3 Individual use of asthma medications

Key points

- Inhaled corticosteroid and long-acting beta agonist users were dispensed, on average, one-quarter of a standard daily dose during the study period. This probably indicates irregular use of these drugs.
- Similarly, people who used short-acting beta agonists or oral corticosteroids also took, on average, around a quarter of the standard daily dose. This may indicate better use, as these drugs should only be used as needed and are not usually recommended for regular use.
- Of the people who used short-acting beta agonists, 14% were dispensed, on average, more than the standard dose per day over the entire study period. This represents very high use and may distinguish individuals with poorly controlled disease.

3.1 Introduction

Current international (GINA 2006) and Australian (NAC 2006) guidelines give recommendations for best practice in the management of asthma. This chapter describes the rates of asthma medication use by individuals during the study period. These rates of use are then compared with asthma management guidelines to assess whether the patterns observed in these data are consistent with current recommendations for asthma care.

3.2 Methods

The calculations in this chapter used the number of DDDs dispensed per record as calculated in Equation 2.1 of the previous chapter. In each medication class the DDDs dispensed in records with the same PIN were summed to get the total number of DDDs dispensed to each person. Therefore:

Equation 3.1

$$\textit{DDDs dispensed to each person} = \textit{sum of DDDs in each PIN}$$

As in previous analyses, formulations that combined medications from more than one class were counted separately as contributing to both medication classes.

The average daily use of each medication class per person was then calculated as follows:

Equation 3.2

$$DDD/person/day = \frac{DDDs\ dispensed\ to\ each\ person}{d}$$

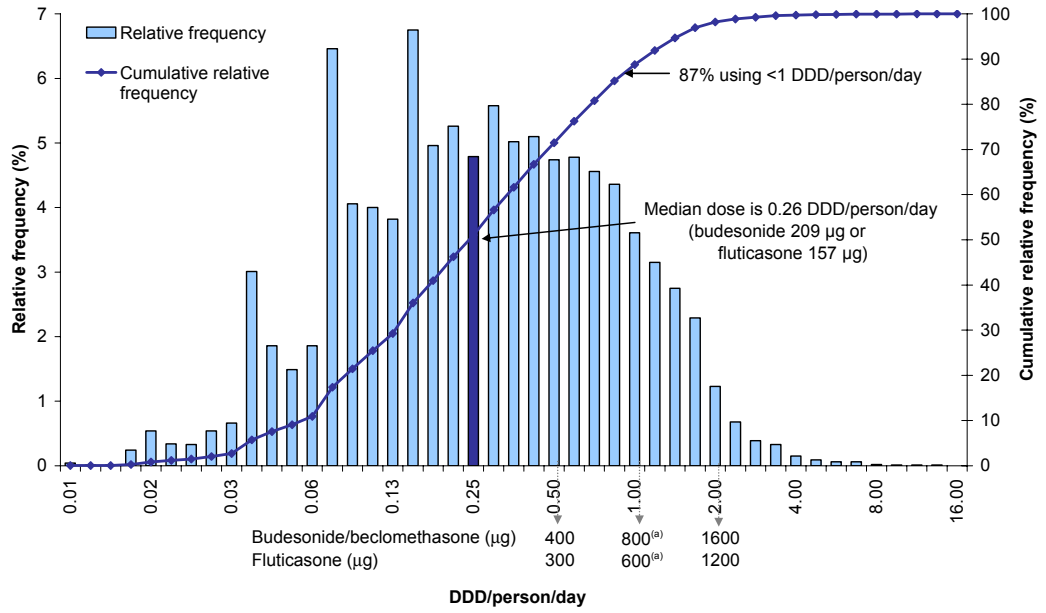
where d is the number of days from the time each person was first dispensed a medication in that class to 30 June 2004 (the end of the period of observation).

For each medication class the frequency distribution of DDD/person/day, median DDD/person/day and the proportion of those whose average daily use was greater than or equal to one DDD/person/day was examined.

3.3 Results

Figures 3.1 to 3.8 show the relative and cumulative frequency distribution of average daily use of each class of asthma medication among those who had at least one prescription for that class dispensed.

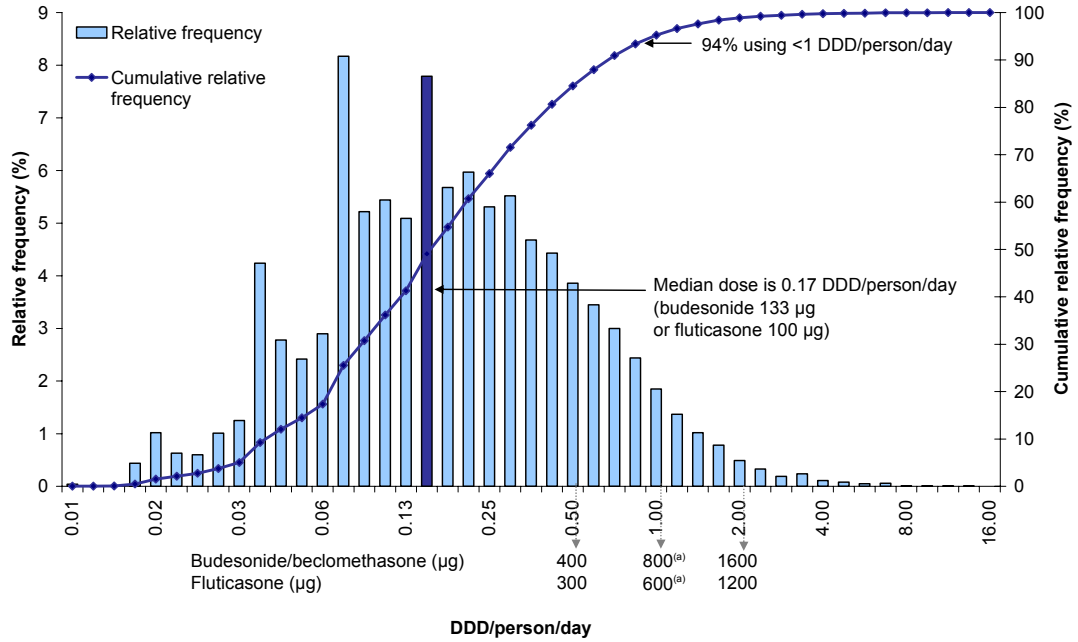
One DDD of inhaled corticosteroid is equivalent to budesonide 800 µg, beclomethasone 800 µg or fluticasone 600 µg. People who used inhaled corticosteroids had a median use of 0.26 DDD/person/day and approximately 13% used an average of one or more DDD/person/day (Figure 3.1). Among people aged 5 to 34 years, the median use was 0.17 DDD/person/day and approximately 6% used one or more DDD/person/day (Figure 3.2).



(a) Examples of inhaled corticosteroid medication doses corresponding to 1 DDD/person/day.

Source: PBS 2002–2004.

Figure 3.1: Average daily use of inhaled corticosteroids, alone or in combination, all ages, Australia, 2002–03 to 2003–04

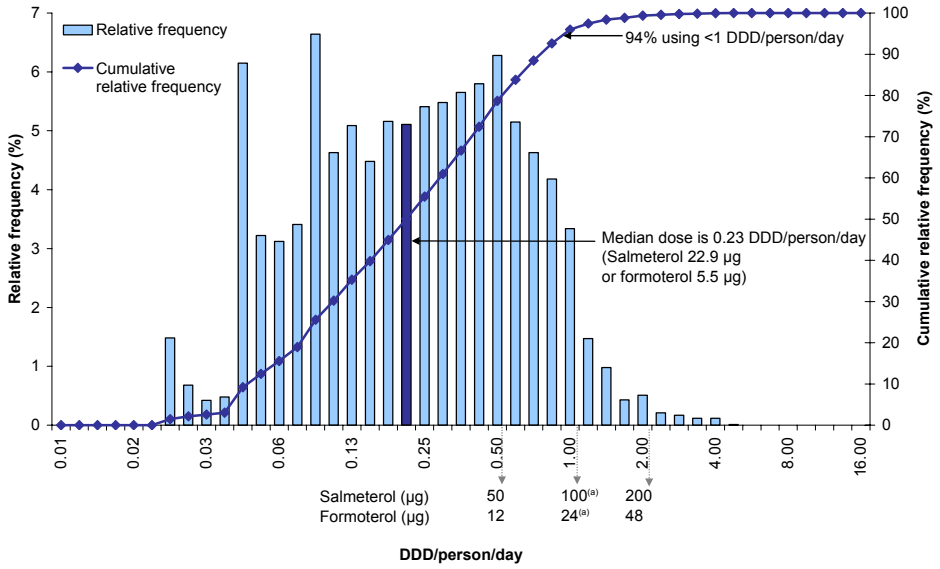


(a) Examples of inhaled corticosteroid medication doses corresponding to 1 DDD/person/day.

Source: PBS 2002–2004.

Figure 3.2: Average daily use of inhaled corticosteroids, alone or in combination, persons aged 5 to 34 years, Australia, 2002–03 to 2003–04

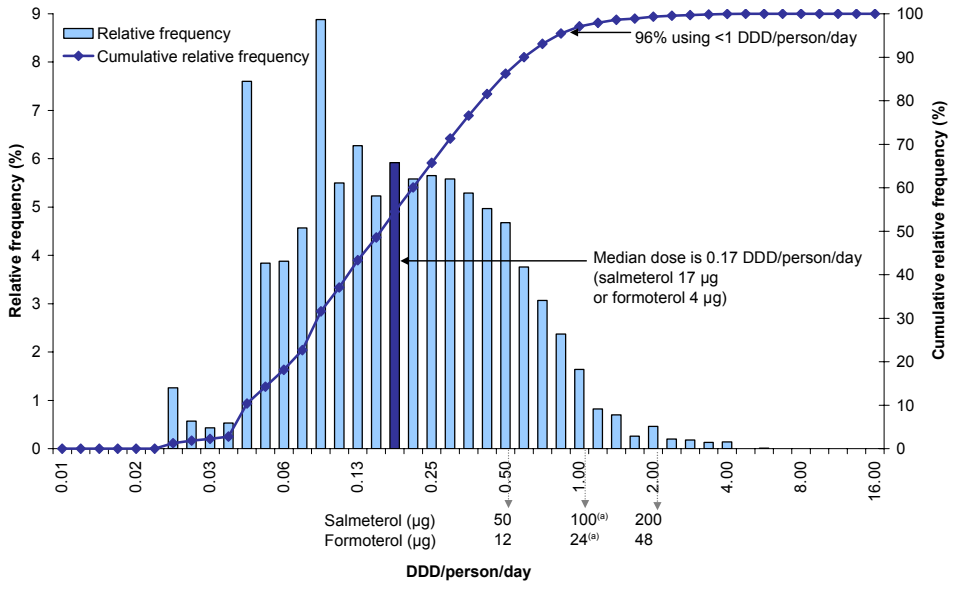
People who were using long-acting beta agonists had a median use of 0.23 DDD/person/day, with 6% using one or more DDD/person/day (equivalent to salmeterol 100 µg or (e)formoterol 24 µg per day) (Figure 3.3). Among people aged 5 to 34 years, the median use was 0.17 DDD/person/day and approximately 4% used one or more DDD/person/day (Figure 3.4).



(a) Examples of long-acting beta agonist medication doses corresponding to 1 DDD/person/day.

Source: PBS 2002–2004.

Figure 3.3: Average daily use of long-acting beta agonists, alone or in combination, all ages, Australia, 2002–03 to 2003–04

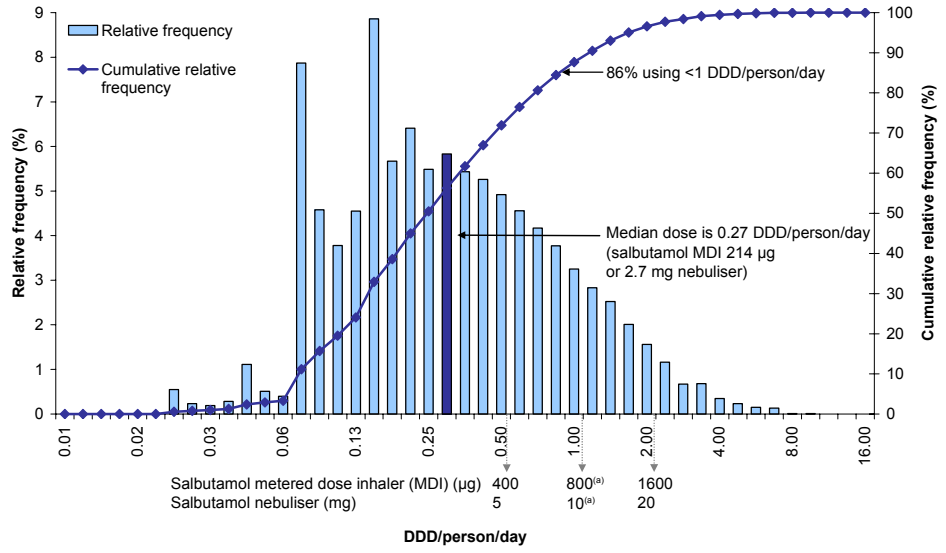


(a) Examples of long-acting beta agonist medication doses corresponding to 1 DDD/person/day.

Source: PBS 2002–2004.

Figure 3.4: Average daily use of long-acting beta agonists, alone or in combination, persons aged 5 to 34 years, Australia, 2002–03 to 2003–04

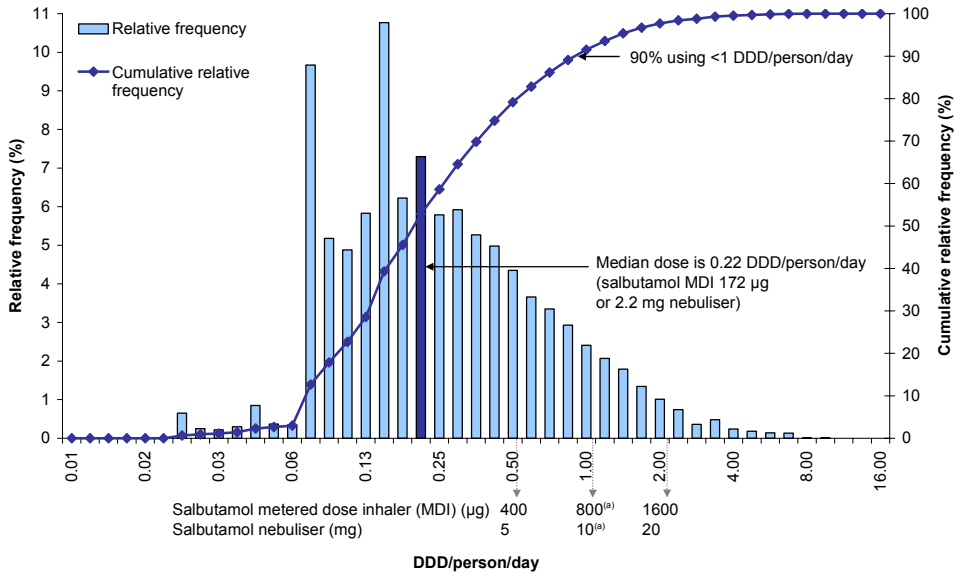
One DDD of short-acting beta agonists is equivalent to salbutamol 800 µg by metered dose inhaler or salbutamol 10 mg by nebuliser. The overall median use of short-acting beta agonists dispensed to concession card holders was 0.27 DDD/person/day and 14% used one or more DDD/person/day (Figure 3.5). Those who were aged 5 to 34 years had a median use of 0.22 DDD/person/day and 10% used one or more DDD/person/day (Figure 3.6).



(a) Examples of short-acting beta agonist medication doses corresponding to 1 DDD/person/day.

Source: PBS 2002–2004.

Figure 3.5: Average daily use of short-acting beta agonists, concessional patients, all ages, Australia, 2002–03 to 2003–04



(a) Examples of short-acting beta agonist medication doses corresponding to 1 DDD/person/day.

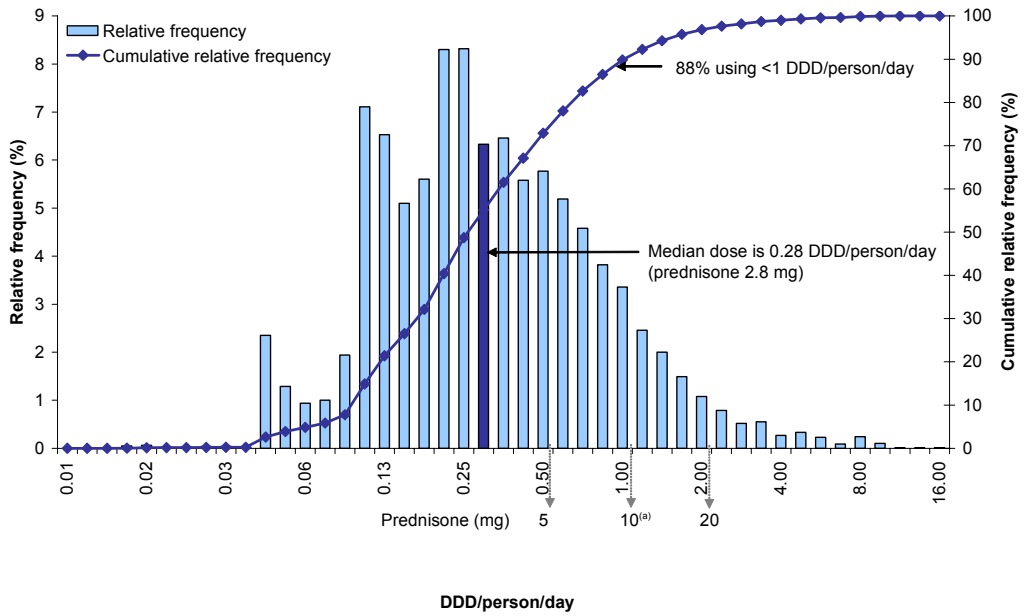
Source: PBS 2002–2004.

Figure 3.6: Average daily use of short-acting beta agonists, concessional patients, aged 5 to 34 years, Australia, 2002–03 to 2003–04

Short-acting beta agonists can be divided into those administered by metered dose inhaler or dry powder inhaler and those administered by nebuliser. The median use of short-acting beta agonists administered by nebuliser was 0.13 DDD/person/day and 9% were using one or more DDD/person/day. Among those aged 5 to 34 years, the median use was 0.08 DDD/person/day and 2% used one or more DDD/person/day (data not shown).

The median use of short-acting beta agonists administered by metered dose inhaler or dry powder inhaler was 0.28 DDD/person/day and 13% were using one or more DDD/person/day (data not shown). This was similar to the overall median daily doses for short-acting beta agonists. Among those aged 5 to 34 years, the median use of short-acting beta agonists administered by metered dose inhaler or dry powder inhaler was 0.22 DDD/person/day and 10% used one or more DDD/person/day (data not shown).

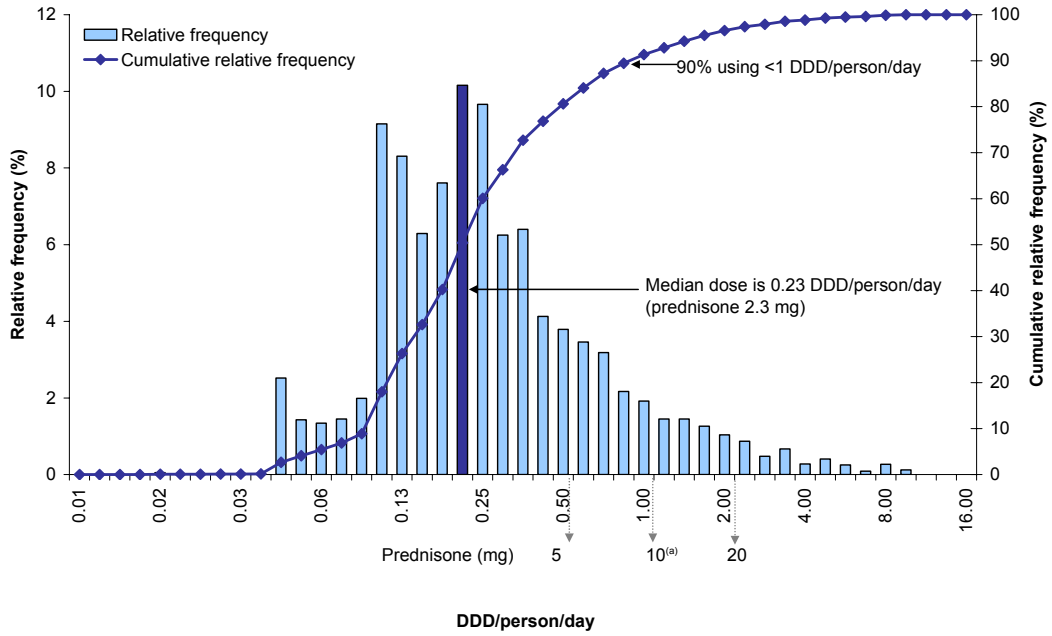
One DDD of oral corticosteroids is equivalent to prednisone 10 mg. The median use of oral corticosteroids dispensed to concession card holders who had also been dispensed other asthma medications was 0.28 DDD/person/day and 12% used one or more DDD/person/day (Figure 3.7). Among those aged 5 to 34 years, median use was 0.23 DDD/person/day and 10% used one or more DDD/person/day (Figure 3.8).



(a) Dose of prednisone corresponding to 1 DDD/person/day.

Source: PBS 2002–2004.

Figure 3.7: Average daily use of oral corticosteroids, concessional patients who had also been dispensed other respiratory medications, all ages, Australia, 2002–03 to 2003–04



(a) Dose of prednisone corresponding to 1 DDD/person/day.

Source: PBS 2002–2004.

Figure 3.8: Average daily use of oral corticosteroids, concessional patients who had also been dispensed other respiratory medication, aged 5 to 34 years, Australia, 2002–03 to 2003–04

Table 3.1: Summary of use of asthma medication classes by people who had at least one prescription for a medication class, by age group, Australia, 2002–03 to 2003–04

Age group (years)	Measures	Inhaled corticosteroids	Long-acting beta agonists	Short-acting beta agonists[a]	Oral corticosteroids[a, b]
	Examples of 1 DDD unit	*Fluticasone 600 μg Budesonide 800 μg*	*Salmeterol 100 μg (e)formoterol 24 μg*	*Salbutamol: MDI 0.8 mg Nebuliser 10 mg*	*Prednisone 10 mg*
0 to 4	Number of persons	39,953	15,292	62,367	289
	Median use (DDD/person/day)	0.08	0.21	0.16	0.16
	Proportion with DDD/person/day ≥ 1	2.2%	5.3%	8.7%	9.7%
5 to 14	Number of persons	205,727	110,247	173,837	13,388
	Median use (DDD/person/day)	0.11	0.18	0.20	0.22
	Proportion with DDD/person/day ≥ 1	2.5%	3.7%	7.2%	9.8 %
15 to 34	Number of persons	370,915	229,563	231,307	39,031
	Median use (DDD/person/day)	0.21	0.16	0.23	0.23
	Proportion with DDD/person/day ≥ 1	7.5%	3.8%	12%	9.7%
35 to 64	Number of persons	614,958	404,799	330,942	93,580
	Median use (DDD/person/day)	0.30	0.23	0.30	0.28
	Proportion with DDD/person/day ≥ 1	14%	5.4%	16%	13%
65 and over	Number of persons	393,107	278,325	429,209	163,517
	Median use (DDD/person/day)	0.47	0.35	0.33	0.31
	Proportion with DDD/person/day ≥ 1	23%	8.4%	17%	12%
All persons	**Number of persons[c]**	**1,625,414**	**1,038,747**	**1,228,463**	**309,997**
	Median use (DDD/person/day)	**0.26**	**0.23**	**0.27**	**0.28**
	Interquartile range	**0.11, 0.62**	**0.10, 0.49**	**0.14, 0.61**	**0.15, 0.58**
	Proportion with DDD/person/day ≥ 1	**13%**	**5.6%**	**14%**	**12%**

(a) Short-acting beta-agonists and oral corticosteroids limited to prescriptions that were dispensed when the patients were concession card holders.

(b) Oral corticosteroids are only those dispensed to individuals who had also been dispensed other respiratory medications.

(c) Overall number may be slightly greater than the sum of the subgroups as a small proportion of records were missing demographic data (see Table 2.1) and does not exclude individuals whose first date of supply was after 23 June 2004 or records of items where a person had filled more than 96 prescriptions for the item in a single medication class.

The median use of all four drug classes was approximately 0.25 DDD/person/day. Use was less in younger individuals and increased with age. The proportion of people taking more than one DDD per day was 12–14% for inhaled corticosteroids, short-acting beta agonists and oral corticosteroids, and 6% for long-acting beta agonists (Table 3.1).

Use tended to be lower among younger people and increased with age for all drug classes. Up until age 35 years, the proportion of people taking more than one DDD per day was highest for oral corticosteroids, and after this age it was highest for inhaled corticosteroids.

Concession card holders who were dispensed inhaled corticosteroids and long-acting beta-agonists used more of these medications (median use 0.36 and 0.27 DDD/person/day respectively) than general beneficiaries (median use 0.26 and 0.20 DDD/person/day respectively) (data not shown).

3.4 Discussion

Most individuals who were dispensed medications for asthma did not use one DDD every day. In fact, on average, individuals used approximately one-quarter of the total amount of medication that would be consistent with one DDD every day. From this analysis it cannot be ascertained whether the lower use was attributable to regular use at less than one DDD per day, or irregular use of a full DDD, or a combination of both of these.

Inhaled corticosteroids and long-acting beta agonists

The low use observed in this study is of most concern in relation to those medications that are intended to be used on a regular basis to control the disease, in particular, inhaled corticosteroids. There is general consensus that patients with moderate to severe persistent asthma should be using inhaled corticosteroids on a regular basis. The best way to use inhaled corticosteroids when persistent asthma is only mild remains a subject of some controversy. However, current asthma management guidelines still recommend the regular use of inhaled corticosteroids in all patients with persistent asthma (NAC 2006). The role of inhaled corticosteroids in the control of intermittent asthma is not established. There is little evidence to support the use of inhaled corticosteroids on an irregular basis and existing guidelines do not recommend this mode of use.

One explanation for these findings is that these medications may be prescribed by doctors at doses that are lower than the defined daily doses. This may be the case in children, for whom recommended doses are lower than adult doses. It may also apply to people who are prescribed inhaled corticosteroids combined with long-acting beta agonists. While intentional prescription of lower doses may contribute to the low use observed in those who were prescribed this class of medication, it is unlikely to fully account for it. Another explanation is that many people who are prescribed inhaled corticosteroids do not use them regularly. Similar findings have been reported elsewhere (Janson et al. 2005; Poluzzi et al. 2002). Possible reasons for this include:

- under-use of asthma medications in the community, linked to barriers such as cost and poor education
- tendency to only use or prescribe medications when ill (such as when experiencing a viral respiratory infection) or when more vulnerable (such as during the winter months)
- management of intermittent asthma, which is very common among children, and may often be managed by irregular use of inhaled corticosteroids
- sporadic use and/or prescription for indications other than asthma.

Short-acting beta agonists

Other drug categories, including oral corticosteroids and short-acting beta agonists, should not usually be taken regularly for long periods to treat asthma. Therefore, the observation that those who had prescriptions for these medications used appreciably less than one DDD per day is consistent with correct use of these medications for asthma. Indeed, use of one or more DDD of short-acting beta agonists per day over a prolonged follow-up period probably distinguishes individuals who have poorly controlled asthma (Anis et al. 2001). Among people of all ages who took short-acting beta agonists, 14% were taking one or more DDD per day, and among people aged 5 to 34 years, 10% took one or more DDD per day. Data on people who took short-acting beta agonists via nebulisers were separately analysed. A lower proportion of people aged 5 to 34 years used one or more DDD per day of nebulised short-acting beta agonists (2%), and among all ages this proportion was 9%. This method of delivery is typically used during episodes of more severe asthma symptoms. However, some individuals, in particular older patients, use nebulisers regularly, even during periods of good control.

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.

Oral corticosteroids

Like short-acting beta agonists, oral corticosteroids are mainly used by people with asthma during disease exacerbations or periods of poor disease control. Among those who had used oral corticosteroids (along with other asthma medications), 12% were dispensed more than one DDD (equivalent to > 10 mg prednisone) per day during the follow-up period (Figure 3.7).

It is difficult to assess the appropriateness of this pattern of use of oral corticosteroids. However, a key aim of effective asthma management is to promote the episodic use of oral steroids for exacerbations that do not respond to simpler approaches but to try to avoid the harmful effects that arise from long-term, regular use of oral corticosteroids. More detailed knowledge of how oral corticosteroids are used by patients with asthma would help in planning interventions in this area.