Section A1.3 for method of analysis). The finding of a higher death rate due to asthma in outer regional and remote areas among adults aged 35 to 64 years is consistent with observations on regional variation in all-cause mortality rates and with previous studies showing increased asthma mortality in rural areas (Castro et al. 2001; Dunn et al. 2002; Jones & Bentham 1997; Tong & Drake 1999).

It is possible that part of this increased risk in remote areas can be attributed to the distance people are located in relation to acute medical facilities and, hence, their access to prompt treatment for severe attacks. Other plausible explanations include differences in exposures influencing disease severity and exacerbation risk, and differences in access to effective long-term asthma management.

Figure 4.8

Deaths due to asthma per 100,000 population, by remoteness, people aged 5 years and over, Australia, 1999–2003



Notes

1. Death rates for aggregated data from 1999 to 2003.
2. Asthma classified according to ICD-10 codes J45 and J46.
3. Remoteness classified according to the Australian Standard Geographic Classification (ASGC) categories of remoteness.
4. Y axis has different scale for each age group.

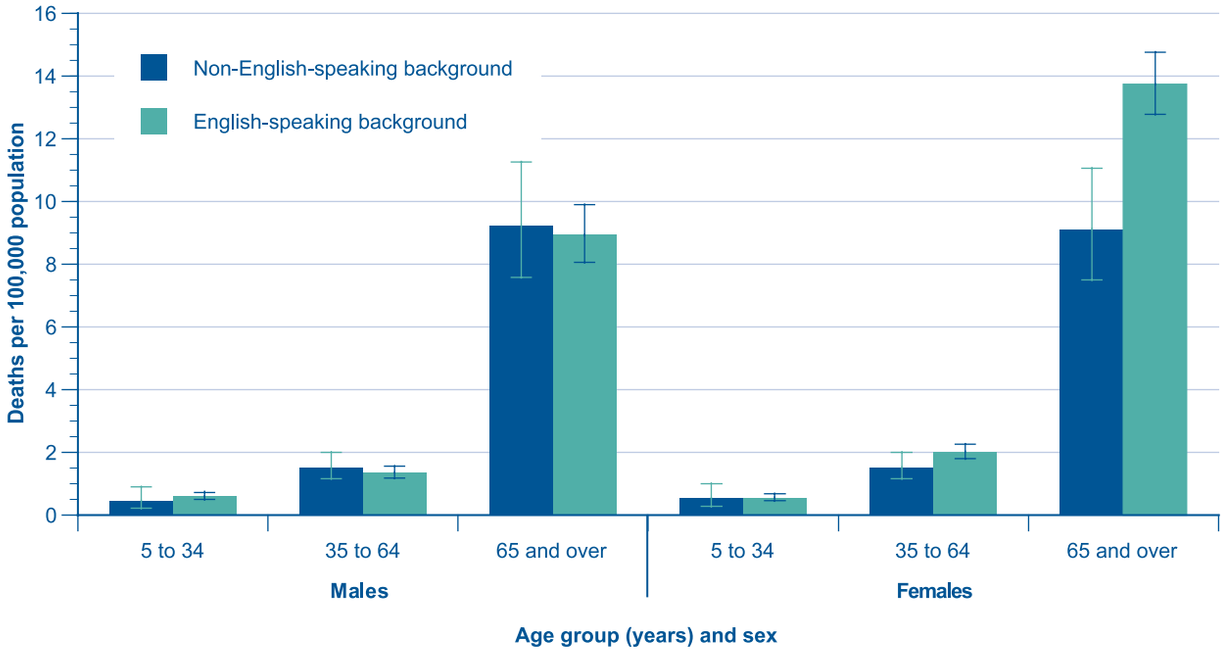
Sources: AIHW National Mortality Database; Australian Bureau of Statistics.

Culturally and linguistically diverse background

Older women from non-English-speaking backgrounds had lower death rates due to asthma than older women from English-speaking backgrounds (Figure 4.9). This difference in death rates is attributable to the lower prevalence of asthma among older, non-English-speaking women (see Figure 3.9). The case-fatality rate due to asthma, in all age groups, is similar in people of English-speaking and non-English-speaking backgrounds (Figure 4.10).

Figure 4.9

Deaths due to asthma per 100,000 population, by sex and English-speaking versus non-English-speaking background, people aged 5 years and over, Australia, 1999–2003

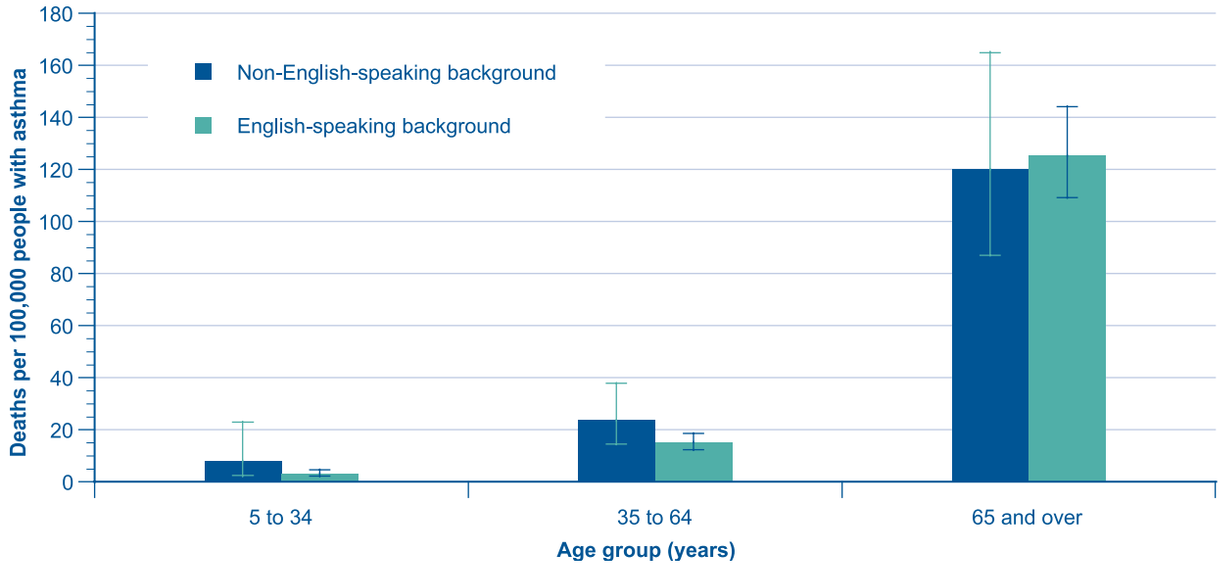


Notes: Death rates for aggregated data from 1999 to 2003. Asthma classified according to ICD-10 codes J45 & J46. For definition of non-English-speaking background and English-speaking background see Glossary.

Sources: AIHW National Mortality Database; Australian Bureau of Statistics.

Figure 4.10

Deaths due to asthma per 100,000 people with asthma, by English-speaking versus non-English-speaking background, people aged 5 years and over, Australia, 1999–2003



Notes: Death rates for aggregated data from 1999 to 2003. Asthma classified according to ICD-10 codes J45 & J46. For definition of non-English-speaking background and English-speaking background see Glossary.

Sources: AIHW National Mortality Database; National Health Survey, Australian Bureau of Statistics.

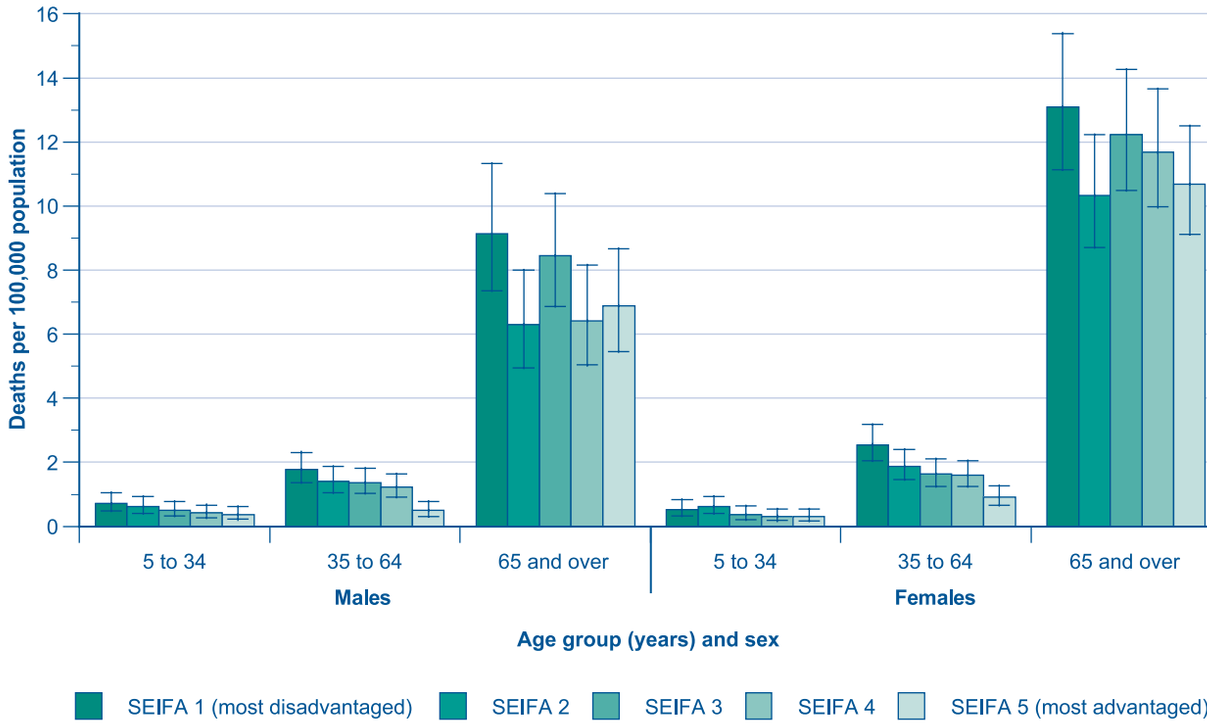
Socioeconomic disadvantage

Socioeconomic status reflects a complex interplay of factors such as ethnicity, education, income, occupation and geographic location. Overseas studies have found an increased risk of death from asthma related to race (Castro et al. 2001; Grant et al. 2000), lower socioeconomic status (Castro et al. 2001; Grant et al. 2000), and lower income and education (Grant et al. 2000). In Australia, all-cause mortality is correlated with the degree of socioeconomic disadvantage, particularly among men (Dunn et al. 2002).

The relation between levels of relative socioeconomic disadvantage and mortality risk were assessed using a locality-based index (SEIFA, see Appendix 1, Section A1.12). There was a significant relation between increasing levels of socioeconomic disadvantage and higher death rates for asthma in those localities among persons aged 5 to 64 years. This trend was not significant among persons aged 65 years and over (Figure 4.11). This trend was strongest in the 35 to 64 year age group, in which the death rate due to asthma in the two most disadvantaged quintiles was 3.2 times higher in males and 2.4 times higher in females than the death rate in the most advantaged quintile (95% CI 1.98 to 5.14 times in males, 1.67 to 3.40 times in females). This association was independent of related variation in the degree of remoteness.

Figure 4.11

Deaths due to asthma per 100,000 population, by age group, sex and socioeconomic status, people aged 5 years and over, Australia, 1999–2003



Note: Death rates for aggregated data from 1999 to 2003. Asthma classified according to ICD-10 codes J45 & J46.

Source: AIHW National Mortality Database; Australian Bureau of Statistics.

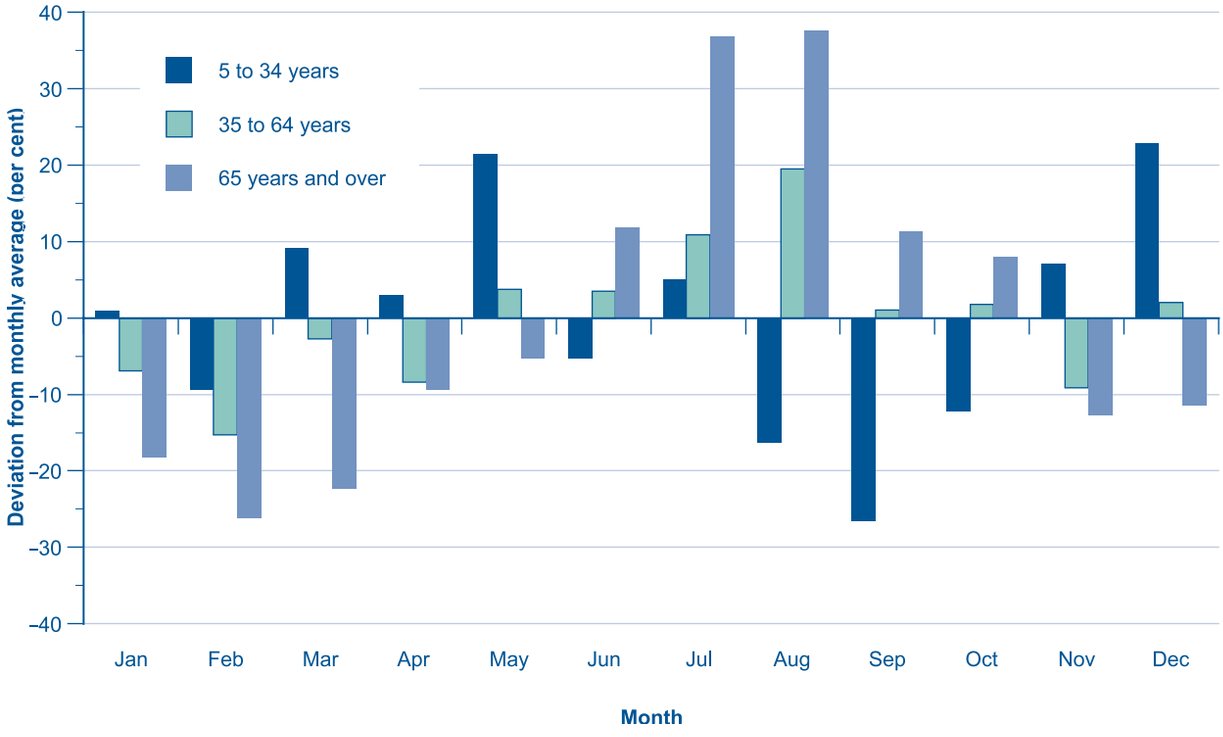
Seasonal variation in mortality risk

Previous studies have shown that seasonal variation in risk of death due to asthma varies between age groups (Marks & Burney 1997; Weiss 1990). These studies from the USA and England & Wales have shown higher rates during winter months in the older age groups. Data for Australia (Figure 4.12) reflected a similar pattern in people aged 65 years and over. This seasonal pattern presumably reflects the impact of the winter rise in influenza and pneumonia. A similar winter predominance is observed for all-cause mortality in this age group (AIHW: De Looper 2002).

Overall, there was no winter predominance in the pattern of asthma mortality among those aged 5 to 34 years and 35 to 64 years. There was no clear seasonal trend in these age groups. This is in contrast to the USA (Weiss 1990) and England & Wales (Marks & Burney 1997) where asthma mortality in 5 to 34 year olds peaked in late summer.

In Australia, all-cause deaths are more common in spring in younger people (AIHW: De Looper 2002), although the degree of seasonal predominance in this age group is less than in older age groups.

Figure 4.12
Average monthly deviation from average number of deaths due to asthma, by broad age group, Australia, 1979–2003



Note: Asthma classified according to ICD-9 code 493, 1979 to 1996 and ICD-10 codes J45 and J46, 1997 to 2003. For each month, the deviation from that year's monthly average number of deaths for the relevant age group was calculated. The mean monthly deviation was then calculated over the observed 24 years.

Source: AIHW National Mortality Database.

Summary

We have shown that Australian mortality rates due to asthma have been steadily falling for more than a decade and that this has continued an overall decline that occurred throughout the 20th century. However, the risk remains high compared with other nations.

Mortality rates for asthma increased markedly with age and, generally speaking, people living in remote areas and those living in socioeconomically disadvantaged areas had higher mortality rates. These trends mirror similar trends observed for all-cause mortality; however, a greater proportion of deaths due to asthma were among people aged 5 to 64 years than of deaths due to all causes. Among people aged 65 years and over, mortality was more commonly attributed to asthma in females than in males. How far this represents diagnostic or labelling preferences, as opposed to real differences in risk, is not known. There was an increased risk of death due to asthma during winter in older people but there was no such pattern among children and young adults.