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Asthma morbidity, control and treatment in New Zealand: results of the Patient Outcomes Management Survey (POMS), 2001

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Abstract

Aims To determine the magnitude of morbidity from asthma within the New Zealand population, the degree of satisfaction of patients with their asthma control, and the level of asthma control achieved in relation to treatment.

Methods Participants were randomly selected from 29 randomly chosen general practices throughout New Zealand. Information was collected from demographic and clinical questionnaires and from lung function tests. Criteria based on GINA guidelines were developed to define the level of asthma control for each participant, their opinion of their level of control, and to define which participants were under-treated.

Results A total of 445 patients (327 adults, age 16–68; 118 children, age 7–15) took part in the study. Ninety three per cent of adults had asthma that was sub-optimally controlled, 71% had asthma that was not well controlled, and 19% had asthma that was markedly out of control. For children, these figures were 90%, 42% and 4% respectively. These results were consistent regardless of asthma severity. In adults and children whose asthma was not well controlled, 49% and 71% respectively were under-treated. For those whose asthma was markedly out of control, 89% and 75% of adults and children respectively were under-treated.

Conclusions A significant proportion of patients have asthma that is not well controlled or that is markedly out of control, and the majority are under-treated.

Asthma is one of the most common chronic diseases in New Zealand and is the most common cause of hospital admission in children.[1,2] New Zealand has one of the highest prevalence rates of asthma,[3–5] with Maori, Pacific Islanders and low socioeconomic groups disproportionately affected.[6,7] A recent publication by the Asthma and Respiratory Foundation of New Zealand has estimated the medical and economic costs of asthma in New Zealand to be over $800 million every year.[8]

The burden of asthma throughout the world in terms of morbidity, mortality and economic cost is considerable.[9] Recent community-based surveys in Europe, the United States and the Asia-Pacific regions have shown that the level of asthma control usually falls far short of the recommended goals.[10–12] For example, throughout these regions, around 30% of patients with asthma reported waking with breathing problems at least once a week. Also, over 40% of children with asthma had missed school and over 20% of adults with asthma had missed work within the previous 12 months due to their condition. Furthermore, over one third of individuals with asthma were either hospitalised, treated in an emergency department or required other urgent care for their asthma in the previous 12 months.

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These findings contrast with the goals of asthma management described in the GINA (Global Initiative for Asthma) guidelines:[9]

- minimal (ideally no) chronic symptoms, including nocturnal symptoms;
- minimal (infrequent) episodes;
- no emergency visits;
- minimal need for reliever medication;
- no limitations on activities including exercise;
- have normal or near-normal lung function (peak expiratory flow variability <20%).

Only 5% of asthmatics surveyed in seven countries in Europe met all of these goals.[10]

The Patient Outcomes Management Survey (POMS) was undertaken in New Zealand in 2001 in order to assess the magnitude of the morbidity from asthma in the population, to assess the level of asthma control in a randomly selected sample of adults and children from a general practice setting, and to correlate these findings to the treatment received.

Methods

This was a multi-centre, national study of asthma control, performed in a general practice setting. Data were collected from 327 adults and 118 children from 29 general practices chosen randomly from across New Zealand.

A computer programme was used to place all practices in New Zealand in a random order. Practices were then approached sequentially and invited to take part until a sufficient number had agreed. The aim was to recruit 400–500 patients, adult or children, from approximately 30 general practices, but this was not based on formal power calculations.

In each practice, asthmatic patients who had been prescribed medication for asthma in the previous year were randomly chosen from computer or paper-based records and invited to participate until approximately 15 patients had been recruited. The definition of asthma used was 'doctor diagnosis of asthma'. There are many definitions and diagnostic criteria for asthma, but no gold standard. 'Doctor diagnosis' is easy to use and has a high specificity and positive predictive value.

For each participant in the survey, the following data were collected:

- age, sex, ethnicity and smoking status;
- asthma symptom frequency, resource utilization, usual management and knowledge about asthma;
- the Asthma Quality of Life Questionnaire for adults and the Paediatric Quality of Life Questionnaire for children;[13,14]
- the highest of three pre-bronchodilator FEV_1 (forced expiratory volume in one second) measurements.

Morning, day and night symptom frequency were recorded as: never; 1–2 times a month; 1–2 times a week; or every day. Activity-induced asthma was classified as: rarely; with exercise or sports; with hills, stairs or active play; or with walking on the flat.

Participants were classified according to their prescribed treatment step in the British Guidelines of Asthma Management (BGAM):[15]

- Step 1: inhaled short-acting bronchodilator only (used in all five steps)
- Step 2: 0–799 µg inhaled corticosteroid (ICS) [all doses are µg/day beclomethasone dipropionate (BDP) or equivalent] or cromoglycate
- Step 3: ≥ 800 µg ICS **or** 0–799 µg ICS plus long-acting ß-agonist (LABA) or other (formoterol, salmeterol, leukotriene receptor antagonist, theophylline ipratropium, β_2-agonist tablets)
- Step 4: ≥ 800 µg **plus** LABA or other
- Step 5: oral steroids for at least one month

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In the analysis, a child was defined as 7–15 years of age inclusive. Data analysis was undertaken using Microsoft Excel and SAS. Ethics committee approval was obtained for the study from all New Zealand Ethics Committees.

Definitions of asthma control and under-treatment The only globally standardized criteria for asthma control are those of the GINA guidelines described above. However, for the vast majority of patients with asthma, this level of control is unrealistic. Therefore, two further criteria of control were developed, based on the frequency and severity of symptoms and lung function (Table 1). These criteria were developed for the purposes of this study and therefore require further validation.

Table 1. Definition of asthma control in patients whose asthma was sub-optimally controlled, not well controlled, or markedly out of control

	Sub-optimal control (at least **1** of the following)	**Not well controlled** (at least **2** of the following)	**Markedly out of control** (at least **3** of the following)
Early-morning symptoms	≥ Weekly	≥ Weekly	≥ Daily
Day symptoms	≥ Weekly	≥ Daily	≥ Daily
Night symptoms	≥ Weekly	≥ Weekly	≥ Nightly
Asthma induced by:	Exercise/sports	Hills/stairs/active play	Walking on flat
FEV_1	<80% predicted	<80% predicted	<70% predicted
Use of reliever	1–2 times/day	1–2 times/day	≥3 times/day

'Sub-optimal control' equates to a patient not achieving a level of control similar to that described in the GINA guidelines, ie, not optimally controlled. For a classification of 'not well controlled' at least two of the listed goals must be breached; for example, this definition will not include those who use their reliever inhaler out of habit or as a prophylactic before exercise. Finally, the definition of 'markedly out of control' represents a level of symptoms that would cause a major interference in the patient's life. 'Not well controlled' and 'markedly out of control' are subsets of 'sub-optimal control', and 'markedly out of control' is a subset of 'not well controlled'.

Further, the proportion of each group who were under-treated was estimated.

Patients classified as not well controlled were considered to be adequately treated if they received either:

1. ICS ≥800 µg/day (beclomethasone dipropionate or equivalent); **or**
2. ICS <800 µg/day and a LABA.

Patients classified as markedly out of control were considered to be adequately treated if they received:

1. ICS ≥800 µg/day; **and**
2. LABA.

It should be noted that for both groups an increase in treatment may not necessarily lead to clinical improvement but that the level of symptoms experienced warrants that increase.

Results

Three hundred and twenty seven adults and 118 children from 29 general practices took part in the survey. Eighty three per cent of practices that were approached agreed to take part and approximately 75% of patients who were approached by their practice opted to take part in the study. The demographics of the participants and their classification with the BGAM steps are presented in Table 2.

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Table 2. Patient demographics

Characteristic	Adults	Children
Gender		
Male	39%	58%
Female	61%	42%
Age (mean, range, SD)	36.7 (16–68, ± 11.1)	10.6 (7–15, ± 2.4)
Smoking status		
Current smokers	27%	0%
Ex-smokers	20%	1%
Non-smokers	53%	99%
Ethnicity		
Pakeha	68%	61%
Maori	9%	10%
Other	23%	30%
BGAM step		
Step 1	10%	9%
Step 2	47%	65%
Step 3	38%	20%
Step 4	5%	5%
Step 5	1%	0%

BGAM = British Guidelines of Asthma Management
NB: some percentages do not add up to 100 due to rounding

The proportions of those classified as either sub-optimally controlled, not well controlled, or markedly out of control were compared to BGAM step (Table 3).

Table 3. Level of asthma control according to the British Guidelines of Asthma Management (BGAM) in adults and children (NB: 'not well controlled' and 'markedly out of control' are subsets of 'sub-optimal control', and 'markedly out of control' is a subset of 'not well controlled')

BGAM Step	Adults (%)			Children (%)		
	Sub-optimal control	Not well controlled	Markedly out of control	Sub-optimal control	Not well controlled	Markedly out of control
1	90	57	10	100	30	0
2	88	66	13	90	44	3
3	98	82	26	83	48	4
4	100	82	35	100	50	17
5	100	100	100			
Total	**93**	**71**	**19**	**90**	**42**	**4**

Data on the use of health services for asthma and the impact of asthma on work and school are outlined in Table 4. This table also includes some important findings from the questionnaires, including time off school or work, contacts with health services and satisfaction with asthma control.

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Table 4. Key results from the questionnaires

	Adults (%)	Children (%)
Days missed from work or school in the last month		
0	90	88
1–2	7	6
>2	3	6
GP contact in the last 3 months		
Scheduled appointment	39	31
Unscheduled appointment	6	6
Phone contact	14	11
Contact with GP after hours	5	16
Hospital admission in last 12 months		
Emergency department	7	12
Hospital admission	2	2
Intensive care unit	0.06	0.90
Is your asthma well controlled?		
Yes	76	76
No	16	8
Do not know	8	16
Are you satisfied with your level of asthma control?		
Yes	80	85
No	19	14
Do not know	1	1
Do you have a written asthma management plan?		
Yes	36	40
Do you have a peak flow meter?		
Yes	72	72

The use of medication in those patients whose asthma was not well controlled or markedly out of control is presented in Table 5.

Table 5. Medication use by patients whose asthma was not well controlled or was markedly out of control

Patients (n)	No ICS No LABA n (%)	ICS <800 No LABA n (%)	ICS ≥800 No LABA n (%)	ICS <800 + LABA n (%)	ICS ≥800 + LABA n (%)	**Under-treated n (%)**
Adults (327)						
Not well controlled (233)	20 (9)	94 (40)	95 (41)	8 (3)	16 (7)	**114 (49)**
Markedly out of control (61)	5 (8)	17 (28)	31 (51)	1 (2)	7 (11)	**54 (89)**
Children (128)						
Not well controlled (49)	4 (8)	31 (63)	11 (22)	0 (0)	3 (6)	**35 (71)**
Markedly out of control (4)	0 (0)	2 (50)	1 (25)	0 (0)	1 (25)	**3 (75)**

All ICS doses are µg/day beclomethasone dipropionate or equivalent
ICS = inhaled corticosteroid; LABA = long-acting ß-agonist

Finally, the proportion of each group who were under-treated was estimated according to the method described above. Those who are considered to be under-treated are represented in bold in Table 5.

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Discussion

This study represents a snapshot of current asthma morbidity and management in New Zealand. The major finding was that a majority of adults and children with asthma were not well controlled according to the criteria used. This applied across all BGAM steps, implying that patients across the spectrum of asthma severity were not well controlled. The results are comparable to those observed in similar studies conducted overseas.

A possible selection bias may have occurred in that only patients who had been prescribed asthma medication in the previous year were invited to take part. This could have resulted in the exclusion of a small subset of very mild asthmatics but this is unlikely to have had a significant impact on the findings.

The definitions of asthma control used in this study have been adapted from the GINA guidelines to capture the spectrum of asthma control levels. It would have been hoped that more than around 10% of adults and children would have achieved a better level of control than the sub-optimal control criteria. Furthermore, the findings that 72% of adults and 44% of children have asthma that is not well controlled are unexpectedly high and it is of great concern that around one fifth of adults and one twentieth of children fall within the category of markedly out of control.

The findings of this study highlight some of the costs of poor asthma control. Around 10% of asthmatics had missed school or work in the previous month due to their condition. In the previous three months, two thirds of adults and children had contacted a GP about their asthma, often out of hours, and about 10% had been to the emergency department or had been admitted to hospital with asthma in the previous year.

Some of the most important findings from this study were those concerning patients' expectations about their condition and management. There was a striking mismatch between the patients' perception of asthma control and the actual level of control as defined in this study. Overall, 76% thought that their asthma was well controlled and 80% were satisfied with their level of control. It would appear that, despite significant symptoms, these patients considered themselves to be 'normal' for a person with asthma. It would follow that these symptoms may not be reported to their doctor. This emphasises the need for diligent assessment of patients with asthma at each clinic visit.

In addition, despite their simplicity and proven effectiveness, only 36% of patients had a written asthma management plan.[16]

It was beyond the scope of this study to assess patient compliance with treatment. Compliance with treatment for chronic conditions is often poor, usually due to the dislike of having to take medications continuously or the fear of side effects.

Finally, this survey has revealed that for those whose asthma is not well controlled, 49% of adults and 71% of children are under-treated. For those whose asthma is markedly out of control, 89% of adults and 75% of children are under-treated. Whilst it was beyond the scope of this study to determine the reasons for this degree of under-treatment, a possible explanation includes the mismatch in patients' perception of asthma control and actual control. The widespread under-treatment that was seen may in part be due to local restrictions placed on the prescribing of newer medications

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such as long-acting ß-agonist drugs and the inhaled corticosteroid/long-acting ß-agonist combinations. It is also likely that problems in accessing GP care have contributed to this level of under-treatment.

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