



Application of asthma action plans to childhood asthma: national survey repeated

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Abstract

Aims Define the way childhood asthma action plans are currently being used in New Zealand; determine New Zealand doctor's recommendations about the use of an increased dose of inhaled steroids in asthma action plans; and determine if there has been any change (during the last 7 years) in the way asthma action plans are used.

Methods A postal survey was sent to all 297 paediatricians and paediatric registrars in New Zealand, and to a random sample of 500 general practitioners (GPs). The questions related to asthma action plan use, the inclusion of an increased dose of inhaled steroid in those plans, and details of the way doctor's adjusted inhaled steroid dose. Comparisons were made for selected questions between this survey and the same survey conducted in 1995.

Results Valid responses were received from 179 (60%) paediatricians and paediatric registrars, and 233 (47%) GPs. 165 (70.8%) GPs and 137 (76.5%) paediatricians / paediatric registrars indicated that they used written action plans for children with asthma in their care. 184 (61.5%) respondents who used asthma action plans included a step involving an increase in the dose of inhaled steroid, compared to 83.6% in 1995 ($p < 0.001$). GPs in 2002 were less likely to use action plans ($p < 0.001$) and include a step with an increased dose of inhaled steroid ($p = 0.003$).

Paediatricians and paediatric registrars in 2002 were just as likely to use action plans ($p = 0.549$), but less likely to include a step with an increased dose of inhaled steroid ($p < 0.001$). GPs in 2002 were significantly more likely (than paediatricians and paediatric registrars) to include a step involving an increased dose of inhaled steroid ($p < 0.001$).

Conclusions There has been a change in the practice of New Zealand GPs, paediatricians, and paediatric registrars—with a decreased tendency to double the dose of inhaled steroids in childhood action plans, thus suggesting doctors are cognisant of conclusions drawn by 'evidence-based medicine'. There has also been a decline in the proportion of asthmatic children receiving a written asthma action plan, and this is inconsistent with recommendations contained in consensus documents.

Asthma action plans facilitate early intervention at home when an exacerbation occurs.^{1,8} Increasing the dose of steroid medication (oral or inhaled) for mild-to-moderate exacerbations of childhood asthma, and incorporating this as a step in an asthma action plan, is done with the intention of avoiding consequences such as hospitalisation, visits to the emergency department, and rescue courses of oral steroid.

In 1997, Garrett et al published the results of a 1995 survey investigating the use of paediatric asthma action plans in New Zealand.¹ Discrepancies were found between recommendations in asthma management guidelines and the way plans were utilised in clinical practice. The authors were interested in the use of an increased dose of inhaled steroid as part of asthma action plans, noting that this was a common practice lacking proof of benefit.

In the last 7 years, there have been several clinical trials investigating the efficacy of high-dose inhaled steroids in treating children experiencing asthmatic exacerbations of varying severity, and in different settings.⁷⁻¹³ There have also been updates to some of the major international asthma consensus documents.²⁻⁵

We repeated the original survey to determine whether this new information had any effect on the clinical application of asthma action plans and whether doctors typically include an increasing-inhaled-steroid-dose step.

Methods

A postal questionnaire on the use of childhood asthma action plans was sent to all paediatricians and paediatric registrars in New Zealand (297 in total), and to a random sample of 500 of the 2639 registered GPs in New Zealand. The New Zealand Medical Council statistician carried out selection of the GP sample group and posted the questionnaires on our behalf. An initial mailout (5 November 2002) and one follow-up questionnaire (26 November 2002) were sent in order to maximise the response rate.

The structure of the questionnaire was identical to that used in 1995. The first question asked respondents whether they provided children (who were suffering asthma) with an asthma action plan. For those who answered 'yes' they were asked what proportion of these children were given a plan; expressed as <25%, 25–50%, 50–75%, >75%, or unknown. We also asked whether a step involving an increased dose of inhaled steroid was included in the plan and, if so, what were criteria determined the increase, its magnitude and duration. A blank copy of the plan used by the respondent was requested.

Respondents who had children with asthma in their care were then asked a series of questions to ascertain their opinion about the use of action plans—in particular, their perception of their usefulness in the management of childhood asthma, and their effect on patient understanding and compliance with asthma medications.

Demographic information on respondent's age, sex, and geographic location was included in the questionnaire. To determine the representativeness of our sample, comparisons were made between demographic features of the sample and data provided by the New Zealand Medical Council Statistician for all New Zealand GPs, paediatricians and paediatric registrars. Ethical approval was not required for this study.

Comparisons (using chi-squared tests) were made between the responses of paediatricians / paediatric registrars and GPs for a selection of questions. We also compared responses to specific questions about the use of action plans, and compared their use of an increased dose of inhaled steroid between 1995 and 2002. A p value of <0.05 was regarded as statistically significant.

Results

Response—Of the 797 questionnaires sent out, 460 (58%) responses were returned. Paediatricians and paediatric registrars returned 199 questionnaires (67%), while GPs returned 261 (52%). Twenty questionnaires returned by paediatricians and paediatric registrars were not included for analysis; comprising 9 paediatricians who indicated they did not treat children with asthma, 6 who were no longer in clinical practice, and 5 who simply did not answer.

Similarly, 28 questionnaires returned by GPs were not included for analysis because 16 were no longer in active practice and 12 did not answer. Therefore, 412 valid responses were used for analysis—179 (60%) from paediatricians and paediatric registrars, and 233 (47%) from GPs.

Demographic data

Population statistics were obtained from the Medical Workforce 2000 publication supplied by the Medical Council of New Zealand statistician. The paediatrician/paediatric registrar sample showed no appreciable deviations from the entire New Zealand paediatrician/paediatric registrar population for any of the demographic variables. GPs sampled did not differ from the entire New Zealand GP population with regard to sex and geographic location. Our sample included more GPs in the older age groups (Table 1).

Table 1 Demographic data of surveyed GPs and paediatricians / paediatric registrars (GPs n=233; Paediatricians and Paediatric Registrars n=179)

Variable	Respondents to the survey		Entire GP population in New Zealand	
	GPs	Paediatricians and Paediatric Registrars	GPs	Paediatricians and Paediatric Registrars
Age (years)				
<35	1.4%	32.4%	14.1%	30.1%
35–44	34.4%	30.6%	43.6%	34.7%
45–54	41.6%	22.4%	26.0%	23.4%
55–64	17.2%	12.9%	9.9%	8.4%
65>	5.3%	1.8%	6.4%	3.3%
Sex				
Male	66.0%	59.6%	61.8%	61.5%
Female	34.0%	40.4%	38.2%	38.5%

Use of action plans

302 (73.3%) respondents (165 [70.8%] GPs, and 137 [76.5%] paediatricians / paediatric registrars) indicated that they used written action plans for children with asthma in their care—compared to 91.2% of GPs and 76.2% of paediatricians / paediatric registrars in 1995.

This difference was significant for GPs ($p<0.001$), but not for paediatricians and paediatric registrars ($p=0.549$). Overall, significantly fewer respondents were using asthma action plans for children with asthma (Table 2). GPs were less likely (than paediatricians / paediatric registrars) to use action plans in 2002 ($p<0.001$). The reverse was true in 1995 (Table 3).

Use of an increased dose of inhaled steroid

In total, 184 (61.5%) respondents who used asthma action plans included a step involving an increase in the dose of inhaled steroid—compared with a rate of 83.6% in 1995 ($p<0.001$).

When compared with their 1995 counterparts, GPs in 2002 were less likely to include a step that involved an increased dose of inhaled steroid ($p=0.003$), as were paediatricians and paediatric registrars ($p<0.001$) [Table 2]. GPs in 2002 were significantly more likely than paediatricians and paediatric registrars to include a step with an increased dose of inhaled steroid ($p<0.001$) [Table 3]. This was also the case in 1995 [Table 3].

Table 2. Use of action plans and an increased dose of inhaled steroid in action plans

	GPs		Paediatricians and Paediatric Registrars		Total	
	Action plan use	Use of an increased dose of inhaled steroid	Action plan use	Use of an increased dose of inhaled steroid	Action plan use	Use of an increased dose of inhaled steroid
1995	91.2% (310/340)	94.5% (293/310)	76.2% (128/168)	57.0% (73/128)	86.2% (438 /508)	83.6% (366/438)
2002	70.8% (165/233)	86.5% (141/163)	76.5% (137/179)	31.6% (43/136)	73.3% (302/412)	61.5% (184/299)
Significance	$P<0.001$	$P=0.003$	$P=0.549$	$p<0.001$	$p<0.001$	$p<0.001$

Note: Those who use an increased dose of inhaled steroid (in action plans) is given as a percentage of the total number of respondents who indicated that they used action plans for children with asthma.

Table 3. Comparisons of GPs and paediatricians / paediatric registrars in 1995 and 2002

	GPs (%)		Paediatricians and Paediatric Registrars (%)		GPs compared with Paediatricians and Paediatric Registrars (level of significance)	
	1995 n=340	2002 n=233	1995 n=168	2002 n=179	1995	2002
Action plan use	91.2	70.8	76.2	76.5	$p<0.001$	$p<0.001$
Inclusion of an increased dose of inhaled steroids in action plan out of those who use action plans	94.5	86.5	57.0	31.6	$p<0.001$	$p<0.001$

Discussion

Updates of major international consensus documents released in recent years have stressed the importance of written asthma action plans in the management of childhood asthma.²⁻⁶ In the last 7 years, there has been a reduction in the use of an increased dose of inhaled steroid in asthma action plans for the treatment of acute exacerbations. This may represent a lack of evidence supporting such an approach.

The British Thoracic Society (BTS) suggested (in 1997) doubling the dose of inhaled corticosteroid temporarily where there is a deterioration in asthma or the first signs of upper respiratory tract infection in children.²

However, recent guidelines published by the BTS group have indicated that doubling the dose of inhaled steroid at the time of an exacerbation is of unproven value.³ Furthermore, The National Heart, Lung and Blood Institute of America tentatively recommended that for home management of mild asthma exacerbations (Peak Expiratory Flow >80% predicted or personal best, no wheezing or shortness of breath), patients should double their dose of inhaled corticosteroid for 7–10 days⁴.

The 2002 Australian Asthma Management Handbook made no comment about increasing the inhaled steroid dose for exacerbations of paediatric asthma.⁵ However, space was provided in the handbook's paediatric asthma action plan to increase the dose of preventer medication at the first sign of a cold, or a significant increase in wheeze or cough. Unfortunately, no such space exists in the Child Asthma Plan released by the Asthma and Respiratory Foundation of New Zealand in 2000, which stresses the importance of increasing reliever/bronchodilator medication in the case of an exacerbation.

In 1994, New Zealand guidelines recommended that adults double the dose of inhaled steroid during an acute attack, but the same clarity of instruction was lacking for children.⁶ However, a 2001 meta-analysis by Holt et al, supported the growing evidence that doubling inhaled steroid in acute asthma is not clinically valuable in adults and adolescents.⁷ Therefore, there is no consistent evidence to suggest increased doses of inhaled steroid for exacerbations of asthma are appropriate, despite earlier consensus documents recommending it.

There has only been one clinical trial investigating an increased dose of inhaled steroids as a step in a written asthma action plan.⁸ Twenty-eight children aged 6–14 years (with mild-to-moderate asthma) were given asthma action plans to take home, and (if their peak expiratory flow rate (PEFR) dropped below 80% of baseline for 24 hours or more) they were instructed to double the dose of inhaled steroid (or their maintenance dose plus placebo) for 3 days.

In the 2 weeks following an exacerbation, there were no differences found in mean-morning and mean-evening PEFR symptom scores, spirometric parameters (FEV₁, FVC, and FEF_{25–75}) scores, or parent opinion scores.

Indeed, doubling the dose of beclomethasone had no beneficial effect when compared with placebo in treating an asthma exacerbation. This was considered evidence against using such an approach as a step in an asthma action plan. The results, however, could not be generalised to include children with severe asthma.

In further studies of pre-school children at home with acute asthma and without action plans, an increase in the use of inhaled steroid did not reduce the need for hospitalisation, emergency room visits, and the requirement of oral steroids (when compared with placebo).^{9,10}

Oral corticosteroids have been the standard treatment for severe asthma exacerbations for several years. In some instances, acute therapy with high-dose inhaled steroids has been found to be at least as effective as oral steroids; however, no study has found them to be more efficacious.¹¹⁻¹³

Although asthma consensus documents have previously suggested treating childhood asthma exacerbations with an increased dose of inhaled steroid, several studies highlight the insufficient evidence supporting this practice. Our results suggest that GPs, paediatricians, and paediatric registrars have taken note of this lack of evidence because fewer are including an increased dose of inhaled steroid as a step in childhood written action plans.

If the exacerbation is mild to moderate, an increase in reliever/bronchodilator medication may be adequate treatment. Another explanation in New Zealand may be the altered format of the pre-printed Childhood Asthma Action Plan. Specifically, for the last 6 years, the plan has not specifically included instructions for parents to increase the dose of their child's preventer medication.

The other significant finding from our study is the overall decline in the use of written Asthma Action Plans for children with asthma. This decrease was significant for GPs in particular. Many GPs, however, may be giving their patients verbal asthma management plans, which incorporate an increased dose of inhaled steroid where an exacerbation occurs. GPs have short consultation times so a brief verbal explanation may be viewed as more efficient than explaining a written asthma action plan in depth.

Furthermore, verbal action plans may be considered more conducive to enhancing effective communication between child, parent, and doctor, ultimately strengthening the patient-doctor relationship. Our survey did not account for the use of verbal asthma plans. Indeed, there is no strong evidence showing that written action plans are beneficial¹⁴—they are believed to promote better self-management, however.¹⁵

On analysis, our use of a random sample, and the ability to ascertain the representativeness of respondents, diminished selection bias. The capacity of respondents to precisely remember aspects of behaviour (recall bias) and their perception of the preferred answer (response bias) were, however, beyond our control.

Although our survey's overall response rate (58%) was below expectations, it is comparable to that achieved in other postal surveys. In retrospect, it would have been helpful to break the 'paediatric' component into 'registrars' and 'practicing paediatricians'—to identify any difference in practice between 'registrars' and 'practicing paediatricians' and to identify any effect from relatively recent education in the role of inhaled steroids in acute asthma versus longstanding practice.

In attempting to be consistent when comparing the two surveys we did not break the 'paediatric' component into 'registrars' and 'practicing paediatricians'. Interpretation of results depends on the severity and number of asthmatics seen by GPs, paediatricians, and paediatric registrars. We assumed that paediatricians and paediatric registrars see children with severe asthma more often.

In conclusion, the application of childhood asthma action plans by New Zealand GPs, paediatricians, and paediatric registrars has changed. Specifically, there has been an overall decline in the use of written asthma action plans, and fewer practitioners are incorporating an increased dose of inhaled steroid in these plans.

Part of this change is evidence based, as recent results from clinical trials do not support the role of high-dose inhaled steroid in treating childhood asthma exacerbations. Despite this, 86.5% of GPs continue to include a step that increases the dose of inhaled steroid.

GPs generally have a looser control of their patients compared to paediatricians and paediatric registrars, so it is likely that significant numbers of children will be taking higher doses of inhaled steroids for longer periods of time—this is still far from ideal, and potentially dangerous.

Finally, inconsistency remains (between recommendations in consensus documents) about the use of asthma action plans and the actual application of them in New Zealand. Our survey shows that not all children with asthma are receiving a written asthma plan, despite this plan being recommended in asthma consensus documents.

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