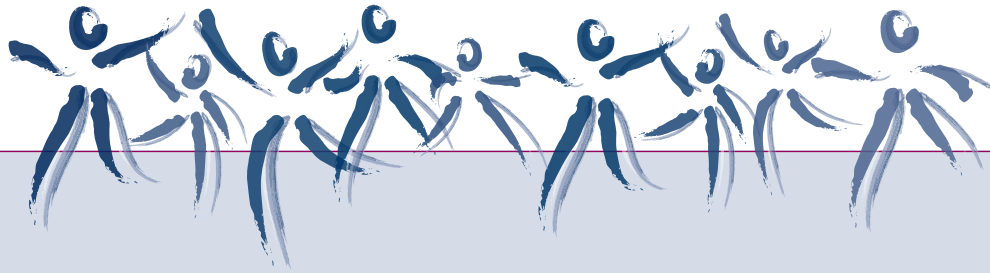
6. Management



Key points

Asthma action plans

- The majority of people with asthma do not have a written asthma action plan, despite national guidelines recommending their use for the management of asthma for nearly 20 years.
- Young men and those living in socioeconomically disadvantaged areas are less likely to possess a written asthma action plan than others.

Medications used to treat asthma

- Drug therapy is the mainstay of asthma management.
- The use of almost all medications for asthma increases with age.
- The pattern of use of asthma therapies is quite different in children compared with adults.
- Use of inhaled corticosteroids is less common in children than in adults with asthma.
- Most children using inhaled corticosteroids are only dispensed one prescription per year.
- Children are more commonly prescribed the less potent formulations of inhaled corticosteroids while prescriptions for combination formulations containing long-acting beta-agonists are relatively uncommon in children.
- Among adults, the majority of inhaled corticosteroids are prescribed in combination with long-acting beta-agonists.
- There has been a recent reduction in prescribing the most potent formulations of inhaled corticosteroids.
- Intermittent use of inhaled corticosteroids is the most common mode of use in adults and children, despite treatment guidelines recommending regular use in people with persistent asthma.

Introduction

This chapter will review data relating to the use of effective asthma management strategies and their implementation in the Australian population. The two elements of asthma management that are discussed here are the possession of *written asthma action plans* and regular *use of medications* that control the disease and prevent exacerbations. Based on evidence accumulated in the last two decades, these represent key elements in the effective management of the condition.

6.1 Written asthma action plans

A written asthma action plan enables people with asthma to recognise deterioration in their condition promptly and respond appropriately, by integrating changes in symptoms or peak expiratory flow measurements with written instructions to adjust medication. The aim of an asthma action plan is to help the process of early intervention and to prevent or reduce the severity of acute asthma episodes. It has been found that use of a written asthma action plan reduces the need for extra medication, urgent visits to doctors, hospitalisations and deaths as well as improves lung function (Abramson et al. 2001; Gibson et al. 2004). Written asthma action plans have formed part of national guidelines for the management of asthma since 1989 (Woolcock et al. 1989) and have been promoted in public education campaigns by the National Asthma Council Australia (NAC 2006).

6.1.1 Possession of written asthma action plans

Less than one-quarter (22.5%) of Australians with asthma reported possessing a written asthma action plan in 2004–05 (Table 6.1). Of those who possessed a written asthma action plan in 2004–05, more than 90% were obtained from doctors and about three-quarters were considered 'standard', that is, similar to that recommended by the National Asthma Council Australia.

Recent estimates of the possession of asthma action plans from state health surveys vary. Relatively high rates were reported in New South Wales in 2005 and 2006 (46% and 38%, respectively) and Victoria in 2006 (54%) (Table 6.1). Estimates of possession from among adults with asthma in Queensland and South Australia were closer to the national average, at around 18.5–20.8%. Some of the apparent variation between surveys (and, hence, states) may be due to differences in the way asthma action plans were described to participants.

Table 6.1: Possession of asthma action plans by people with current asthma, 2001–2006

Place	Age (people with current asthma)	Year	Rate (%)	95% CI
Possession of a written asthma action plan				
Australia (1)	All ages (n = 2,782)	2004–05	22.5	20.6–24.3
Australia (1)	15 years and over (n = 2,202)	2004–05	18.8	16.8–20.8
Possession of a written asthma management plan from doctor on how to treat your asthma				
New South Wales (2)	16 years and over (n = 886)	2006	37.6	33.2–42.0
New South Wales (3)	16 years and over (n = 1,282)	2005	45.9	42.1–49.7
Possession of a written asthma action plan from doctor				
Victoria (4)		2006	53.7	48.6–58.8
Possession of written instructions from their doctor about how to manage worsening asthma				
Australia (5)	16 years and over (n = 1,006)	2003–04	21.6	19.1–24.1
As far as you are aware, do you have a treatment plan for your asthma?				
Queensland (6)	18 years and over (n = 382)	2006	19.4	15.5–24.0
Possession of an asthma action plan (written instructions on what to do if asthma is out of control)				
South Australia (7)	15 years and over	2003	20.8	n.a.
South Australia (7)	15 years and over	2002	18.5	n.a.
CHILDREN				
Possession of a written asthma management plan from a doctor on how to treat asthma				
New South Wales (8)	2–12 years (n = 1,296)	2001	43.6	40.1–47.2
Proportion who have written asthma action plans				
Victoria (9)	1 to under 13 years	2006	62.6	58.0–67.2

n.a. not available

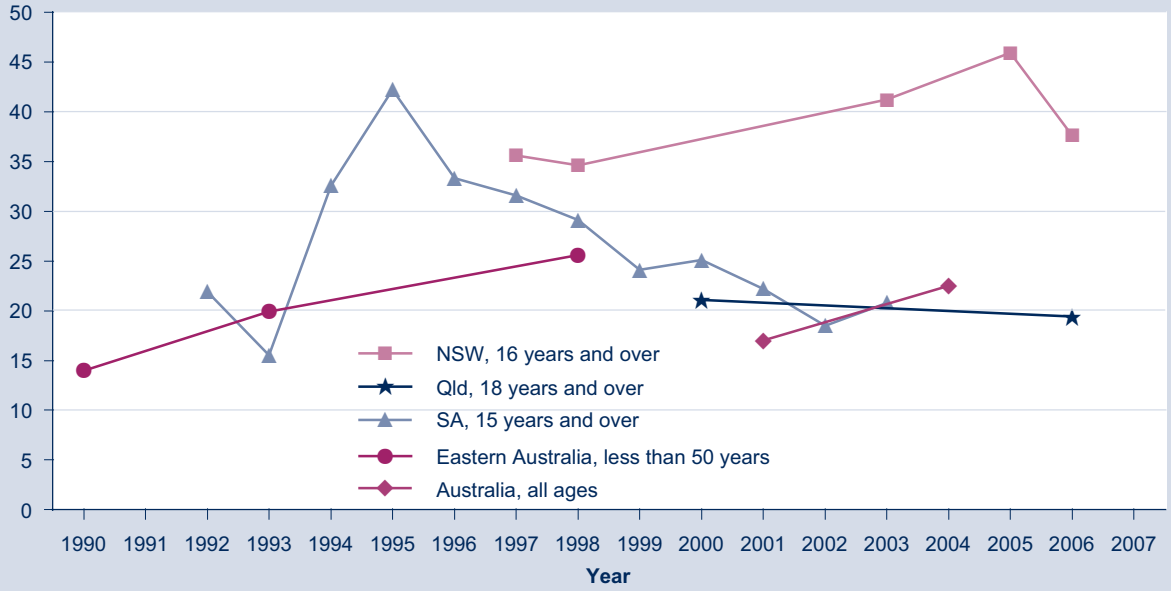
Notes

1. Only people with current asthma (n) were asked about the possession of asthma action plans. The definitions for current asthma were: New South Wales Survey, Victorian Child Health and Wellbeing Survey and Queensland Chronic Disease Survey—doctor diagnosis of asthma plus treatment or symptoms of asthma in the last 12 months; Victorian Population Health Survey—symptoms of asthma in the last 12 months; National Health Survey and South Australian Omnibus—'yes' to the question 'Have you ever been diagnosed by a doctor with asthma?' and 'yes' to 'Do you still have/get asthma?'
2. While the currently accepted term for written instructions on how to manage one's asthma is an 'asthma action plan', it was previously known as an 'asthma management plan'. As a result, the questions used in some surveys reported in the table refer to an 'asthma management plan' while others refer to an 'asthma action plan'.

Sources: (1) Australian Centre for Asthma Monitoring (ACAM) analysis of Australian Bureau of Statistics (ABS) National Health Survey 2004–05 confidentialised unit record files; (2) 2006 Report on Adult Health from the New South Wales Population Health Survey (Centre for Epidemiology and Research 2007); (3) 2005 Report on Adult Health from the New South Wales Population Health Survey (Centre for Epidemiology and Research 2006); (4) Department of Human Services, Victorian Population Health Survey 2006; (5) Australian Asthma Survey (Marks et al. 2007); (6) Queensland Chronic Disease Survey; (7) South Australian Health Omnibus Survey (Wilson et al. 2006); (8) New South Wales Child Health Survey (Centre for Epidemiology and Research 2002); (9) Victorian Child Health and Wellbeing Survey 2006.

6.1.2 Time trends

There was a rise in the proportion of adults with asthma who reported they had asthma action plans between 1992 and 1995 (Figure 6.1). Since that time, the rate of ownership declined in the South Australian series. More recent survey results show an increase in the possession of asthma action plans in New South Wales and nationally. In 2005, almost half (46%) of people aged 16 years and over with asthma in New South Wales reported possessing an asthma action plan. Data from the NHS (all ages) show that, overall, significantly more people with asthma had a written asthma action plan in 2004–05 (22.5%) than in 2001 (17%).



Notes: Only people with current asthma were asked about the possession of asthma action plans. Definitions used to identify asthma action plans are—Australia and South Australia: current asthma = 'yes' to the question 'Have you ever been diagnosed by a doctor with asthma?' and 'yes' to 'Do you still have asthma?' then asked 'Do you have an asthma action plan (written instructions of what to do if your asthma is out of control)?'; New South Wales: current asthma = doctor diagnosis of asthma plus treatment or symptoms of asthma in the last 12 months, 'Do you have a written asthma action plan?'; eastern Australia: current asthma = self-reported diagnosis of asthma, 'Do you have a written asthma action plan?'.

Sources: Australian Centre for Asthma Monitoring (ACAM) analysis of Australian Bureau of Statistics (ABS) National Health Survey confidentialised unit record files, Queensland Chronic Disease Survey, New South Wales Population Health Survey, South Australian Omnibus, Comino et al. 1996; Gibson et al. 2000; Public Health Division 2001; Wilson et al. 2002; Wilson et al. 2003.

Figure 6.1: Possession of asthma action plans by adults with current asthma, Australia, 1990–2007

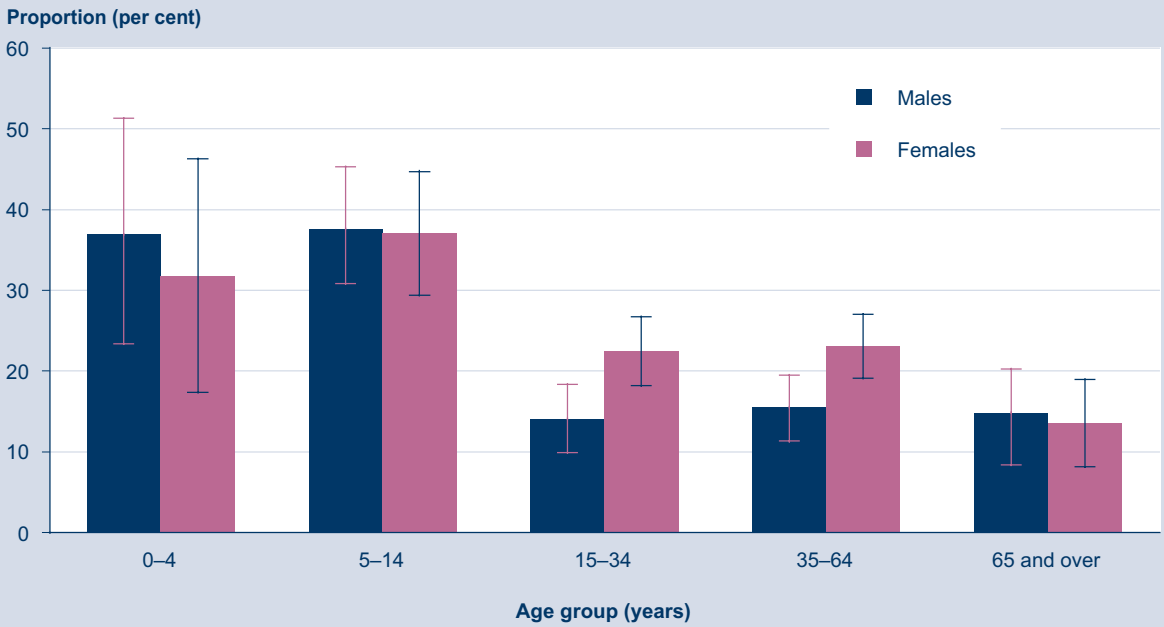
6.1.3 Population subgroups

Age and sex

Children with asthma who were aged 5–14 years were significantly more likely to have a written asthma action plan than people aged 15 years and over (Figure 6.2). Among those aged 15–64 years, more females than males had a written asthma action plan ($p < 0.0001$).

States and territories

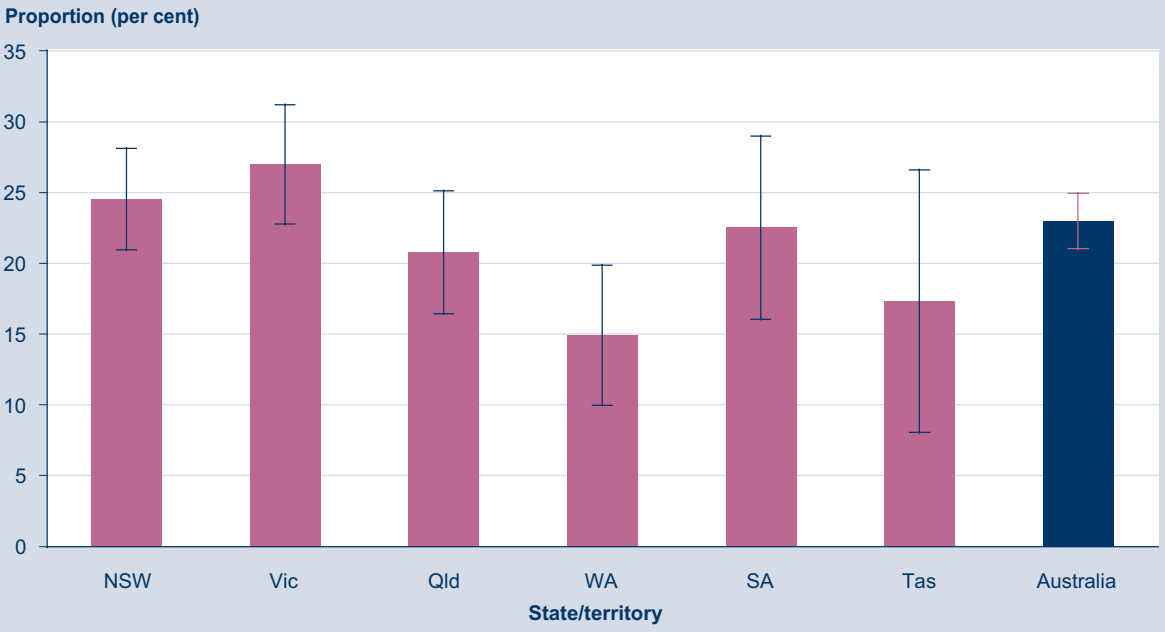
In 2004–05, the proportion of people with current asthma who reported having a written asthma action plan was relatively low in Western Australia (15%) compared with the national average (22.5%) (Figure 6.3).



Notes: Age-standardised to the Australian population as at June 2001.

Source: Australian Centre for Asthma Monitoring (ACAM) analysis of Australian Bureau of Statistics (ABS) National Health Survey 2004–05 confidentialised unit record files.

Figure 6.2: Possession of a written asthma action plan by people with asthma, by age and sex, 2004–05



Notes: Age-standardised to the Australian population as at June 2001. The Northern Territory and the Australian Capital Territory are excluded because numbers were too small to produce reliable estimates.

Source: Australian Centre for Asthma Monitoring (ACAM) analysis of Australian Bureau of Statistics (ABS) National Health Survey 2004–05 confidentialised unit record files.

Figure 6.3: Possession of a written asthma action plan by people with current asthma, by state and territory, all ages, 2004–05

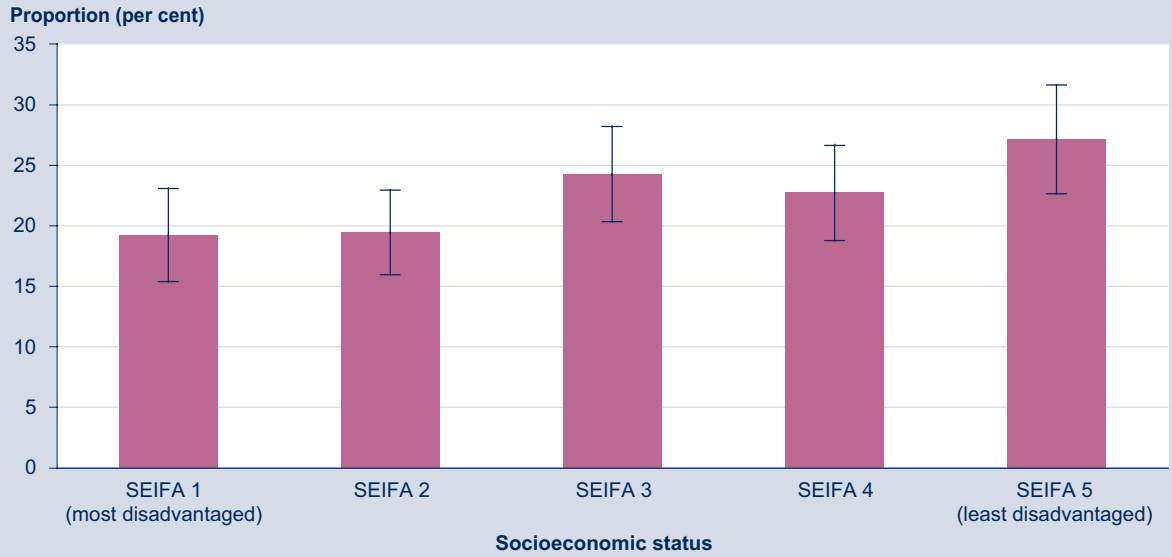
Urban, rural and remote areas

Data from the two most recent National Health Surveys conducted in 2001 and 2004–05 show that, overall, possession of a written asthma action plan did not differ significantly between those living in major cities, inner regional areas or other areas of Australia (data not shown). In New South Wales in 2006, there was also no difference in possession of asthma action plans among people living in urban versus rural areas (Centre for Epidemiology and Research 2007).

Socioeconomic disadvantage

Australian data show a lower rate of possession of written asthma action plans among people with asthma living in localities with greater levels of socioeconomic disadvantage. In 2004–05, the proportion of people with current asthma who reported having a written asthma action plan was highest among those living in the most advantaged localities of Australia (27%) and lowest for those living in the most disadvantaged localities (19%) (Figure 6.4). There was a significant overall trend of increasing rates of possession of plans with higher levels of socioeconomic advantage (p trend = 0.002).

In contrast, data from the New South Wales Health Survey Program show no evidence of significant variation according to socioeconomic disadvantage of locality (Centre for Epidemiology and Research 2007). A study of children in Victoria also found no evidence of such a trend (Vuillermin et al. 2007), with children residing in disadvantaged areas just as likely to have been provided with a written asthma plan than children residing in less disadvantaged areas (p = 0.81).



Notes: Age-standardised to the Australian population as at June 2001. SEIFA = Socio-economic indexes for Areas

Source: Australian Centre for Asthma Monitoring (ACAM) analysis of Australian Bureau of Statistics (ABS) National Health Survey 2004–05 confidentialised unit record files.

Figure 6.4: Possession of a written asthma action plan by people with current asthma, by socioeconomic status, Australia 2004–05

Summary

Although written asthma action plans have been recommended in national guidelines for the management of asthma for almost 20 years, the majority of people with asthma do not have one. Young adults, particularly men, those living in socioeconomically disadvantaged areas and those living in Western Australia were least likely to possess a written asthma action plan in 2004–05.

6.2 Medications used to treat asthma

Drug therapy is the mainstay of asthma management. Broadly speaking, there are three ways in which medications are used in the treatment of asthma:

1. to relieve symptoms when they occur
2. to control the disease and attempt to prevent symptoms and exacerbations (or 'flare ups')
3. to treat exacerbations of the disease.

The most commonly used class of medications for relief of symptoms are short-acting beta-agonists (salbutamol and terbutaline). However, rapid-onset, long-acting beta-agonist drugs (formoterol; see Box 6.1) (O'Byrne et al. 2005) and short-acting anti-cholinergic drugs (ipratropium) can also be used for this purpose in some management plans.

There is evidence from systematic reviews that inhaled corticosteroids (beclomethasone, budesonide and fluticasone) are highly effective for the second purpose, to minimise symptoms and prevent exacerbations (Adams et al. 2003, 2004a, 2005). Recent analyses of data from clinical trials have demonstrated that most people with asthma can be well controlled with relatively low doses of inhaled corticosteroids, resulting in a low risk of adverse effects (Powell & Gibson 2003). The addition of long-acting beta-agonists to inhaled corticosteroids, now available in combined formulations (salmeterol+fluticasone and formoterol+budesonide), allows equivalent or greater effectiveness in disease control with lower doses of inhaled corticosteroids (Greening et al. 1994). Leukotriene receptor antagonists (montelukast and zafirlukast) are also used for disease control, though they are less effective than inhaled corticosteroids (Ng et al. 2004). Cromones (cromoglycate and nedocromil) have been traditionally used for the prevention of asthma exacerbations in children but evidence for their effectiveness for this purpose is generally lacking.

Oral corticosteroids have long been the mainstay of treatment for *exacerbations* of asthma. The role of intermittent use of inhaled corticosteroids or short-term increases in the maintenance or usual dose of inhaled corticosteroids remains uncertain.

Box 6.1: Formoterol

Note that formoterol has only been shown to be safe to use as a 'reliever' when used in a combination formulation with budesonide and when that formulation is taken regularly, twice daily, as well as on an 'as required' basis (O'Byrne et al. 2005).

Guidelines for the management of asthma (GINA 2006; NAC 2006) generally recommend a stepwise approach to management, aiming to optimise asthma control, with intermittent use of medications to relieve symptoms when they occur, regular (daily or twice daily) use of medications to control the disease and prevent symptoms and exacerbations, and occasional short courses of oral corticosteroids to treat disease exacerbations. Different classes of medications are used for each of these purposes, as outlined above. However, recent evidence has demonstrated that an alternative approach, in which a combined rapid-onset long-acting bronchodilator and inhaled corticosteroid (formoterol+budesonide) is used twice daily to control the disease and also as required for the relief of symptoms (O'Byrne et al. 2005), is also effective in achieving good disease control.

6.2.1 Monitoring use

Since appropriate use of medications for asthma improves disease outcomes, disparities in the use of medication are almost certainly relevant to disparities in outcomes of asthma. Under-use of medication to control the disease does occur in poor areas in the United States of America (USA) and Great Britain. Furthermore, adherence to use of various types of medication, including inhaled corticosteroids, is also lower among those with lower socioeconomic status (Apter et al. 1998; Wamala et al. 2007) and in African Americans compared to others in the USA (Bosworth et al. 2006; Charles et al. 2003a).

A central issue in determining the appropriateness of use of medications for asthma is the underlying severity of asthma and the level of asthma control at the time the medications were prescribed. However, it is usually not possible to determine from survey data or prescription data whether the level of treatment that has been prescribed or dispensed is appropriate for the level of disease severity or control (Khan et al. 2003). In the absence of information on disease severity and control, information on the use of medications must be interpreted with caution.

In this chapter, we review data on use of medications for the treatment of asthma in Australia, focusing in particular on medications used to control the disease, principally inhaled corticosteroids. Data on other principal classes of medications are also presented. Various sources of data have been used for this purpose.

6.2.2 Sources of data

Pharmaceutical Benefits Scheme (PBS) data

Information on reimbursements for the purchase of prescription medications is available from the PBS and the Repatriation Pharmaceutical Benefits Scheme (RPBS) databases. An important limitation of these data is that the databases only include records for prescriptions that were subsidised by the PBS and RPBS. The PBS currently subsidises the cost of approximately 80% of prescription medications dispensed in Australia (DoHA 2006). However, even for these items that are covered by the PBS or RPBS, subsidies are only paid, and hence recorded in the database, where the cost of the medication is more than the copayment amount. The copayment amount is the amount the consumer pays. The government subsidises any additional amount above the copayment. The copayment amount differs substantially between general patients and those who hold government health-care concession cards. For the former, the copayment amount ranged from $22.40 in 2002 to $30.70 in 2007, whereas for people holding concession cards, the copayment amount ranged from $3.60 in 2002 to $4.90 in 2007. This means that many medications are far cheaper to those with concession cards. The implications of this limitation and the way in which we have dealt with it in this report are described below.

All long-acting beta-agonist preparations (except Oxis 6 Turbuhaler in 2005 and 2006; see Appendix 1, Table A1.7) and all combined long-acting beta-agonist and inhaled corticosteroid preparations are at a price higher than the PBS copayment amount for general patients. Hence, the PBS database contains a complete record of prescriptions in Australia for these medication classes.

Most inhaled corticosteroid preparations cost more than the PBS copayment amount for those without a concession card but some formulations cost less and, hence, were not captured on the PBS database (see Appendix 1, Table A1.7). Since the PBS schedule changes frequently throughout the year, the prescriptions covered by the scheme can vary within a year and from year to year.

Short-acting beta-agonists and oral corticosteroids cost less than the PBS copayment amount and are only subsidised by the PBS when the patient is a concession card holder. For this reason, our PBS analysis of short-acting beta-agonist and oral corticosteroid prescriptions has been limited to those dispensed to concession card holders.

Short-acting beta-agonists are also available 'over the counter', that is, without a prescription. However, the over-the-counter cost is greater than the copayment for a concession card holder who uses a prescription, which means there is a financial incentive for concession card holders to purchase short-acting beta-agonists with a doctor's prescription. Therefore, it is assumed that most, though not all, short-acting beta-agonists dispensed to people with a concession card are supplied with a prescription and recorded on the PBS database.

The PBS database, which was designed for administrative purposes, has included patient Medicare numbers with all prescription details since 2002. Use of the Medicare number has allowed us to anonymously identify prescriptions for the same individuals within the PBS data and also to link information on age, sex and home postcode using an encrypted Medicare patient identification number. In this way, it is ensured that patient confidentiality is protected.

IMS Health data

Information on the wholesale supply of medications in the community is available from IMS Health, a commercial market information company. IMS Health collects data from all pharmaceutical wholesalers about the sale of both prescription and non-prescription medications to the hospital and community sectors. Since these are wholesale supply data, they do not include any information about the individuals who purchased the medications. See Appendix 1, Section A1.8, for more details about these data sources.

Unfortunately, data from the PBS and IMS Health do not contain information on the reason for which the drug was prescribed. The medications that are used for asthma are also used for the treatment of some other respiratory illnesses, in particular, chronic obstructive pulmonary disease (COPD) among older people and wheezy bronchitis in young children. For this reason, medication use within the subgroup of people aged 5–34 years is described separately in this chapter. In this age group, COPD is very uncommon and wheezy bronchitis is a relatively uncommon diagnosis and, therefore, the medications were more likely to have been used for asthma.

Health surveys, including the ABS NHS, are the best source of information about *actual use* of medication by people with asthma and we have included some information from the 2004–05 NHS. Information about how asthma medications are prescribed in general practice is provided in Section 5.1.

In the following sections, we describe the rate of medication use for asthma and other respiratory conditions in the community as a whole and assess variation by age group, sex, socioeconomic status and remoteness of residence.

6.2.3 Time trends in the supply of medications for asthma and other respiratory disorders

Figure 6.5 shows the trend in the supply of various medications from IMS Health (wholesalers) as well as the trend in the PBS data (reimbursement of prescriptions) for medications commonly used to treat asthma since the mid-1990s. The trend data are expressed in units of defined daily doses (DDDs) per 1,000 population per day. This unit of measurement represents a standardised measure of medication dosage, allowing data for different members of the same class to be combined and various classes to be compared, using a common currency. See Appendix 1, Section A1.8.3, for more details of these calculations.

Short-acting beta-agonists, mainly salbutamol and terbutaline, remain the most commonly supplied class of medications among those used to treat respiratory disorders in Australia (Figure 6.5a). This class of medication is commonly dispensed over the counter, that is, without a prescription. Therefore, we have also incorporated information from the Pharmacy Guild Survey in our estimation of reimbursed prescriptions for short-acting beta-agonists (Figure 6.5b) which takes into account over-the-counter purchases. According to this survey, approximately 27–30% of short-acting beta-agonists were purchased over-the-counter between 2002 and 2006 (DoHA 2007b). Short-acting beta-agonists and anti-cholinergics are also commonly used in patients hospitalised with respiratory illness, where they are dispensed by hospital pharmacies. In this case, usage would be recorded in the IMS Health data but not in the PBS and Pharmacy Guild Survey data. Apart from the difference observed in the case of short-acting beta-agonists, the IMS Health data on wholesale supply and combined PBS and Pharmacy Guild Survey data on reimbursed prescriptions agree very closely (Figure 6.5).

Supply of short-acting beta-agonists has been decreasing since 1999 and, more recently, use of the short-acting anti-cholinergic ipratropium bromide has also been declining. The latter trend has probably been accelerated by the introduction of tiotropium bromide, a long-acting anti-cholinergic medication that is mainly recommended for use by patients with COPD.

The annual total usage of inhaled corticosteroids has been relatively stable over a long period of time. There was a small increase in supply between 1999 and 2002, but since then there has been a small decrease back to pre-1999 levels (Figure 6.5a).

Long-acting beta-agonists first became eligible for reimbursement under the PBS in 2000. Since that year, there has been a rapid increase in the use of this class of medications (Figure 6.5b).

The use of other medications for asthma and other respiratory disorders, cromones (cromoglycate and nedocromil) and theophylline, was low and decreased during 1995–2006. Reimbursement for prescriptions for leukotriene receptor antagonists has only recently been introduced and only children are eligible. The overall usage of this class of medications remains low relative to other respiratory medications.

Notes: Respiratory medications classified according to the Anatomical Therapeutic Chemical Classification System (ATC). Reimbursed prescriptions (b) for short-acting beta-agonists were calculated from Pharmaceutical Benefits Scheme (PBS) and Repatriation Pharmaceutical Benefits Scheme (RPBS) data and the Pharmacy Guild Survey (which includes over-the-counter purchases).

Sources: (a) IMS Health; (b) PBS and RPBS (all medication classes) and the Pharmacy Guild Survey (short-acting beta-agonists).

Figure 6.5: Respiratory medications (a)supplied by wholesalers and manufacturers and (b)reimbursed prescriptions, by defined daily dose (DDD) per 1,000 persons per day, 1995–2006

6.2.4 Current use of medications for asthma

In 2004–05, almost 56% of people with asthma reported using medication for their condition in the last 2 weeks (NHS data). The proportion of people with asthma who used medication increased with age (p trend < 0.0001). The lowest reported use was among children aged 5–14 years (45%) and the highest was among those aged 65 years and over (75%).

Among school-entry children in the Australian Capital Territory, 94% of those with parent-reported asthma had used at least one asthma medication in the preceding year (Phillips et al. 2007).

Inhaled corticosteroids

Inhaled corticosteroids are used to reduce airway inflammation; a key feature of asthma. For patients with asthma, this results in better control of symptoms and disease exacerbations. They are most effective when used on a regular basis, either daily or twice daily. Regular use of inhaled corticosteroids is the recommended treatment in people with persistent asthma.

In 2006, there were 23 standard defined daily doses (DDDs) of inhaled corticosteroids supplied per 1,000 persons per day. This represented a continuation of a downward trend in this measure of utilisation from a peak in 2002 (28 DDDs per 1,000) (Figure 6.5 and Figure 6.6).

Among people with current asthma aged 5 years and over in 2004–05, 18.5% reported having used inhaled corticosteroids in the previous 2 weeks (ACAM 2007a). In the subgroup who reported using short-acting beta-agonists in the previous 2 weeks, indicating that they were likely to have experienced symptoms of asthma during that time, only 28% had also used inhaled corticosteroids during this period. Hence, there is evidence that use of inhaled corticosteroids for control of symptomatic asthma is sub-optimal in the community.

The frequency of medication use among children with asthma had remained stable between 2000 and 2005 in the Australian Capital Territory and 53% of all children with asthma that were taking inhaled corticosteroids, mast cell stabilisers or montelukast were using them at least 4 days per week during this time (Phillips et al. 2007).

In 2006, prescription data from the PBS showed that the use of inhaled corticosteroids increased with age (Table 6.2). This is consistent with the trends seen in the use of other classes of medication used in the treatment of asthma and may reflect the changing nature of obstructive lung disease from childhood to older adult life. There were no important differences in rates of use of this class of medication with levels of socioeconomic disadvantage. However, government health-care concession card holders were more likely to be dispensed inhaled corticosteroids (11%) than those without a concession card (4%). The cost of inhaled corticosteroids is approximately six times greater for individuals who do not have a concession card. Therefore, it appears that cost is an important barrier to use of inhaled corticosteroids.

Table 6.2: Proportion of population dispensed inhaled corticosteroids (alone or in combination with long-acting beta-agonists), by demographic characteristics, 2006

	All ages		Age 5–34 years	
Demographic characteristics	Number	Per cent	Number	Per cent
Sex				
Male	492,515	4.8	157,576	3.7
Female	609,154	5.9	164,246	4.0
Age group				
0–4 years	31,796	2.5	..	..
5–14 years	112,326	4.1	112,326	4.1
15–34 years	209,496	3.7	209,496	3.7
35–64 years	437,090	5.4	..	..
65 years and over	310,951	11.4	..	..
Socioeconomic status				
SEIFA 1 (most disadvantaged)	230,512	6.1	65,951	3.9
SEIFA 2	177,694	6.2	49,721	4.0
SEIFA 3	205,713	6.0	60,454	4.0
SEIFA 4	246,691	5.6	73,815	3.8
SEIFA 5 (least disadvantaged)	230,965	5.5	68,874	3.7
Remoteness category				
Major Cities	731,027	5.4	220,913	3.9
Inner Regional	241,034	5.6	64,974	3.9
Other areas[(a)]	129,026	5.0	35,723	3.4
Concessional status[(b)]				
Government health concession card holders	552,505	10.7	75,753	6.7
No government health concession card	405,032	4.2	133,743	3.4
All persons	**1,102,343**	**5.3**	**321,822**	**3.8**

.. Not applicable.

(a) Other areas include Outer Regional, Remote and Very Remote.

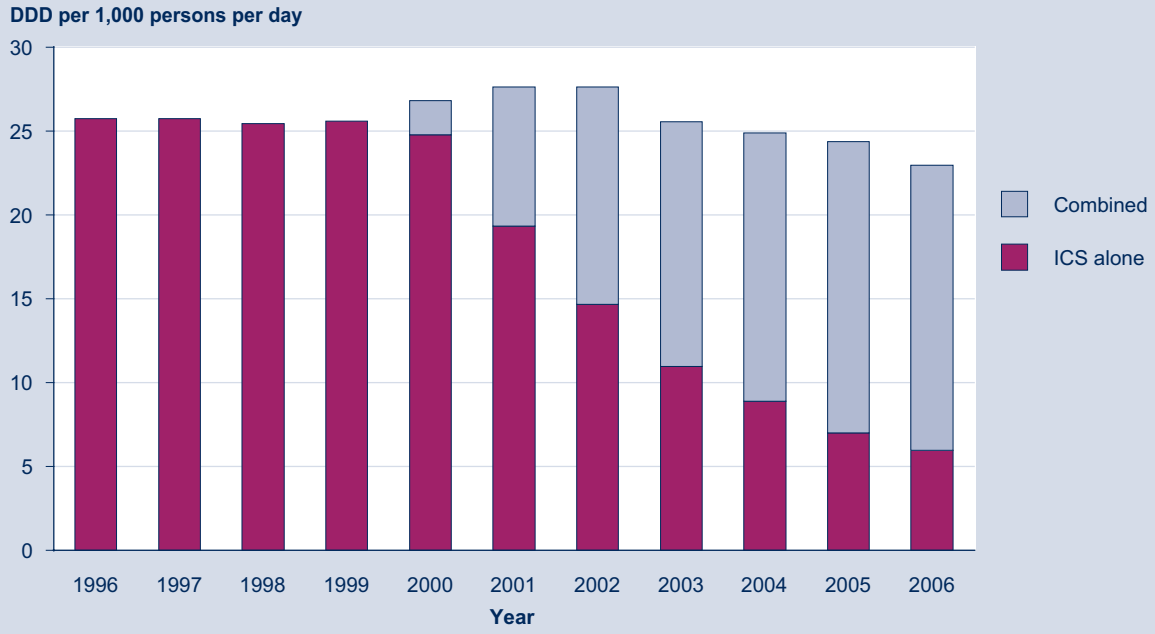
(b) Limited to persons aged 15 years and over.

Note: SEIFA = Socio-economic Indexes for Areas.

Sources: Pharmaceutical Benefits Scheme; Australian Bureau of Statistics.

Combined long-acting beta-agonist and inhaled corticosteroid formulations

Inhalation devices that combined long-acting beta-agonists and corticosteroids in the same unit were introduced onto the Australian market in 2000. In subsequent years, the proportion of all inhaled corticosteroids that were supplied by wholesalers in combination with long-acting beta-agonists steadily increased. Two years after their introduction onto the Australian market, combined therapy represented 47% of all wholesale supplied inhaled corticosteroid therapy and, by 2006, the market share had risen to 74% (Figure 6.6).



Note: DDD = defined daily dose, ICS = inhaled corticosteroids.
Source: IMS Health.

Figure 6.6: Inhaled corticosteroids supplied by wholesalers separately or as part of combined therapy, by defined daily dose per 1,000 persons per day, 1996–2006

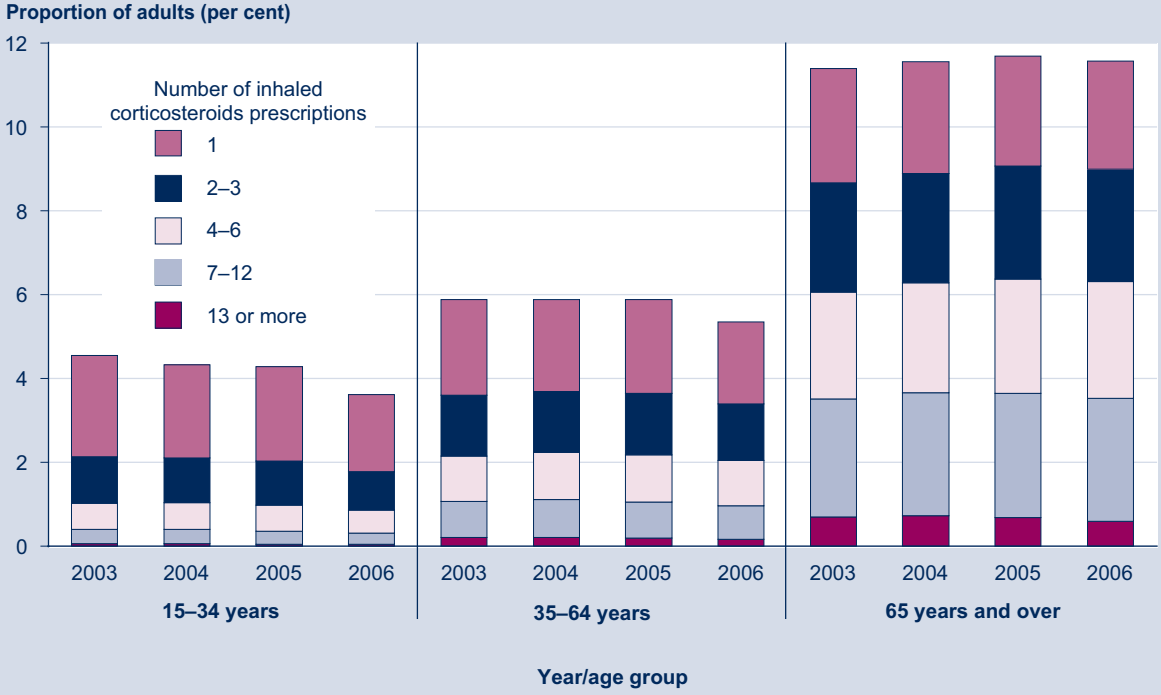
In the Australian population, use of inhaled corticosteroids and long-acting beta-agonists in combination formulations increased with age. Among those aged 0–4 years, only 1.4% were dispensed this type of combined therapy while 8.8% of those aged 65 years and over were dispensed this class of medication. In the population as a whole, there tended to be slightly higher rates of use among people living in areas of greater socioeconomic disadvantage. However, this was not observed when the analysis was limited to people aged 5–34 years. People living in more remote areas had lower rates of use. There were much higher rates dispensed to government health-care concession card holders than to those without a concession card.

Number of inhaled corticosteroid prescriptions

In children, intermittent asthma is much more common than persistent asthma. Hence, inhaled corticosteroids are generally not required for the treatment of asthma in children, particularly in young children. For this reason, we describe the use of this class of medications separately for adults and children.

Adults. Between 2003 and 2006, the use of any inhaled corticosteroids, as indicated by the number of prescriptions dispensed for this class of medication during that time, decreased among people aged 15–64 years, particularly since 2005 (Figure 6.7). This is consistent with the overall decline in supply over this period, as described above. This may be partly attributed to the large (24%) increase in the copayment cost in January 2005. Studies from Western Australia have shown that dispensing of combined asthma medications decreased following the rise in copayment cost at that time (Hynd et al. 2008).

In 2006, 5.7% of persons aged 15 years and over had at least one prescription for inhaled corticosteroids. The use of inhaled corticosteroids increased with age. In 2006, 3.6% of those aged 15–34 years, 5.3% of those aged 35–64 years and 11.6% of those aged 65 years and over had at least one prescription for inhaled corticosteroids. Among persons aged 15–34 years, more than half of those dispensed any inhaled corticosteroids only had one prescription for this class of medication in any one year, compared to 36–39% of those aged 35–64 years (Figure 6.7).



Note: Includes prescriptions for inhaled corticosteroids alone or in combination with long-acting beta-agonists.

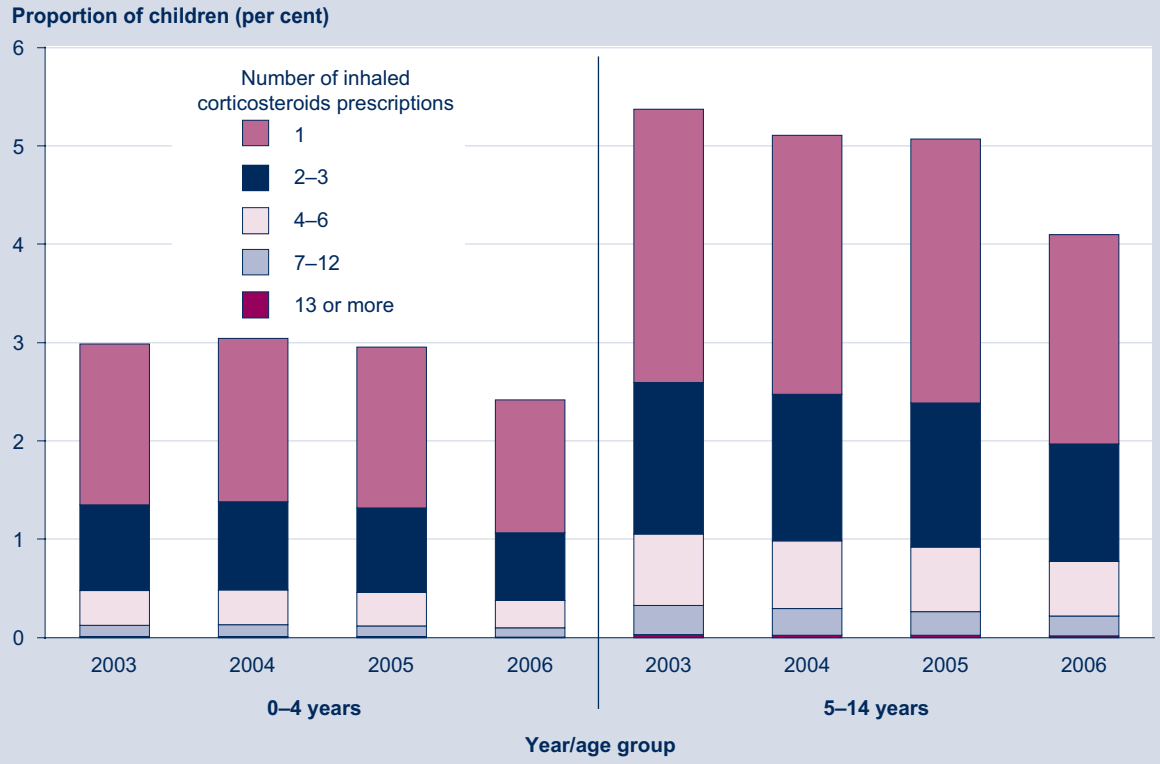
Sources: Pharmaceutical Benefits Scheme; Australian Bureau of Statistics.

Figure 6.7: Use of inhaled corticosteroids (alone or in combination with long-acting beta-agonists) in adults, by age, number of prescriptions and year, 2003–2006

People aged 65 years and over had the highest prevalence of having inhaled corticosteroids dispensed and the highest proportion of frequent users. Approximately 30% of people in this older age group who had a prescription for inhaled corticosteroids had seven or more prescriptions. Furthermore, 5–6% had 13 or more prescriptions in any given year (that is, more than one prescription per month). In contrast, only 8–9% of people aged 15–34 years and 18–19% of those aged 35–64 years had seven or more inhaled corticosteroid prescriptions between 2003 and 2006. This is likely to be the minimum rate of prescription consistent with regular use.

Children. Thirty-one to 39% of children with parent-reported asthma, who were beginning school in the Australian Capital Territory during the period 2000 to 2005, were using inhaled corticosteroids at that time. There was no trend in usage over this period (Phillips et al. 2007). However, data from the PBS demonstrates that overall, between 2003 and 2006, the use of inhaled corticosteroids decreased among children aged 0–14 years, particularly since 2005 (Figure 6.8). This may reflect a decline in the prevalence of asthma in children over this period.

In 2006, 2.4% of children aged 0–4 years and 4.1% of children aged 5–14 years were dispensed at least one prescription of inhaled corticosteroid. In 2006, the overall proportion of children aged 0–14 years who were dispensed any inhaled corticosteroids was 3.6%. More than half of the children dispensed inhaled corticosteroids were dispensed only one prescription in any given year between 2003 and 2006.



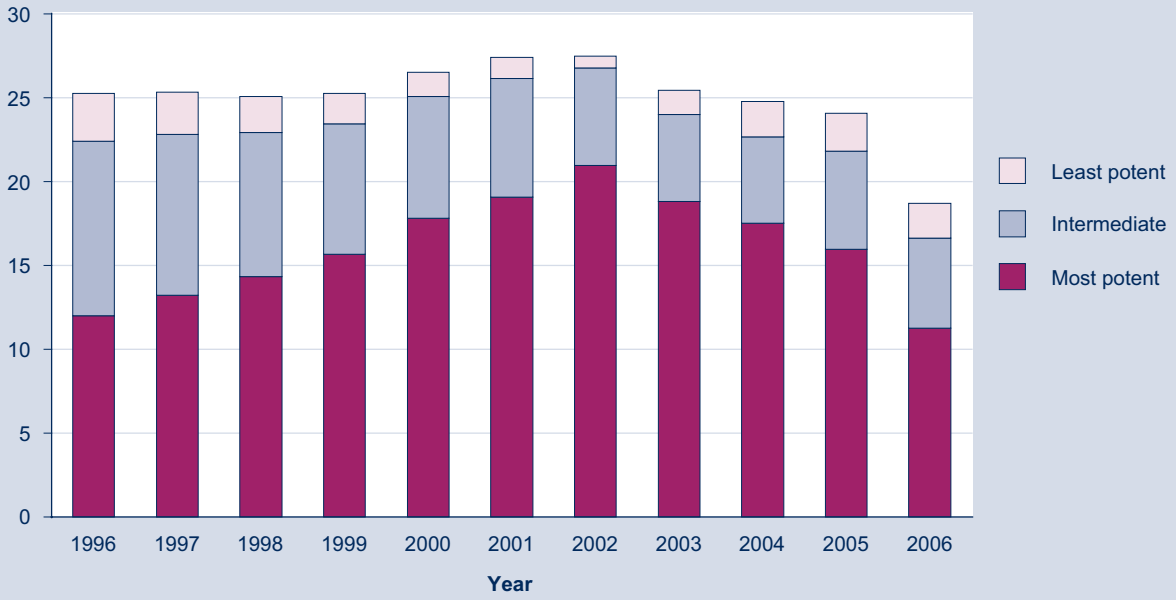
Note: Includes prescriptions for inhaled corticosteroids alone or in combination with long-acting beta-agonists.
Sources: Pharmaceutical Benefits Scheme; Australian Bureau of Statistics.

Figure 6.8: Use of inhaled corticosteroids (alone or in combination with long-acting beta-agonists) in children, by age, number of prescriptions and year, 2003–2006

Overall, both the prevalence and the frequency of use of inhaled corticosteroids were much greater in people aged 15 years and over than in children. This is to be expected given the differences in the patterns of disease observed.

Potency of inhaled corticosteroids

Data on the supply of pharmaceuticals demonstrate that both the total number of doses and the proportion of doses that are the highest potency formulation of inhaled corticosteroids have declined substantially during 2006 (Figure 6.9). However, less potent formulations still represent a minority of those supplied. A similar trend is observed in examining dispensed prescriptions. The majority of prescriptions for inhaled corticosteroids were for the most potent formulations of this class of medication (Figure 6.10).

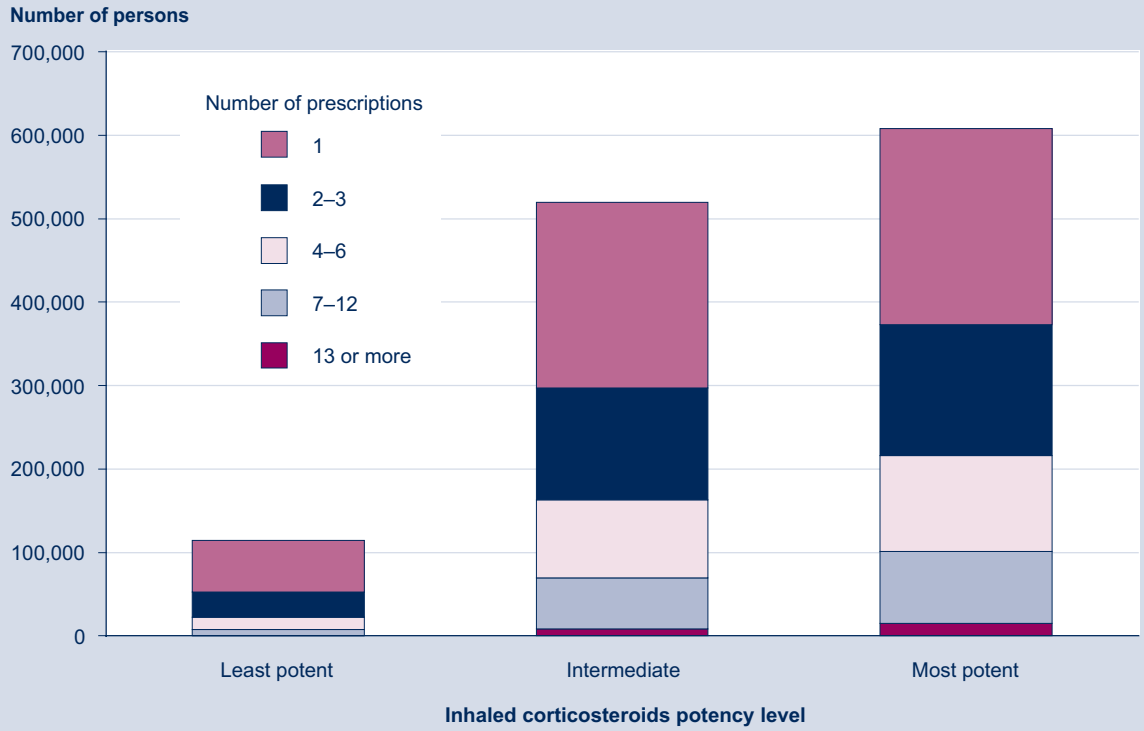


Notes

1. Least potent includes Becotide 100, Becotide MDI 100, Qvar 50, Qvar 50 autohaler, Pulmicort meter aero 100, Pulmicort turbuhaler, Alvesco 80, Flixotide jnr accuhaler, Flixotide jnr Oral pressurised inhalation 50 micrograms per dose (120 doses) CFC-free formulation, Seretide accuhaler 100/50, Seretide MDI 50/25, Symbicort turbuhaler 100/6.
2. Intermediate level includes Respocort inhaler Becloforte MDI 250, Respocort autohaler 250, Qvar 100, Qvar 100 autohaler, Pulmicort respules, Pulmicort meter aero 200, Pulmicort turbuhaler, Alvesco 160, Flixotide accuhaler, Flixotide, Seretide accuhaler 250/50, Seretide MDI 125/25, Symbicort turbuhaler 200/6.
3. Most potent includes Pulmicort respules, Pulmicort turbuhaler, Flixotide accuhaler, Flixotide, Seretide accuhaler 500/50, Seretide MDI 250/25, Symbicort turbuhaler 400/12.
4. DDD = defined daily dose.

Source: IMS Health.

Figure 6.9: Relative potency of inhaled corticosteroids supplied by wholesalers separately or as part of combined therapy, by defined daily dose per 1,000 persons per day, 1996–2006



Notes

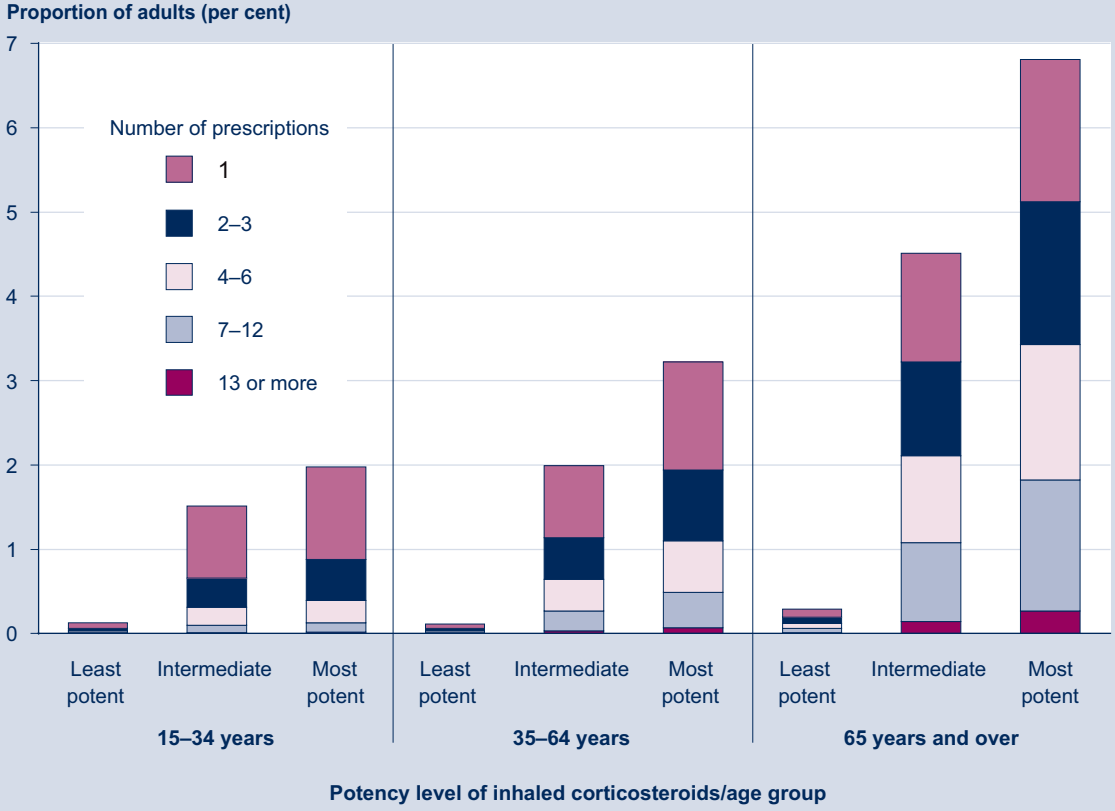
1. Least potent includes Becotide 100, Becotide MDI 100, Qvar 50, Qvar 50 autohaler, Pulmicort meter aero 100, Pulmicort turbuhaler, Alvesco 80, Flixotide jnr accuhaler, Flixotide jnr Oral pressurised inhalation 50 micrograms per dose (120 doses) CFC-free formulation, Seretide accuhaler 100/50, Seretide MDI 50/25, Symbicort turbuhaler 100/6.
2. Intermediate level includes Respocort inhaler Becloforte MDI 250, Respocort autohaler 250, Qvar 100, Qvar 100 autohaler, Pulmicort respules, Pulmicort meter aero 200, Pulmicort turbuhaler, Alvesco 160, Flixotide accuhaler, Flixotide, Seretide accuhaler 250/50, Seretide MDI 125/25, Symbicort turbuhaler 200/6.
3. Most potent includes Pulmicort respules, Pulmicort turbuhaler, Flixotide accuhaler, Flixotide, Seretide accuhaler 500/50, Seretide MDI 250/25, Symbicort turbuhaler 400/12.

Source: Pharmaceutical Benefits Scheme.

Figure 6.10: Number of prescriptions for inhaled corticosteroids, by potency class, all persons, 2006

Adults. Overall, among persons aged 15 years and over, 54.8% of prescriptions for inhaled corticosteroids were in the most potent category, 42.1% were of intermediate potency and only 3.1% were classified as being in the least potent category.

A higher proportion of older Australians were prescribed inhaled corticosteroids of the most potent formulations compared to young adults and those aged 35–64 years (Figure 6.11). Those aged 65 years and over were also more likely to have 13 or more prescriptions for intermediate and most potent formulations of this class of medication in 2006 than younger adults.



Notes

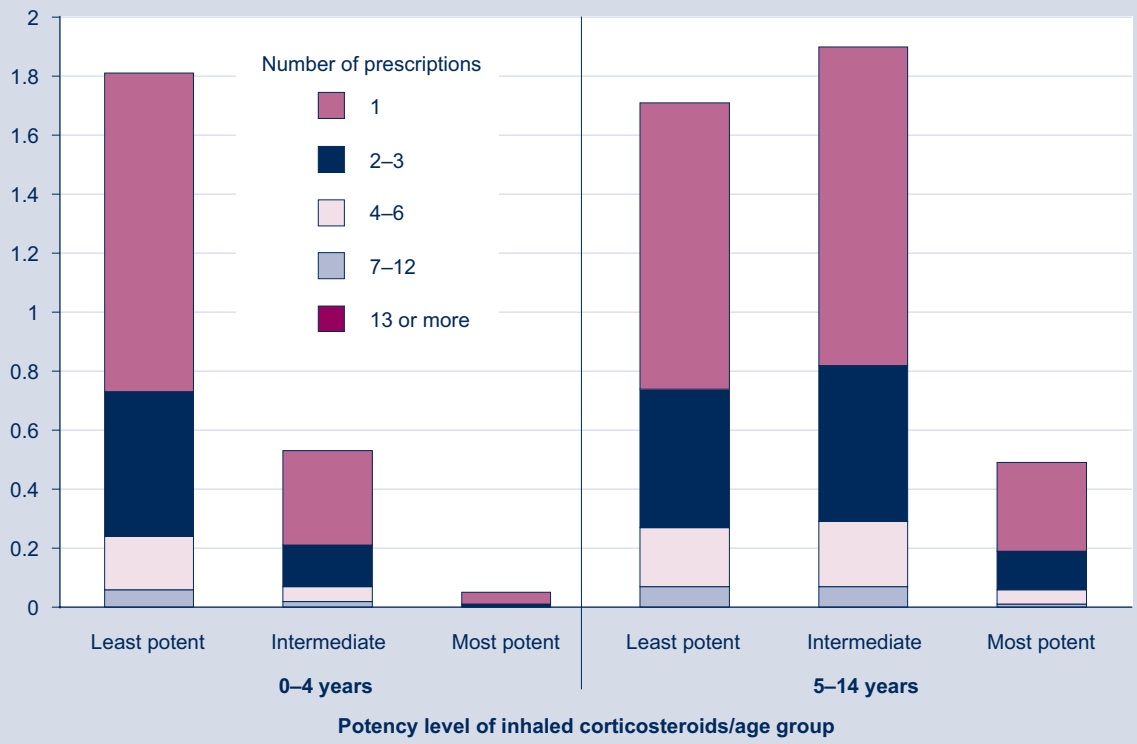
1. Least potent includes Becotide 100, Becotide MDI 100, Qvar 50, Qvar 50 autohaler, Pulmicort meter aero 100, Pulmicort turbuhaler, Alvesco 80, Flixotide jnr accuhaler, Flixotide jnr Oral pressurised inhalation 50 micrograms per dose (120 doses) CFC-free formulation, Seretide accuhaler 100/50, Seretide MDI 50/25, Symbicort turbuhaler 100/6.
2. Intermediate level includes Respocort inhaler Becloforte MDI 250, Respocort autohaler 250, Qvar 100, Qvar 100 autohaler, Pulmicort respules, Pulmicort meter aero 200, Pulmicort turbuhaler, Alvesco 160, Flixotide accuhaler, Flixotide, Seretide accuhaler 250/50, Seretide MDI 125/25, Symbicort turbuhaler 200/6.
3. Most potent includes Pulmicort respules, Pulmicort turbuhaler, Flixotide accuhaler, Flixotide, Seretide accuhaler 500/50, Seretide MDI 250/25, Symbicort turbuhaler 400/12.
4. Adults have been classified according to the most potent formulation of inhaled corticosteroid prescription they received in 2006.

Sources: Pharmaceutical Benefits Scheme; Australian Bureau of Statistics.

Figure 6.11: Use of inhaled corticosteroids among adults, by potency class, age and number of prescriptions, 2006

Children. Among children (those aged less than 15 years), 50.6% of prescriptions for inhaled corticosteroids were in the least potent category, 40.2% were of intermediate potency and only 9.3% were classified as being in the most potent category.

There was a much higher proportion of children aged 5–14 years who had prescriptions for intermediate and most potent formulations of inhaled corticosteroids compared to children aged 0–4 years (Figure 6.12). The frequency of use of these more potent formulations was also higher in older children compared to younger children.



Notes

1. Least potent includes Becotide 100, Becotide MDI 100, Qvar 50, Qvar 50 autohaler, Pulmicort meter aero 100, Pulmicort turbuhaler, Alvesco 80, Flixotide jnr accuhaler, Flixotide jnr Oral pressurised inhalation 50 micrograms per dose (120 doses) CFC-free formulation, Seretide accuhaler 100/50, Seretide MDI 50/25, Symbicort turbuhaler 100/6.
2. Intermediate level includes Respocort inhaler Becloforte MDI 250, Respocort autohaler 250, Qvar 100, Qvar 100 autohaler, Pulmicort respules, Pulmicort meter aero 200, Pulmicort turbuhaler, Alvesco 160, Flixotide accuhaler, Flixotide, Seretide accuhaler 250/50, Seretide MDI 125/25, Symbicort turbuhaler 200/6.
3. Most potent includes Pulmicort respules, Pulmicort turbuhaler, Flixotide accuhaler, Flixotide, Seretide accuhaler 500/50, Seretide MDI 250/25, Symbicort turbuhaler 400/12.
4. Children have been classified according to the most potent formulation of inhaled corticosteroid prescription they received in 2006.

Sources: Pharmaceutical Benefits Scheme; Australian Bureau of Statistics.

Figure 6.12: Use of inhaled corticosteroids among children, by potency class, age and number of prescriptions, 2006

Short-acting bronchodilators

Short-acting bronchodilators are commonly referred to as 'relievers' due to their mode of use by patients with asthma. Short-acting beta-agonists (salbutamol and terbutaline) are the most commonly used class of short-acting bronchodilators. They are very effective in providing rapid relief of acute asthma symptoms and, since they can be purchased without a prescription, are readily accessible in Australia (ACAM 2005). The duration of action of short-acting beta-agonists is typically 4–6 hours (Lotvall 2002).

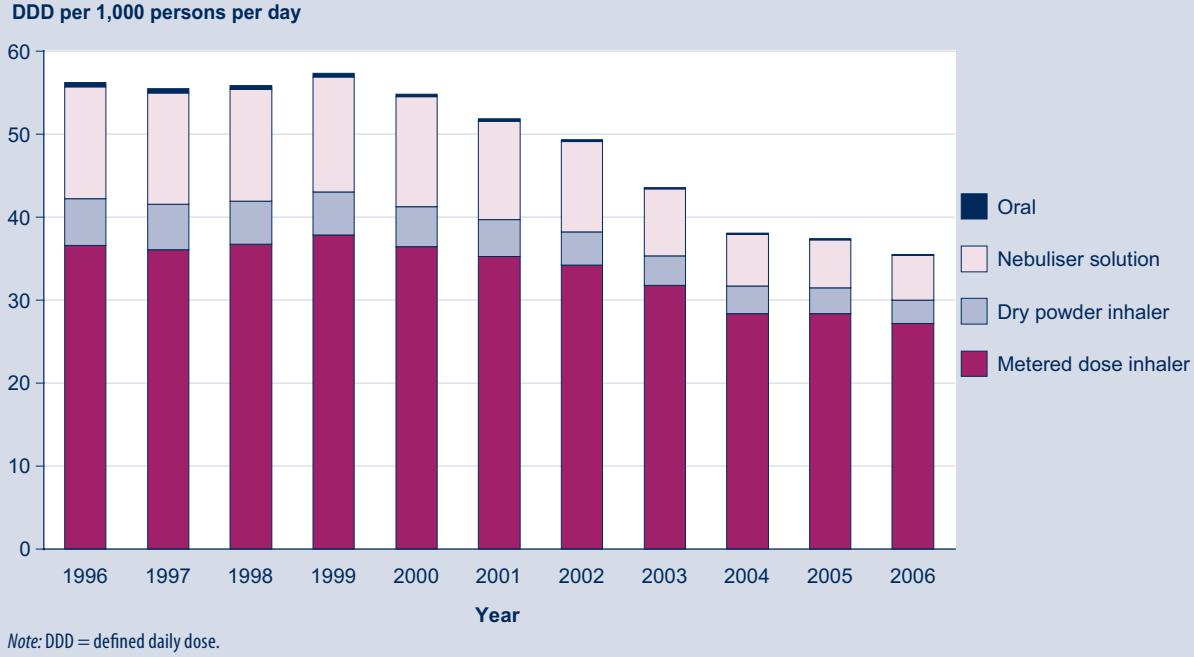
It is recommended that short-acting beta-agonists are used on an as-needed basis for short-term relief of symptoms (NAC 2006). Short-acting anticholinergics (ipratropium) and rapid-onset, long-acting beta-agonists (formoterol; see Box 6.1) may also be used as 'relievers'.

Overall, 12.3% of all adults holding a government health-care concession card had at least one PBS-subsidised prescription for short-acting beta-agonists during 2006. In 2004–05, 47.5% of surveyed people with current asthma who were aged 5 years and over reported using short-acting beta-agonists in the last 2 weeks (NHS confidentialised unit record files—CURFs). Furthermore, among people attending their GP for management of asthma, 94% had used a short-acting beta-agonists in the previous 12 months including 14% who reported using this medication twice daily (13.8%) (AIHW: Britt & Miller 2007, SAND abstract 104). Hence, use of short-acting bronchodilators is very common among people with asthma and related conditions.

Some children who use salbutamol do not have a diagnosis of asthma. Among children beginning school in the Australian Capital Territory who were taking salbutamol, 19% did not have a diagnosis of asthma in 2000 and this proportion had increased to 35% in 2005 (Phillips et al. 2007). It is possible that this increase reflects changes in diagnostic labelling.

Route of administration of bronchodilators

Short-acting bronchodilators are available in oral formulations as well as inhaled formulation. However, oral formulations are associated with reduced efficacy and more side effects and are not recommended for use in patients with asthma. In fact, nearly all short-acting beta-agonist and anti-cholinergic bronchodilator medication is administered by inhalation (Figure 6.13). The most popular devices supplied were metered dose inhalers, or 'puffers'. Between 1996 and 2000, approximately one-quarter of the supply of this class of medication was in the form used for nebulised delivery. This proportion has gradually declined and in 2006 only 15% was supplied in the form of nebuliser solution. The decrease in the use of nebulised bronchodilators is in accordance with current evidence and recommendations (Cates 1999).



Note: DDD = defined daily dose.
Source: IMS Health.

Figure 6.13: Delivery devices supplied by wholesalers for the administration of short-acting beta-agonist and anticholinergic medication, by defined daily dose per 1,000 persons per day, 1996–2006

Sociodemographic distribution of use

The prevalence of use of short-acting beta-agonists by people with current asthma in 2004–05 was highest among young adults aged 15–34 years (49.0% used this medication class in the previous 2 weeks) and older adults (49.7%) but was also common among children (36.4%) (NHS CURFs).

Prescription of short-acting beta-agonists was slightly more common in females (13.2%) than males (11%) (PBS data for concession card holders, Table 6.3). Use of this class of medications increased with age. Among those aged 65 years and over, 13.5% were dispensed this class of medication compared to only 10% among those aged 15–34 years. Among people aged 15 years and over, those residing in inner regional areas of Australia had a higher proportion of short-acting beta-agonist prescriptions dispensed than those living in major cities or remote areas of Australia ($p < 0.0001$).

Table 6.3: Proportion of people with government health-care concession cards dispensed short-acting beta-agonists, by demographic characteristics, 2006

	Age 15 years and over		Age 15–34 years	
Demographic characteristics	Number	Per cent	Number	Per cent
Sex				
Male	240,505	11.0	39,839	8.5
Female	391,226	13.2	73,001	11.0
Age group				
15–34 years	112,840	10.0	112,840	10.0
35–64 years	221,093	12.3	..	..
65 years and over	297,798	13.5	..	..
Remoteness category				
Major Cities	391,579	12.3	70,425	10.1
Inner Regional	158,050	13.4	28,324	10.4
Other areas[(a)]	81,680	10.5	14,007	8.7
All concession card holders	**631,731**	**12.3**	**112,840**	**10.0**

.. Not applicable.

(a) Other areas include Outer Regional, Remote and Very Remote.

Note: The National Health Survey was used to estimate the total number of Australians with a government concession card.

Sources: Pharmaceutical Benefits Scheme; Australian Bureau of Statistics 2004–05 National Health Survey.

The need to limit the analysis of short-acting beta-agonist prescriptions data to concession card holders meant it was not possible to judge the impact of socioeconomic status, since concession card holders already represent a more socioeconomically disadvantaged subgroup. Studies elsewhere have explored this. In Canada, Lynd and colleagues (2004) found that greater levels of socioeconomic disadvantage were associated with higher levels of use of short-acting beta-agonists, even when controlling for level of severity of asthma.

Generally, high rates of use of short-acting beta-agonists are an indicator of poor asthma control. Campaigns that focus on the subgroup of people with asthma who are high users of short-acting beta-agonists may lead to gains in a range of asthma outcomes.

Long-acting beta-agonists

Long-acting beta-agonists (salmeterol and formoterol), which were introduced into clinical use in Australia in 1999, provide approximately 12–24 hours bronchodilatation (Lotvall 2002). Current national (NAC 2006) and international (GINA 2006) guidelines for the management of asthma recommend that adults with asthma that is not adequately controlled on moderate doses of inhaled corticosteroids alone use long-acting beta-agonists in conjunction with inhaled corticosteroids on a regular basis.

Overall, 4.3% of the population used this class of medications in 2006. Use was greater among females (4.7%) and those aged 65 years and over (9.3%) (Table 6.4).

Table 6.4: Proportion of population dispensed long-acting beta-agonists, by demographic characteristics, 2006

	All ages		Age 5–34 years	
Demographic characteristics	**Number**	**Per cent**	**Number**	**Per cent**
Sex				
Male	398,793	3.9	124,889	2.9
Female	488,520	4.7	130,956	3.2
Age group				
0–4 years	17,554	1.4	..	..
5–14 years	84,495	3.1	84,495	3.1
15–34 years	171,350	3.0	171,350	3.0
35–64 years	359,354	4.4	..	..
65 years and over	254,552	9.3	..	..
Socioeconomic status				
SEIFA 1 (most disadvantaged)	182,503	4.8	50,109	3.0
SEIFA 2	142,949	4.9	38,949	3.1
SEIFA 3	166,370	4.8	48,145	3.2
SEIFA 4	198,700	4.5	59,015	3.0
SEIFA 5 (least disadvantaged)	188,763	4.5	57,225	3.1
Remoteness category				
Major Cities	591,514	4.4	177,132	3.1
Inner Regional	192,330	4.5	50,797	3.0
Other areas[(a)]	103,008	4.0	27,750	2.7
Concessional status[(b)]				
Government health concession card holders	446,699	8.7	58,586	5.2
No government health concession card	338,557	3.5	112,764	2.8
All persons	**887,851**	**4.3**	**255,845**	**3.0**

.. Not applicable.

(a) Other areas include Outer Regional, Remote and Very Remote.

(b) Limited to persons aged 15 years and over.

Notes: The National Health Survey was used to estimate the total number of Australians with a government concession card. SEIFA = Socio-economic Indexes for Areas.

Sources: Pharmaceutical Benefits Scheme; Australian Bureau of Statistics 2004–05 National Health Survey.

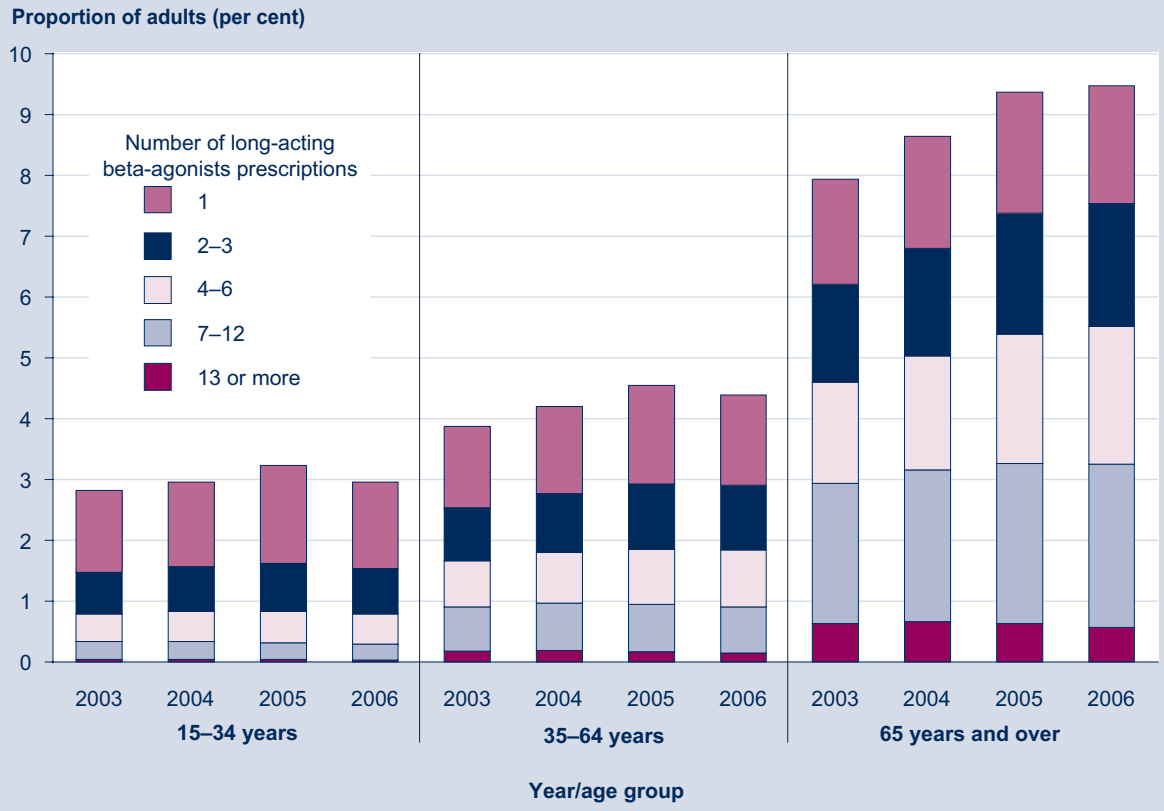
There was little variation in the proportion of users according to socioeconomic status and remoteness of residence. However, there was a higher proportion of government health concession card holders that were dispensed this class of medication compared to those without concession cards. The same trends were seen among persons aged 5–34 years (Table 6.4).

There is evidence that long-acting beta-agonists are less effective in children than in adults and their use is not recommended except in children with asthma that is poorly controlled despite other therapy (Bisgaard & Szefler 2006; Sorkness et al. 2007). Hence, we have described the utilisation of this class of medications separately for adults and children.

Long-acting beta-agonist prescriptions among adults

There has been an increase in the proportion of adults dispensed long-acting beta-agonists between 2003 and 2006 (Figure 6.14). In 2006, 4.7% of all persons aged 15 years and over were dispensed at least one prescription for long-acting beta-agonists.

The proportion of adults using four or more prescriptions per year increased with age (Figure 6.14). In 2006, 0.8% of adults aged 15–34 years had four or more prescriptions for this class of asthma medication compared to 1.8% of adults aged 35–64 years and 5.5% of those aged 65 years and over. Furthermore, during the same year, 0.3% of people aged 15–34 years had seven or more prescriptions for long-acting beta-agonists compared to 0.9% of adults aged 35–64 years and 3.3% of those aged 65 years and over.



Notes

1. Includes all those using long-acting beta-agonists alone and in combined formulation with inhaled corticosteroids.
2. Oxis Turbuhaler 6µg; 60 doses (Pharmaceutical Benefits Scheme (PBS) item code 8239P) is included for all adults pre-2005 but only for concession card holders in 2005 and 2006. This is due to the fact that the price for this item was below the general PBS threshold from 2005 onwards (see Appendix 1, Table A1.7).

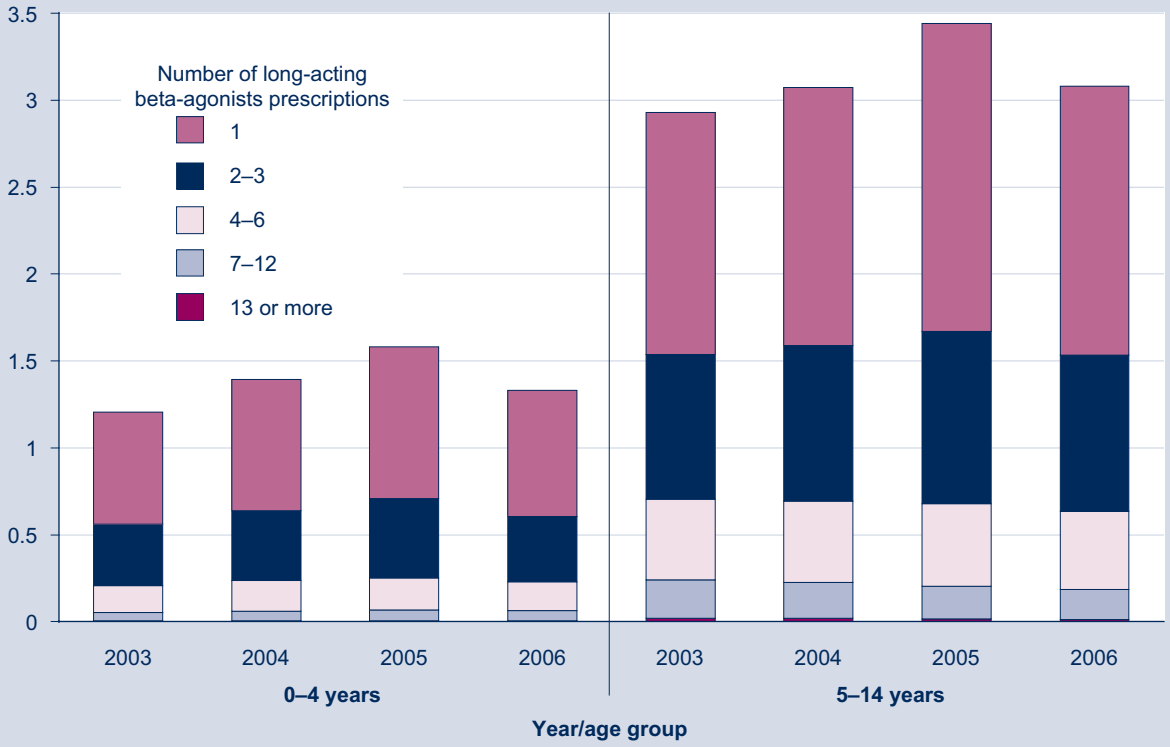
Sources: Pharmaceutical Benefits Scheme; Australian Bureau of Statistics.

Figure 6.14: Use of long-acting beta-agonists among adults, by age group, number of prescriptions and year, 2003–2006

Long-acting beta-agonist prescriptions among children

The proportion of children dispensed long-acting beta-agonists also increased between 2003 and 2005 (Figure 6.15). Between 2005 and 2006, there was a decrease in the rate of prescriptions for this class of medication among children.

In 2006, 2.5% of all children aged 0–14 years were dispensed at least one prescription for long-acting beta-agonists. Usage was much lower in younger children. In contrast to adults, approximately half of the children prescribed long-acting beta-agonists were dispensed only one prescription in any given year (Figure 6.15). Very few children averaged one or more prescriptions for long-acting beta-agonists per month.



Note: Includes all those using long-acting beta-agonists alone and in combined formulation with inhaled corticosteroids.

Sources: Pharmaceutical Benefits Scheme; Australian Bureau of Statistics.

Figure 6.15: Use of long-acting beta-agonists among children, by age group, number of prescriptions and year, 2003–2006

Oral corticosteroids

During episodes of more severe asthma (known as 'exacerbations'), oral corticosteroids may be used to gain control of the disease. A very small number of people with asthma need long-term treatment with oral corticosteroids to control their disease.

Among concession card holders who had a prescription for any asthma medication in 2006, 3.4% were dispensed oral corticosteroids (Table 6.5). The use of oral corticosteroids increased with age, with 1.5% of those aged 15–34 years compared to 4.6% of those aged 65 years and over being dispensed oral corticosteroids in 2006.

Table 6.5: Proportion of concessional population dispensed oral corticosteroids, by demographic characteristics, 2006

	Age 15 years and over		Age 15–34 years	
Demographic characteristics	**Number**	**Per cent**	**Number**	**Per cent**
Sex				
Male	67,013	3.1	5,098	1.1
Female	108,141	3.7	11,954	1.8
Age group				
15–34 years	17,052	1.5	17,052	1.5
35–64 years	55,552	3.1	..	..
65 years and over	102,550	4.6	..	..
Remoteness category				
Major Cities	108,015	3.4	10,581	1.5
Inner Regional	44,605	3.8	4,343	1.6
Other areas[(a)]	22,433	2.9	2,114	1.3
All concession card holders	**175,154**	**3.4**	**17,052**	**1.5**

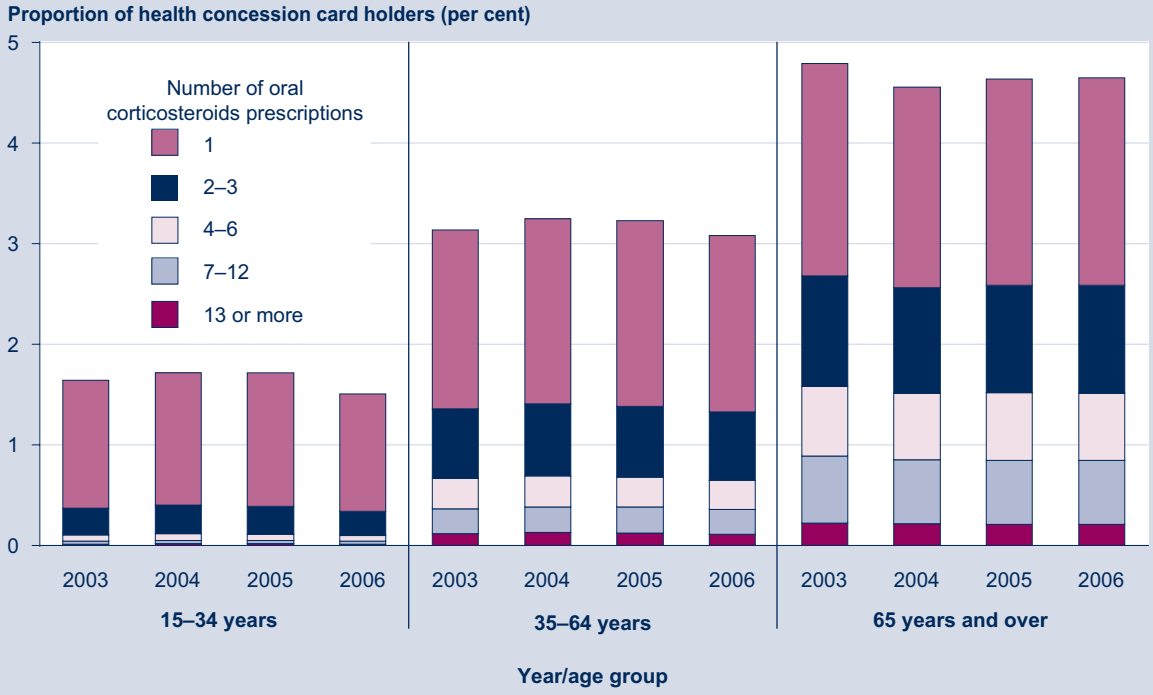
.. Not applicable

(a) Other areas include Outer Regional, Remote and Very Remote.

Note: The National Health Survey was used to estimate the total number of Australians with a government concession card.

Sources: Pharmaceutical Benefits Scheme; Australian Bureau of Statistics 2004–05 National Health Survey.

The use of oral corticosteroids by people being treated for asthma increased with age but has remained stable over the period 2003–2006 (PBS data for concession card holders who had been dispensed at least one other medication for asthma, Figure 6.16). In 2006, 1.5%, 3.1% and 4.6% of people with a concession card aged 15–34 years, 35–64 years and 65 years and over, respectively, were dispensed one or more prescription for oral corticosteroids. Most adults who were dispensed oral corticosteroids filled only one prescription for this class of medication in any one year. Furthermore, the proportion of adults with multiple prescriptions for oral corticosteroids increased with age.



Note: Data restricted to patients with government health concession card.

Sources: Pharmaceutical Benefits Scheme; Australian Bureau of Statistics 2001 and 2004–05 National Health Survey for the population estimate for government health concession card holders.

Figure 6.16: Use of oral corticosteroids among adults with a government health concession card, by age group, number of prescriptions and year, 2003–2006

Summary

The most important change in the nature of the pharmacological treatment for asthma over the last 5 or 6 years has been the gradual increase in use of long-acting beta-agonists in combination with inhaled corticosteroids. This has been accompanied by a reduction in the use of short-acting beta-agonists over this period, possibly indicating a trend to improved levels of control of the disease.

However, there are important age-related differences in treatment for asthma. The use of almost all medications for asthma increases with age. The pattern of use of asthma therapies is quite different in children compared with adults. Use of inhaled corticosteroids is less common in children than in adults with asthma. Most children using inhaled corticosteroids are only dispensed one prescription per year. Furthermore, the majority of inhaled corticosteroids prescribed to children are among the less potent formulations and combination with long-acting beta-agonists is relatively uncommon in children, particularly in young children. In the last year of data (2006), there was a reduction in the use of inhaled corticosteroids.

Among adults, the majority of inhaled corticosteroids are prescribed in combination with long-acting beta-agonists. Clinical trials have shown that this combination should allow equivalent effectiveness for controlling asthma with a lower dose of inhaled corticosteroids. There is some evidence that, in the most recent year of data (2006), there was a reduction in the prescription of the most potent formulations of inhaled corticosteroids. It is clear that intermittent use of inhaled corticosteroids is the most common mode of use in adults, as well as children, despite treatment guidelines recommending regular use in people with persistent asthma.

The explanation for the reduction in both supply of, and prevalence of use of, inhaled corticosteroids in the last 3 or 4 years cannot be directly deduced from the available data. Possible explanations include (a) steroid sparing effects of combination with long-acting beta-agonist; (b) a reduction in the prevalence or severity of asthma in the community; (c) greater recognition of intermittent asthma, particularly in children, for whom regular inhaled corticosteroids may not be indicated; and (d) less appropriate use of inhaled corticosteroids due to the cost of medications and other barriers to their effective use.