

6 Use of health services and medication for asthma

Children with asthma use health services for a variety of reasons. These include visiting a general practitioner (GP) for routine review or the prescription of asthma medications, or, in the most extreme cases, admission to an emergency department for urgent management of exacerbations or hospitalisation.

Children under the age of 14 years are more likely than adults to visit a GP for asthma care (ACAM 2008). Of all GP encounters, the proportion of those related to asthma is largest among children aged between 5 and 14 years than at any other age.

Among children aged 0–14 years who visited a GP for their asthma between 2004 and 2007, 39% were prescribed inhaled corticosteroids (ICS) either alone or in combination with long-acting beta agonists (ACAM 2008). Few children were prescribed oral corticosteroids, which are used for management of severe exacerbations, and even fewer were prescribed the non-steroid preventers: leukotriene receptor antagonists or cromones.

Children have high rates of hospitalisation for asthma compared with adults (ACAM 2008), and those who live in areas of greater socioeconomic disadvantage have higher rates than those living in other areas. However, over recent years the number of children receiving hospital care for asthma and the duration of hospital stays for asthma care have decreased. Between 1993–94 and 2006–07 there was a 42% reduction in the rate of hospital admissions for asthma among children, and between 1998–99 and 2006–07 the average length of stay decreased by 24%.

Severe and poorly controlled asthma has important consequences for the child and the health-care system. Children with severe and inadequately controlled asthma are more likely to use emergency medical care or require hospital admission, compared with those who use an asthma action plan and properly administer medications.

The identification of factors associated with health service use in children would assist in the improvement of asthma management plans and, potentially, ease the burden on emergency departments and hospitals.

Methods

Two year follow-up data from the LSAC infant and kindergarten cohorts were used to examine the use of health services for asthma. Data on asthma medications dispensed to members of both cohorts, between the baseline and the 2 year follow-up surveys, were obtained from the PBS database.

Parent-report of medications used for asthma in the last 12 months was also examined using the follow-up survey. Data on hospitalisations for asthma among the kindergarten cohort were obtained from the parent-completed questionnaire at the follow-up survey. There were no data on hospitalisations for asthma in the infant cohort.

Results

Infants

Asthma medication use at 2 year follow-up

In their third year of life, 11.5% of the entire infant cohort and 30.0% of those with parent-reported wheeze or asthma had used asthma medications in the last 12 months (Table 6.1). Among infants who had wheeze or ever diagnosed asthma at age 2–3 years, 10% had used preventer medications (ICS, cromones and/or leukotriene receptor antagonists) at least once during the 2 year period between baseline and follow-up.

Table 6.1: Prevalence^(a) of asthma medication use at age 2–3 years, infant cohort

| Type of asthma medication and source of information | Infants with parent-reported wheeze or asthma at age 2–3 years | | All children | |
|---|--|---|--------------------|---|
| | Number of children | Prevalence per 100 children at risk ^(a) (95% CI) | Number of children | Prevalence per 100 children at risk ^(a) (95% CI) |
| Number of children at risk | 1,691 | | 4,606 | |
| Information collected from PBS linked data for medications^(b) dispensed between baseline and 2 year follow-up | | | | |
| Any ICS | 140 | 8.7 (7.1–10.2) | 156 | 3.7 (3.1–4.4) |
| ICS alone | 76 | 5.4 (4.1–6.8) | 82 | 2.2 (1.7–2.8) |
| ICS in combination with long-acting beta agonists (LABA) | 72 | 3.9 (2.9–4.9) | 83 | 1.8 (1.3–2.2) |
| Cromones | 2 | 0.1 (0.0–0.4) | 5 | 0.1 (0.0–0.3) |
| Leukotriene Receptor Antagonists | 30 | 1.6 (1.0–2.1) | 31 | 0.6 (0.4–0.9) |
| Any of the above medications | 167 | 10.1 (8.5–11.8) | 187 | 4.4 (3.7–5.1) |
| Information collected at 2 year follow-up from questionnaire | | | | |
| Medication for asthma in last 12 months | 501 | 30.0 (28.0–32.1) | 501 | 11.5 (10.5–12.6) |

(a) Weighted to the Australian population aged 0–1 years as at March 2004.

(b) Does not include over-the-counter items and items that cost less than the general patient copayment, in particular short-acting beta agonists (such as Ventolin) and Prednisone.

Kindergarten cohort

Asthma medication use at 2 year follow-up

In their seventh year of life, 15.5% of the entire kindergarten cohort and 43.5% of those who had parent-reported wheeze or asthma at age 4–5 years had used medication for asthma in the last 12 months, as reported by a parent (Table 6.2). Twenty-two per cent of those who had wheeze or asthma at age 4–5 years had used preventer medications (inhaled corticosteroids, leukotriene receptor antagonists, or cromones) at least once during the 2 year period between baseline and the follow-up.

Table 6.2: Prevalence^(a) of asthma medication use at age 6–7 years, kindergarten cohort

| Type of asthma medication and source of information | Children with parent-reported wheeze or asthma at baseline | | All children | |
|---|--|---|--------------------|---|
| | Number of children | Prevalence per 100 children at risk ^(a) (95% CI) | Number of children | Prevalence per 100 children at risk ^(a) (95% CI) |
| Number of children at risk | 1,202 | | 4,464 | |
| Information collected from PBS linked data for medications^(b) dispensed between baseline and 2 year follow-up | | | | |
| Any inhaled corticosteroids (ICS) | 234 | 19.3 (17.0–21.7) | 319 | 7.2 (6.4–8.0) |
| ICS alone | 98 | 8.4 (6.6–10.2) | 122 | 2.8 (2.3–3.4) |
| ICS in combination with long-acting beta agonists (LABA) | 157 | 12.5 (10.6–14.4) | 219 | 4.8 (4.2–5.5) |
| Cromones | 7 | 0.4 (0.1–0.8) | 13 | 0.3 (0.1–0.4) |
| Leukotriene Receptor Antagonists | 56 | 4.4 (3.1–5.7) | 69 | 1.5 (1.1–1.9) |
| Any of the above medications | 268 | 22.2 (19.5–24.8) | 370 | 8.3 (7.5–9.2) |
| Information collected at 2 year follow-up from questionnaire | | | | |
| Medication for asthma in last 12 months | 524 | 43.5 (40.1–46.8) | 685 | 15.5 (14.1–16.8) |

(a) Weighted to the Australian population aged 4 years as at March 2004.

(b) Does not include over-the-counter items and items that cost less than the general patient copayment, in particular short-acting beta-agonists (such as Ventolin) and Prednisone.

Hospitalisation for asthma at 2 year follow-up

Among children who had parent-reported wheeze or asthma at age 4–5 years, 2.2% (95% CI 1.3–3.2) had been admitted to hospital for asthma in the 12 months preceding the 2 year follow-up assessment (data not shown).

Frequent asthma symptoms and medication use

Of the 1,202 children who had parent-reported wheeze or asthma at age 4–5 years, 11% had frequent symptoms at age 6–7 years (Table 6.3). As expected, children with frequent symptoms at 2 year follow-up had higher rates of asthma medication use than those with infrequent or no symptoms (Table 6.4).

Table 6.3: Asthma symptoms at age 6–7 years among children with parent-reported wheeze or asthma at age 4–5 years, kindergarten cohort

| Frequency of asthma symptoms ^(a) | Number of children | Per cent (95% CI) |
|---|--------------------|-------------------|
| Infrequent or no symptoms | 1,082 | 89.2 (87.2–91.1) |
| Frequent symptoms | 120 | 10.8 (8.9–12.8) |
| Total | 1,202 | 100.0 |

(a) Frequency of asthma symptoms defined by number of times in last 12 months that child had wheezing that lasted for at least 1 week: 0–2 times = Infrequent or no symptoms; 3+ times = Frequent symptoms.

Table 6.4: Prevalence^(a) of asthma medication use at age 6–7 years by frequency of symptoms among children with parent-reported wheeze or asthma at age 4–5 years, kindergarten cohort

| Type of asthma medication and source of information | Infrequent or no symptoms | | Frequent symptoms | |
|---|---------------------------|---|--------------------|---|
| | Number of children | Prevalence per 100 children at risk ^(a) (95% CI) | Number of children | Prevalence per 100 children at risk ^(a) (95% CI) |
| Number of children at risk | 1,082 | | 120 | |
| Information collected from PBS linked data for medications^(b) dispensed between baseline and 2 year follow-up | | | | |
| Any inhaled corticosteroids (ICS) | 179 | 16.2 (13.7–18.6) | 55 | 45.1 (36.1–54.1) |
| ICS alone | 75 | 6.9 (5.2–8.6) | 23 | 20.5 (12.8–28.2) |
| ICS in combination with long-acting beta agonists (LABA) | 119 | 10.4 (8.5–12.3) | 38 | 29.9 (21.0–38.7) |
| Cromones | 5 | 0.3 (0.0–0.7) | 2 | 1.3 (0.0–3.1) |
| Leukotriene Receptor Antagonists | 44 | 4.0 (2.6–5.4) | 12 | 8.0 (2.9–13.1) |
| Any of the above medications | 208 | 19.0 (16.2–21.8) | 60 | 48.1 (38.7–57.5) |
| Information collected at 2 year follow-up from questionnaire | | | | |
| Medication for asthma in last 12 months | 426 | 38.8 (35.4–42.2) | 98 | 81.8 (74.7–88.9) |

(a) Weighted to the Australian population aged 4 years as at March 2004.

(b) Does not include over-the-counter items and items that cost less than the general patient copayment, in particular short-acting beta agonists (such as Ventolin) and Prednisone.

Frequent asthma symptoms and hospitalisation for asthma

Among children with parent-reported wheeze or asthma at age 4–5 years, those who had frequent symptoms at the follow-up assessment were more likely to have been hospitalised for asthma in the preceding 12 months (10.6% (95% CI 4.5–16.7)) than those with infrequent or no symptoms at the follow-up assessment (1.2% (95% CI 0.5–1.9)) (data not shown).

Discussion

Questionnaire data from parents showed that only 30% of infants with wheeze or asthma at age 2–3 years had used any medication for their condition in the last 12 months. This is consistent with the findings of others (Beimfohr et al. 2001). It seems likely that in many cases the symptoms of wheeze among infants and young toddlers did not require treatment. However, there may be some variation in the practice of prescribing asthma medications for children under the age of 6 years (Zuidgeest et al. 2009).

According to information from PBS linked data, most of the medications that were prescribed at this age were not ‘preventer’ medications. Only 10% of infants with parent-reported wheeze or asthma had filled a script for either ICS (alone or in combination with LABA), cromones or leukotriene receptor antagonists. This is equivalent to approximately one-third of children whose parents reported medication use via questionnaire. These findings reflect the fact that most wheezing illness in infants does not require treatment with this class of medications. Among infants, inhaled bronchodilators are recommended for short-term treatment of virus-associated episodic wheeze (Eigen 2008). The National Asthma Council (NAC) recommends the prescription of short-acting beta agonists (SABA) for all children with symptomatic asthma as a reliever therapy (NAC 2006). Although we cannot directly measure SABA use with the PBS dataset (because most of it is purchased over-the-

counter), our findings suggest that up to two-thirds of medication use reported by parents were SABAs.

Among children in the kindergarten cohort with wheeze or asthma at 4–5 years, parents reported that 43.5% had taken asthma medication in the 12 months preceding 2 year follow-up. It is possible that some of the children with initial parent-reported wheeze or asthma had become asymptomatic or had gone into remission by follow-up. Alternatively, some parents may have forgotten about medication used to treat asthma symptoms during the early part of the 12 months preceding follow-up. The PBS data analysis revealed that 22% of those with parent-reported wheeze or asthma at baseline used ICS, cromones or leukotriene receptor antagonists, at least once during the follow-up period. This is equivalent to approximately 50% of children with parent-reported medication use. Since bronchodilators, such as Ventolin, are the only other commonly used medication for asthma, it is likely that most of the remaining 50% of children were using bronchodilator alone. Another possibility is that some of the parent-reported data represents over-the-counter medication used for asthma, PBS listed items that are privately funded and items that cost less than the general patient copayment.

A comparison of the infant and kindergarten cohort demonstrates that there is a reduction in the use of SABA without ‘preventer’ medications between infancy and the kindergarten age. This is consistent with current asthma guidelines, which recommend that young children do not require long-term preventive medication and that a stepwise approach to drug therapy should be implemented in symptomatic children (NAC 2006). Infants are more likely to be prescribed SABA alone to deal with exacerbations, which are usually related to a viral respiratory tract infection, while older children are more likely to be prescribed preventer medications in response to the natural progression of their illness.

At 2 year follow-up, 161 children from the kindergarten cohort who were asymptomatic at baseline (4.9%) had taken asthma medication in the previous 12 months (data not shown). A majority of these cases will have been new asthma cases, although some may have been prescribed this medication for viral respiratory tract infections.

Nearly half of the hospitalisations for asthma within the kindergarten cohort occurred in children who had not reported symptoms or been diagnosed with asthma at the time of the baseline survey (data not shown). In other words, in these children hospitalisation occurred at, or soon after, the time of initial diagnosis. This early childhood period represents a time of relatively high incidence rates for asthma. These data imply that hospitalisation often occurs early in the course of the illness.

Nearly 20% of children with frequent asthma symptoms were reported not to be taking medications for asthma, and over half were not taking preventer medications. We would expect that all such children with frequent symptoms would have been receiving asthma medication. It is possible that either medication use or frequency of symptoms was incorrectly reported for these children. However, it is also possible that this apparent under-treatment may have contributed to the fact that 10.6% of those reporting frequent symptoms at 2 year follow-up also reported that their child had been hospitalised for asthma during the same period. In summary, we have found evidence to suggest that asthma and asthma symptoms are under-treated among a small group of children with frequent symptoms. This may have led to poorer outcomes, including higher rates of hospitalisation.