

# Childhood asthma in Melbourne's inner west: Emergency department visits and parental perspectives on enablers and barriers of care

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## Background and objectives

In Australia, asthma is the most common chronic childhood disease, with prevalence and care varying across communities. In three local government areas (LGAs) in Melbourne's inner west, we compared childhood asthma-related emergency department (ED) visits to Victoria overall, and explored parents' perceived enablers and barriers to community-based asthma care.

## Methods

We used an administrative dataset (2007–19) and a cross-sectional survey of parents across six primary schools in the three LGAs (2022–23). Descriptive analysis was conducted to present childhood asthma-related ED rates, and asthma control, management practices, parental perceived asthma care enablers and barriers. Differences in these measures across LGAs were also examined.

## Results

Childhood asthma-related ED visit rates were 26–53% higher in the three LGAs compared with Victoria overall. Parents ( $n = 545$ ) identified general practitioners (GPs), pharmacists and EDs as the most helpful resources, but faced barriers to community-based asthma care, such as fear during asthma flare-ups, difficulty accessing GPs, and concerns about medication side effects.

## Discussion

Melbourne's inner west has disproportionately higher asthma-related ED presentation rates. This warrants further investigation and development of strategies to improve community-based asthma care and reduce triggers, including air pollution.

**ASTHMA IS THE MOST COMMON** chronic condition affecting Australian children,<sup>1–3</sup> with childhood asthma estimated to cost about \$7.1 billion in 2022.<sup>4</sup> However, not all communities are impacted equally, with children from lower socioeconomic areas<sup>5</sup> or exposed to harmful air pollution more likely to experience asthma.<sup>6</sup> Improving indoor and outdoor air quality to reduce triggers and access to high-quality community-based asthma care can help prevent unnecessary emergency department (ED) visits and reduce healthcare costs.<sup>6–8</sup> In addition, supporting caregivers in accessing and navigating the asthma care system and achieving effective asthma control are essential, particularly in high-risk communities.

Asthma not only affects children's physical health, but also their social and emotional wellbeing.<sup>9</sup> Poorly controlled asthma can lead to increased stress, reduced participation in daily activities and subsequent social isolation.<sup>10</sup> Caregivers often carry significant personal and professional burdens, including heightened responsibilities and disruptions to their routines (eg time off work to attend appointments) when asthma is poorly controlled.<sup>1</sup> Addressing these multifaceted impacts requires a holistic approach to asthma care that considers both the clinical burden and the lived experiences of affected children and their families.<sup>7,11,12</sup>

Certain communities in Australia experience higher asthma risk, reflecting greater exposure to risk factors, and likely, systemic inequities in care. For example, when looking at the entire population (ie children and adults) in 2019, the local government areas (LGAs) of Maribyrnong, Hobsons Bay and Brimbank in Melbourne's inner west had substantially higher asthma-related hospitalisation rates than the Australian average.<sup>13</sup> When looking at children, the Australian Atlas of Healthcare Variation (2011–13) also identified Maribyrnong as having the highest asthma hospital admissions rate among those aged 3–19 years in Victoria.<sup>14</sup> However, these data are outdated and limited to short cross-sectional periods, highlighting the need for more current and longitudinal data to determine whether these higher rates have persisted over time.

Children with asthma rely on their caregivers for effective symptom management,<sup>1</sup> which is critical to reducing asthma-related morbidity, mortality, hospitalisation and severe exacerbations.<sup>15</sup> However, families frequently face challenges accessing and navigating healthcare systems, worsening asthma carers' burden.<sup>16</sup> Although qualitative studies have explored caregivers' perspectives on asthma care,<sup>1,16,17</sup> specific enablers and barriers to asthma care in Melbourne's inner west, where the burden appears disproportionately high,<sup>13</sup> remain unclear.

In Melbourne's inner west, we examined childhood asthma through two lenses: (1) trends in childhood asthma-related ED presentations compared with the overall Victorian average over a decade; and (2) parental perspectives on the enablers and barriers for seeking asthma care. This study aims to inform our understanding of childhood asthma care in high-risk communities.

## Methods

This study used two datasets to address two separate aims. For aim (1), we conducted a quantitative analysis using population-based administrative data from the Victorian Emergency Minimum Dataset (VEMD). For aim (2), we used a cross-sectional parent survey data from the Breathe Melbourne project. Detailed methods for each aim are presented below.

### Aim 1: Childhood asthma-related emergency department presentations

#### *Data sources, study design and procedures*

VEMD contains de-identified data on ED presentations to Victorian public hospitals.<sup>18</sup> Data from 1 July 2007 to 30 June 2019 were obtained for those aged 0–19 years through the Centre for Victorian Data Linkage.<sup>19</sup> These data included presentation date, patients' sex, age, residential postcode, and diagnosis. Patients residing outside of Victoria were excluded.

#### *Measures*

Presentations were classified as asthma-related if the diagnosis contained any of the following International Classification of Diseases 10th revision (ICD-10) Australian Modification (AM) codes: J45 (Asthma), J46 (Status asthmaticus) or R06.2 (Wheezing). Postcode-level data were mapped to LGAs using the Australian Bureau of Statistics (ABS) correspondence files, with population-weighted calculations applied where postcodes spanned multiple LGAs.<sup>20</sup>

#### *Statistical analysis*

ED presentation rates per 10,000 children were calculated using ABS population estimates.<sup>21</sup> Risk ratios (RRs) were calculated in contingency tables to compare rates in the three LGAs with the overall Victoria. Graphs were produced in R version 4.4.3.

#### *Ethics*

Ethics approval was granted by the Department of Research Ethics and Governance at The Royal Children's Hospital, Melbourne (QA/103907/RCH-2023).

### Aim 2: Community-based childhood asthma care enablers and barriers

#### *Data sources, study design and procedures*

The Breathe Melbourne project<sup>22</sup> was conducted in six public primary schools recruited on the basis of convenience across three LGAs in Melbourne's inner west with known high air pollution levels (ie Maribyrnong, Hobsons Bay, and Brimbank).<sup>13</sup> This study uses data from the first parent survey, distributed electronically via centralised school communication systems to all parents and other caregivers. A de-identified survey link was used via the REDCap data capture platform. The survey was active from 12 November 2022 to 16 March 2023, with three follow-up reminders.

The parent survey was co-developed with respiratory experts and the Victorian Department of Health stakeholders, piloted, and translated into Vietnamese to improve accessibility. Where possible, the questions were from validated tools (eg asthma control questions were from Childhood Asthma Control Test<sup>23</sup>) or measures used in previous studies (eg lung health questions were modified from the International Study of Asthma and Allergies in Childhood, Longitudinal Study of Australian Children, and the HealthNuts Study). The parent survey can be found in Appendix 1 (available online only).

#### *Measures*

One parent per family completed the survey. The parent survey captured demographics such as age, gender, grade, postcode, highest education level, and primary language spoken at home. Neighbourhood disadvantage was linked on the basis of postcode using the 2021 census-derived Index of Relative Socio-economic Advantage and Disadvantage (IRSAD), where higher values indicate less disadvantage.

Children with asthma were defined as those reported to have: (1) doctor-diagnosed asthma; or (2) undiagnosed asthma with symptoms consistent with asthma.

All parents were asked to answer questions on their children's lung health and their understanding of asthma care. Only parents who reported having children with asthma were prompted to answer questions on asthma control, management practices, and asthma care enablers and barriers. Asthma control scores were calculated and classified as well-controlled (scores >19) or not well-controlled (scores ≤19).<sup>23</sup>

#### *Statistical analysis*

Differences in asthma control, management practices, and parental perceived asthma care enablers and barriers across LGAs were tested using Chi-Square or Fisher's Exact test, depending on cell size. All statistical analyses were performed in Stata/SE version 18.0 (StataCorp, College Station, TX, US).

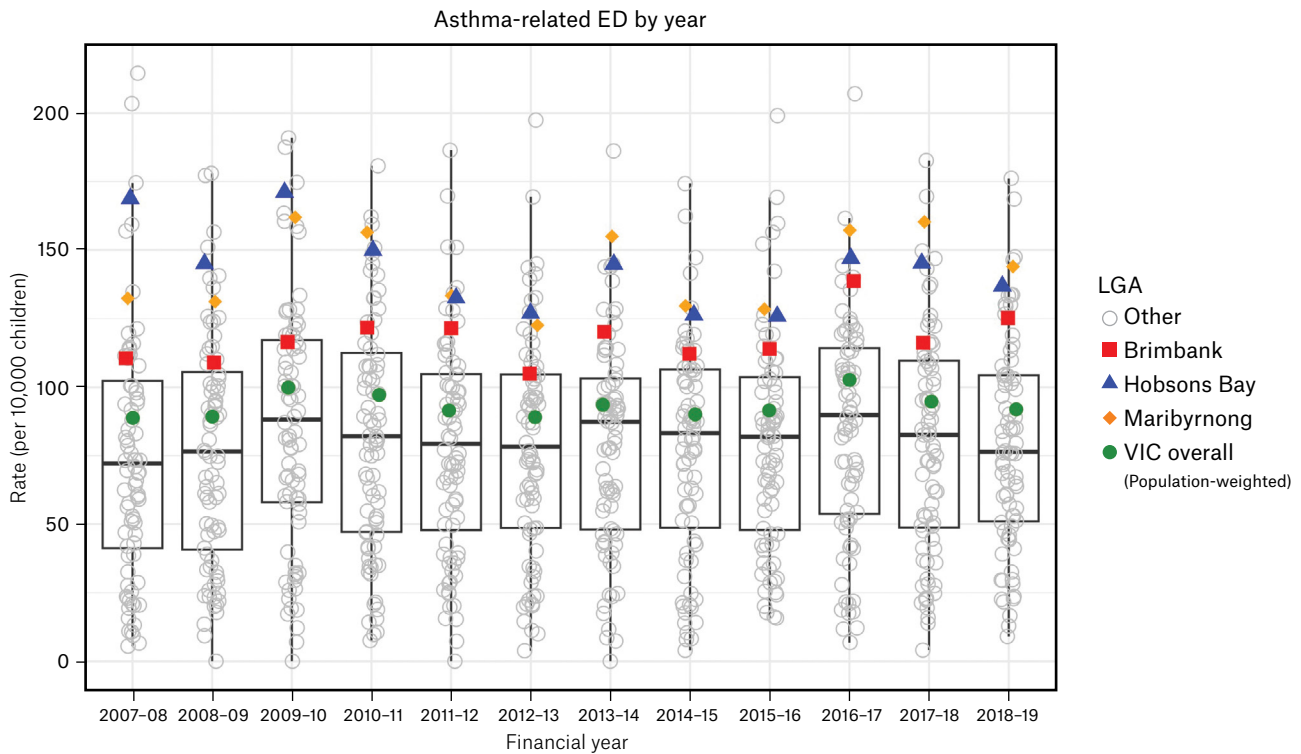
#### *Ethics*

Breathe Melbourne received approval from Deakin University Human Research Ethics Committee (2022-080) and the Victorian Department of Education (2022\_004609).

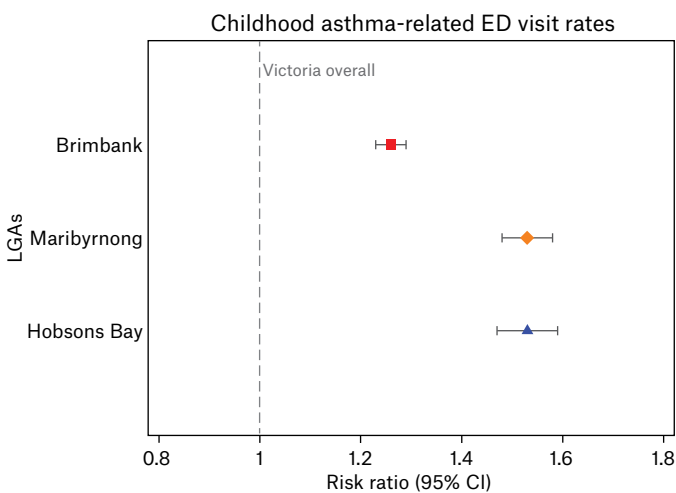
## Results

### Aim 1: Childhood asthma-related emergency department presentations

Figure 1 presents childhood asthma-related ED presentation rates across all 79 Victorian LGAs (2007–19), highlighting the overall Victorian rate and rates for Maribyrnong, Hobsons Bay, and Brimbank. There were annual fluctuations in asthma-related ED presentations across these LGAs. The boxplot median represents the midpoint of asthma-related ED rates across all LGAs in Victoria. The Victoria overall rate (green dot) is a population-weighted average, which represents the asthma-related ED rate for the entire Victorian population. Over the 12-year study period, these inner-west Melbourne LGAs consistently ranked in the top 25% for ED visits, with significantly higher rates than the overall state. The highest risk ratios in Melbourne's inner west were observed in Maribyrnong and Hobsons Bay, where the rates were 53% higher than Victoria as a whole (Figure 2) (Appendix 2; available online only). Brimbank had a lower risk ratio compared with Maribyrnong and Hobsons Bay.



**Figure 1.** Childhood asthma-related emergency department presentation rates by year among local government areas in Victoria. ED, emergency department; LGA, local government area; VIC, Victoria.



**Figure 2.** Risk ratios of childhood (0–19 years) asthma-related emergency department visit rates across three Melbourne inner west local government areas compared with Victoria overall, 2007–19. CI, confidence interval; ED, emergency department; LGA, local government area.

**Aim 2: Community-based childhood asthma care enablers and barriers**

A total of 545 parents provided information on 781 children (response rate: 14–47% across the three LGAs; Appendix 3; available online only). Participant demographics by LGA are shown in Table 1. On average, parents were aged 43 years (standard deviation [SD] = 5) (79% female), primarily speaking English at home (92%) and coming from higher socioeconomic areas than the Australian average (IRSAD: 1070 vs 1000).

Of the 781 children (52% female, mean age: 9 years [SD = 2]), over half were reported to have ever had asthma-like symptoms, and 81% of these children reported to have had asthma-like symptoms in the past 12 months. Nearly one-quarter had either diagnosed asthma or undiagnosed symptoms consistent with asthma.

Of the 166 parents with at least one child with asthma, 43% typically sought care from a GP during an asthma attack, and

59% reported having an asthma action plan (Appendix 4; available online only). Overall, 76% reported their child's asthma was well controlled, though only 33% reported this in Brimbank, which was substantially lower than in the other two LGAs. Nearly half had taken their children to the hospital due to asthma concerns, 82% indicated they could recognise asthma symptoms, and 57% felt confident performing asthma first aid.

Asthma care enablers are summarised in Figure 3. The most helpful asthma care resources identified were the child's GP, pharmacists and hospital EDs. In contrast, community/maternal and child health nurses,

school community, and local community support groups were perceived as less helpful.

Barriers to managing children's asthma in the community are presented in Figure 4. Parental fear during asthma flares was common (44%) and may drive ED visits even when GPs are available. Other key barriers included difficulty accessing GPs (23%), worries about medication side effects (21%), and uncertainty about asthma triggers (18%). There is little evidence of stigma against their child having asthma among parents. Across the three LGAs, most perceived enablers and barriers did not differ significantly (Appendices 5 and 6; available online only).

## Discussion

### Synthesis of findings

Our findings quantified a 26–53% increased risk of childhood asthma-related ED presentations in Melbourne's inner west compared with Victoria overall. While parents identified GPs, pharmacists and EDs as the most helpful resources for asthma care, less than half of parents sought GP care during asthma attacks, over one-third of children lacked an asthma action plan, and nearly half had been taken to the hospital due to asthma concerns. Reported barriers to community-based asthma care included parental fear during flare-ups,

**Table 1. Demographic characteristics of participants who took part in the Breathe Melbourne Parent Survey by local government area**

Characteristics	All	Maribyrnong	Hobsons Bay	Brimbank
<b>Parents</b>	<b>n = 545</b>	<b>n = 275</b>	<b>n = 226</b>	<b>n = 44</b>
Age, mean (SD)	43.3 (5)	44.1 (5)	43.1 (4.4)	38.6 (5.2)
Gender %				
Female	78.8	80.1	77.1	79.1
Male	21	19.5	22.9	20.9
Non-binary	0.2	0.4	0.0	0.0
IRSAD <sup>a</sup> , mean (SD)	1070.2 (54.4)	1074 (44.8)	1086.8 (39.2)	956.6 (48.9)
Survey language %				
English	99.4	100	100	93.2
Vietnamese	0.6	0.0	0.0	6.8
Highest level of education completed %				
Below high school	2.9	1.1	1.8	20.5
High school, trade or apprenticeship	7.2	6.5	5.8	18.2
University degree	89.2	92.4	92.5	52.3
Other	0.7	0.0	0.0	9.1
Primary language spoken at home %				
English	91.5	94.9	95.6	48.8
Vietnamese	1.7	1.5	0.0	11.6
Arabic	0.4	0.0	0.4	2.3
Other language	6.3	3.6	4.0	34.9
Do not know	0.2	0.0	0.0	2.3

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**Table 1. Demographic characteristics of participants who took part in the Breathe Melbourne Parent Survey by local government area (cont'd)**

Characteristics	All	Maribyrnong	Hobsons Bay	Brimbank
<b>Child</b>	<b>n = 781</b>	<b>n = 384</b>	<b>n = 338</b>	<b>n = 59</b>
Child age, mean (SD)	8.5 (2.0)	8.6 (2.1)	8.4 (2.0)	8.4 (2.1)
Gender %				
Female	52.0	52.4	51.8	50.0
Grade %				
Prep (1st year of school)	16.2	15.2	17.8	14.3
1	17.6	15.8	20.3	14.3
2	13.4	14.6	12.7	9.5
3	16.5	16.1	15.9	23.8
4	11.7	10.2	13.4	11.9
5	11.4	12.4	10.5	9.5
6	13.1	15.8	9.4	16.7
Asthma diagnosis or undiagnosed asthma with symptoms %				
Diagnosed asthma	19.9	20.8	18.9	18.6
Undiagnosed asthma with symptoms	4.1	4.8	3.9	1.7
Asthma-like symptoms ever %				
Yes	52.3	56.8	50.1	35.6
Of children with asthma-like symptoms, had symptoms in the past 12 months %				
N <sup>B</sup>	405	216	168	21
Yes	81.0	81.5	82.7	62.0

SD, standard deviation.

<sup>A</sup>The Index of Relative Socio-economic Advantage and Disadvantage (SEIFA 2021), national mean = 1000, standard deviation = 100;

<sup>B</sup>Number of participants varied as the question was answered by a subset of the sample.

difficulty accessing GPs, and worries about medication side effects.

### Interpretation considering existing evidence

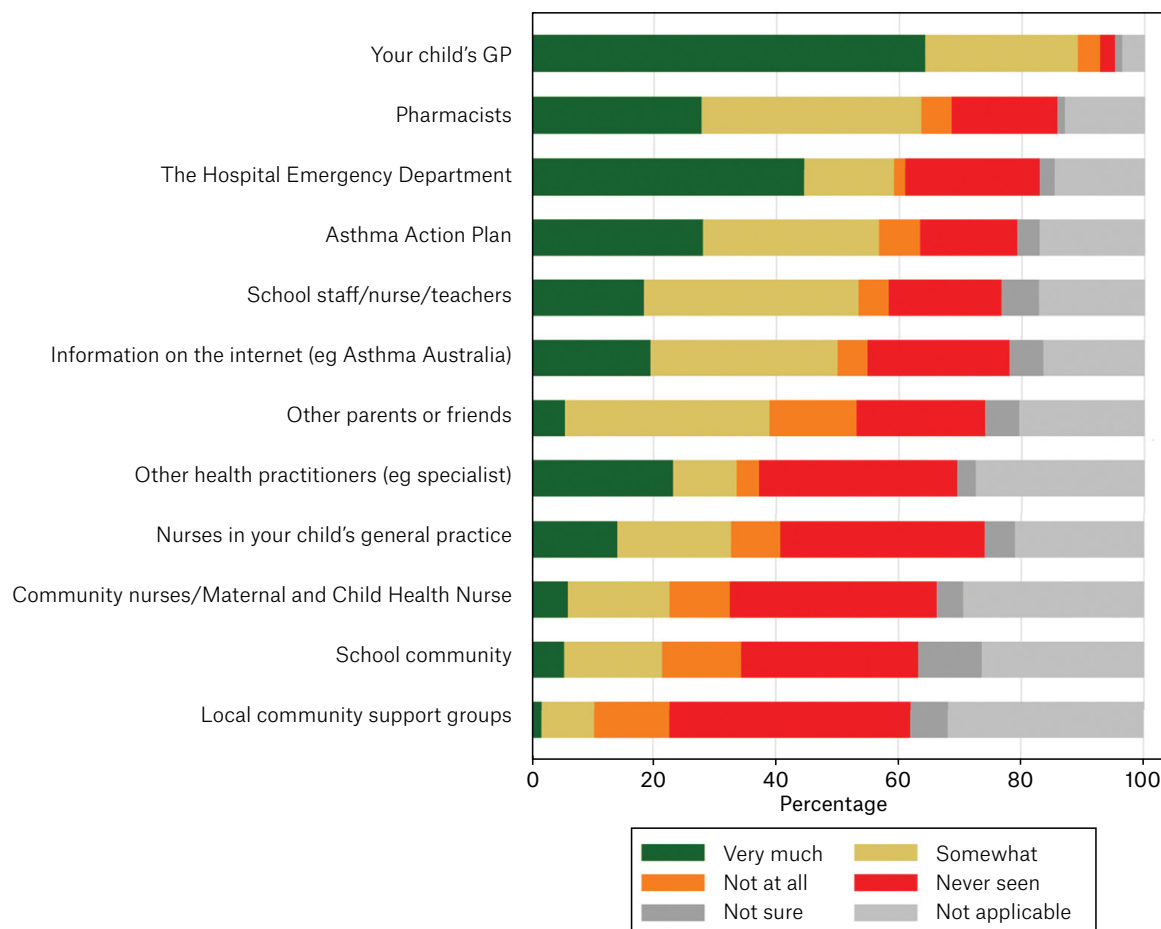
Previous studies have linked higher asthma prevalence to socioeconomic disadvantage and remoteness.<sup>5</sup> However, socioeconomic factors alone do not explain our results, as Maribyrnong and Hobsons Bay are more socioeconomically advantaged than the Australian average (1074 and 1087 vs 1000). The elevated ED presentation rates in these LGAs may reflect a combination of poor asthma management, limited access to effective primary care, proximity to hospitals,

and parental uncertainty around asthma care. The reason for the lower risk ratio in Brimbank compared with Maribyrnong and Hobsons Bay is unclear. This difference could be attributed to several factors, including variations in primary care access, asthma control, asthma triggers, or ease of access (eg transport and distance) to EDs. The fluctuations in asthma-related ED presentations over the 12-year study period may be attributable to the variations in asthma triggers such as respiratory tract infection rates or pollen loads.

We found gaps in recommended asthma management practices that may contribute to increased ED visits. Despite GPs being rated

as highly helpful, only 43% of parents sought GP care during flare-ups, and 25% reported difficulty accessing GP services. Nearly half of parents lacked knowledge of asthma first aid, highlighting a critical need for targeted caregiver education. These findings align with earlier research highlighting systemic barriers in childhood asthma care, such as inconsistent management plans, poor follow-up, insufficient caregiver education, and fragmented care.<sup>24</sup>

While the 2022 National Health Survey reported 67.2% of children with asthma had an asthma action plan, our sample showed a lower rate (59%).<sup>25</sup> A US national survey reported even higher uptake (80%) and found



**Figure 3.** Rating of helpfulness of health services among parents with at least one child with asthma (n = 166).

GP, general practitioner.

asthma action plans improved parental self-efficacy and reduced absenteeism, regardless of socioeconomic status.<sup>26</sup> Increasing asthma action plan uptake remains a key goal,<sup>27</sup> given its association with better symptom control and reduced caregiver stress.<sup>26</sup>

### Implications and future directions

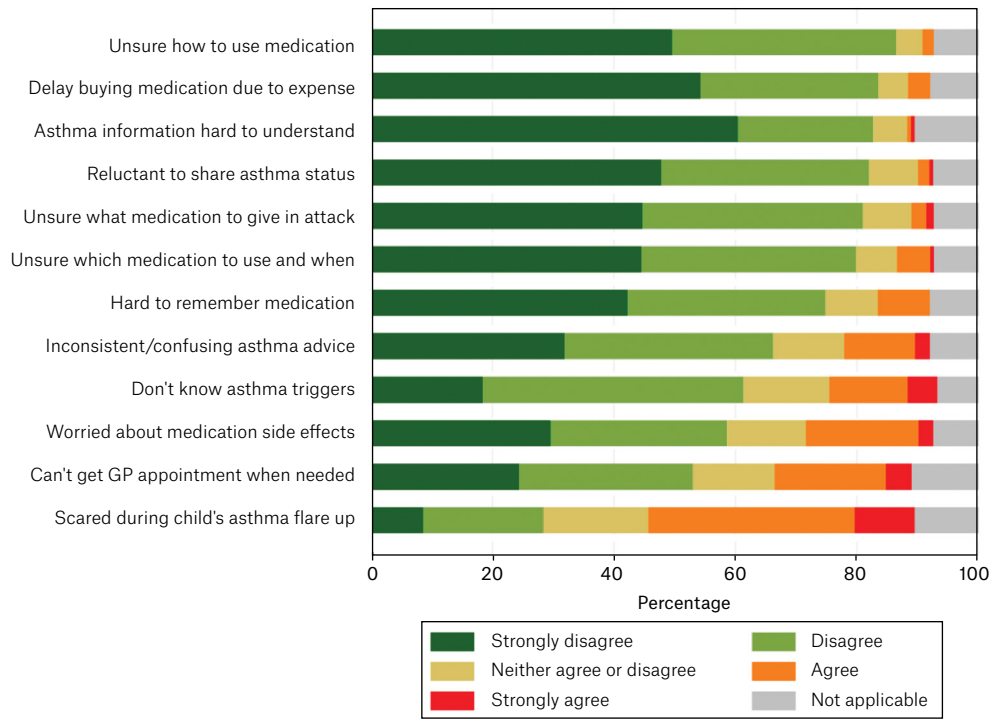
These findings show the need for multifaceted strategies to improve asthma knowledge and management, particularly in high-risk communities. Priorities include improving GP access and training, increasing use of community asthma care nurses and asthma action plans, adopting anti-inflammatory reliever regimens when indicated,<sup>28</sup> and addressing caregiver

concerns through targeted education and support. Randomised controlled trials are needed to evaluate interventions such as community-based asthma education for pharmacists and nurses, and digital tools for asthma management.

Beyond clinical care, government action is essential to address environmental determinants of asthma. The three studied regions experience high air pollution (a known asthma trigger)<sup>7</sup> with 71% of air quality breaches since 2010 occurring in Melbourne's inner west, primarily due to industrial activity, truck traffic and wood heaters.<sup>6,13</sup> Improving indoor and outdoor air quality and prioritising children's respiratory health has been identified as a national priority by the Australian asthma care sector.<sup>7</sup>

### Strengths and limitations

A key strength of this study is the integration of high-quality administrative data with parent-reported insights, offering both quantitative and contextual perspectives on asthma care needs. However, several limitations should be noted. ED data were limited to public hospitals, likely underestimating total asthma-related presentations. In Melbourne's inner west, limited access to private paediatric EDs may have inflated the relative risk by concentrating presentations in public hospitals. The study focused solely on asthma-related ED presentations, so it is unclear whether asthma signals broader health issues in these children. Additionally, survey participants were predominantly from higher



**Figure 4.** Rating of barriers to community-based childhood asthma care, among parents with at least one child with asthma (n = 166).

GP, general practitioner.

socio-economic and education backgrounds, which may limit generalisability. Finally, the low response rate in Brimbank may introduce bias in LGA-level comparisons of community-based childhood asthma care enablers and barriers. Thus, a certain level of caution is needed when generalising the results from Brimbank in particular.

**Conclusion**

Children in Melbourne's inner west experience disproportionately higher asthma-related ED presentation rates. Our findings highlight the need to better understand asthma and related health triggers and to implement coordinated, locally driven strategies to reduce triggers and improve care. Enhancing access to primary care, promoting the use of asthma action plans, and supporting caregivers through targeted education and community-based resources are critical next steps.

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