

## Evaluation of peak flow and symptoms only self management plans for control of asthma in general practice

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### Abstract

**Objective**—To compare a peak flow self management plan for asthma with a symptoms only plan.

**Design**—Randomisation to one of the self management plans and follow up for a year.

**Setting**—Four partner, rural training practice in Norfolk.

**Subjects**—115 Patients (46 children and 69 adults) with asthma who were having prophylactic treatment for asthma and attending a nurse run asthma clinic.

**Main outcome measures**—The number of doctor consultations, courses of oral steroids, and short term nebulised salbutamol treatments and the number of patients who required doctor consultations, courses of oral steroids, and short term nebulised salbutamol.

**Results**—Both self management plans produced significant reductions in the outcome measures but there were no significant differences in the degree of improvement between the groups. The results were similar for children and adults. The proportions of patients requiring a doctor consultation fell from 98% (50/51) to 66% (34/51) in the peak flow group and from 97% (62/64) to 53% (34/64) in the symptoms only group and the proportions requiring oral steroids from 73% (34/46) to 47% (21/46) and 52% (31/60) to 12% (7/60). The median number of doctor consultations was reduced from 8.0 to 2.0 in the peak flow group and from 4.5 to 1.0 in the symptoms only group.

**Conclusions**—The peak flow meter was not the crucial ingredient in the improved illness of the two groups. Teaching patients the importance of their symptoms and the appropriate action to take when their asthma deteriorates is the key to effective management of asthma. Simply prescribing peak flow meters without a system of self management and regular review will be unlikely to improve patient care.

### Introduction

The use of peak flow meters in general practice has been well described, particularly in the diagnosis and assessment of asthma.<sup>1-3</sup> The issuing of the comparatively cheap and accurate mini-Wright peak flow meter<sup>4</sup> has been advocated as worthwhile for patients with asthma,<sup>5</sup> and pressure has been growing to make such meters available on prescription,<sup>6</sup> as is already the case in New Zealand. Few studies have looked at issuing peak flow meters to patients for use in the day to day management of their asthma. Studies have highlighted the fact that up to a fifth of patients are unable to gauge the severity of their asthma despite appreciable deterioration in their lung function.<sup>7,8</sup> A peak flow meter would seem to be invaluable to such patients.

Recent studies have shown considerable success

### Peak flow self management plan What to do and when

- If peak flow greater than 70% of normal  
Continue maintenance treatment:
  - (a) Bronchodilator two times a day or when needed
  - (b) Inhaled steroid two times a day
- If peak flow less than 70% of normal
  - (1) Double dose of inhaled steroid for number of days required to achieve previous baseline
  - (2) Continue on this increased dose for same number of days
  - (3) Return to previous dose of maintenance treatment
- If peak flow less than 50% of normal
  - (1) Start oral prednisolone 40 mg daily (20 mg daily for children) and contact general practitioner
  - (2) Continue on this dose for the number of days required to achieve previous baseline
  - (3) Reduce oral prednisolone to 20 mg daily (10 mg daily for children) for same number of days
  - (4) Stop prednisolone
- If peak flow less than 30%
  - (1) Contact general practitioner urgently or, if unavailable,
  - (2) Contact ambulance or, if unavailable,
  - (3) Go directly to hospital

FIG 1—Peak flow self management plan adapted from Beasley *et al*<sup>9</sup>

when patients are given self management plans.<sup>9</sup> The aim of this study was to evaluate the role of peak flow meters in such a plan and to find out the effectiveness of a symptom led self management plan.

### Methods

The study was carried out in a nurse run asthma clinic in this general practice.<sup>10</sup> Aylsham is a market town in rural Norfolk. The study practice of four partners and a trainee had a mid-year population in 1987 of 8049 patients. As part of a trainee project, agreed by all the partners, letters were sent to all the patients on the repeat prescribing register who were receiving prophylactic treatment for asthma. They were invited to make an appointment with one of the practice nurses. Asthma clinics were run by the nurse alone using an appointment system on three afternoons (a total of 10 hours) a week.

Patients were allocated by a random numbers chart into a peak flow group and symptoms only group. Figure 1 shows the self management plan of the peak flow group, who were asked to buy a peak flow meter, and figure 2 that of the symptoms only group. The nurse instructed each patient in the methods to be used in carrying out the two self management plans.

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**Symptoms only self management plan**  
**What to do and when**

- When you feel normal  
 Continue maintenance treatment:
  - (a) Bronchodilator two times a day or when needed
  - (b) Inhaled steroid two times a day
- If you get a cold or start to feel tight  
 Use your bronchodilator two puffs every four hours
- If you wake with wheezing at night or have a persistent cough
  - (1) Double dose of inhaled steroid for number of days it takes you to return to normal
  - (2) Use bronchodilator two puffs every four hours
- If your bronchodilator only lasts two hours and you find doing your normal activities makes you short of breath
  - (1) Start oral prednisolone 40 mg daily (20 mg daily for children) and contact general practitioner
  - (2) Continue to use this dose for the number of days required to return you to normal
  - (3) Reduce oral prednisolone to 20 mg daily (10 mg daily for children) for same number of days
  - (4) Stop prednisolone
- If your bronchodilator lasts only 30 minutes or you have difficulty talking call the doctor immediately

FIG 2—Symptoms only self management plan developed by one of us (IC)

The first interview usually took 45 minutes. One week later the patients were reviewed by the nurse for a further 15 minutes, when spirometry was again performed and inhaler technique checked. Progress with self monitoring and self management were checked and treatment altered, if necessary, after discussion with the patient's general practitioner. Topics such as smoking, holidays, provoking factors, and emergency treatments were discussed in the course of the follow up visits. All the patients were reviewed every eight weeks by the nurse or more often if she considered it necessary.

**DATA ANALYSIS**

Patients' degree of illness was measured in terms of the number of consultations with the doctor, the number of courses of oral steroids, and the number of acute treatments with nebulised salbutamol. This

information was extracted from the patients' records for the 12 months before they attended the clinic and during the first 12 months of attendance at the clinic. The changes within the two groups before and after the clinic were analysed with the Wilcoxon signed rank test; the differences between the two groups were analysed with the Mann-Whitney U test. The analyses were repeated for children ( $\leq 16$  years) and adults.

Data were also classified dichotomously into the number of patients who did or did not consult the doctor, who required or did not require courses of oral steroids, and who required or did not require short term treatments with nebulised salbutamol. Changes within the two self management groups before and after the asthma clinic were analysed with McNemar's test and  $\chi^2$  values were used to analyse the differences between the groups. The analyses were also repeated for the children and adults.

Data were analysed with the statistical package for the social sciences program for personal computers (SPSS/PC+)<sup>11</sup> and the Minitab statistical package.<sup>12</sup>

**Results**

In all, 115 patients (51 in the peak flow and 64 in the symptoms only group) attended the asthma clinic. Forty six were children (19 in the peak flow group, 27 in the symptoms only group) and 69 adults. Patients who required maintenance treatment with steroids or nebulised salbutamol during the study were not included in the relevant analyses. Tables I and II present the results of analysing the dichotomously classified data and tables III and IV those of analysing the number of consultations, courses, and nebulised treatments.

**DICHOTOMOUSLY CLASSIFIED DATA**

Table I shows the numbers of patients requiring consultation with a doctor, courses of oral steroids, and short term nebulised salbutamol in the two groups before and after the formation of the asthma clinic.

*All patients*—Over a period of 24 months the proportion of patients needing to consult a doctor for asthma in the peak flow group fell significantly from 98% (50/51) to 66% (34/51) ( $p < 0.001$ ). In the symptoms only group over a similar period the proportion fell significantly from 97% (62/64) to 53% (34/64) ( $p < 0.001$ ). The estimated difference between the two groups was not, however, significant ( $p = 0.59$ ) (table II). The proportion of patients receiving oral steroids in the peak flow group fell significantly from 73%

TABLE I—Comparisons within peak flow and symptoms only groups of number of patients requiring doctor consultation, courses of oral steroids, and short term nebulised salbutamol before and after formation of asthma clinic

Group	Neither before nor after clinic	Before but not after clinic	After but not before clinic	Before and after clinic	Observed difference in proportions of after—before (95% confidence interval)	McNemar's $\chi^2$	p Value	
<i>All patients</i>								
Doctor consultation	Peak flow	3	16	1	31	-0.29 (-0.33 to -0.14)	13.24	<0.001
	Symptoms only	1	29	2	32	-0.42 (-0.56 to -0.29)	23.52	<0.001
Oral steroids	Peak flow	10	16	5	15	-0.24 (-0.42 to -0.06)	5.76	0.02
	Symptoms only	29	24	5	2	-0.32 (-0.47 to -0.16)	12.45	<0.001
Nebulised salbutamol	Peak flow	30	10	2	3	-0.18 (-0.26 to -0.01)	5.33	0.02
	Symptoms only	56	6	2	0	-0.06 (-0.12 to 0.04)	2.00	0.16
<i>Adults</i>								
Doctor consultation	Peak flow	3	11	1	17	-0.31 (-0.37 to -0.09)	8.33	<0.01
	Symptoms only	1	13	2	21	-0.30 (-0.39 to -0.08)	8.07	<0.01
Oral steroids	Peak flow	4	10	4	9	-0.22 (-0.43 to 0.08)	2.57	0.11
	Symptoms only	13	13	2	5	-0.33 (-0.44 to -0.09)	8.07	<0.01
Nebulised salbutamol	Peak flow	21	4	1	2	-0.11 (-0.18 to 0.08)	1.08	0.18
	Symptoms only	33	2	2	0	0.00 (-0.09 to 0.09)	0.00	1.00
<i>Children</i>								
Doctor consultation	Peak flow	0	5	0	14	-0.26 (-0.26 to 0.01)	5.00	0.03
	Symptoms only	0	16	0	11	-0.59 (-0.59 to -0.35)	16.00	<0.001
Oral steroids	Peak flow	6	6	1	6	-0.26 (-0.37 to 0.06)	3.57	0.06
	Symptoms only	16	11	0	0	-0.41 (-0.41 to -0.18)	11.00	<0.001
Nebulised salbutamol	Peak flow	9	6	1	1	-0.29 (-0.41 to 0.06)	3.57	0.06
	Symptoms only	23	4	0	0	-0.15 (-0.15 to 0.03)	4.00	0.05

(34/46) to 47% (21/46) ( $p=0.02$ ). In the symptoms only group this proportion also fell significantly from 52% (31/60) to 12% (7/60) ( $p<0.001$ ), but the difference between the two groups was not significant ( $p=0.26$ ) (table II). The proportion of patients requiring nebulised salbutamol fell significantly from 33% (15/45) to 11% (5/45) in the peak flow group ( $p=0.02$ ), but the fall in the symptoms only group from 9% (6/64) to 3% (2/64) was not significant ( $p=0.16$ ). The difference between the two groups with the  $\chi^2$  test was also not significant ( $p=0.91$ ).

**Adults**—The proportion of adults needing to consult a doctor for asthma in the peak flow group fell significantly from 97% (31/32) to 62% (20/32) ( $p<0.01$ ). In the symptoms only group the proportion fell significantly from 95% (35/37) to 62% (23/37) ( $p<0.01$ ). The difference between the two groups was not, however, significant ( $p=0.84$ ) (table II). The proportion receiving oral steroids fell from 81% (22/27) to 51% (14/27), which was not significant in the peak flow group ( $p=0.11$ ), but in the other group the fall from 63% (21/33) to 21% (7/33) was significant ( $p<0.01$ ). The difference between the two groups was not significant ( $p=0.58$ ). The proportion of adults requiring nebulised salbutamol fell from 25% (7/28) to 11% (3/28) in the peak flow group ( $p=0.11$ ), but it remained stable at 5% (2/37) in the symptoms only group. The difference between the two groups was not significant ( $p=0.81$ ).

**Children**—The proportion of children requiring a consultation with a doctor for asthma fell significantly from 100% (19/19) to 74% (14/19) ( $p=0.03$ ) in the peak flow group and from 100% (27/27) to 41% (11/27)

( $p<0.001$ ) in the symptoms only group. Table II shows that the difference between the two groups was not significant ( $p=10$ ). The proportion receiving oral steroids fell from 63% (12/19) to 37% (7/19) in the peak flow group, which was not significant ( $p=0.06$ ), but it fell significantly from 41% (11/27) to 0% (0/27) ( $p<0.001$ ) in the symptoms only group. The difference between the two groups was not significant ( $p=0.81$ ). The proportion of children requiring nebulised salbutamol fell from 41% (7/17) to 12% (2/17). This was almost a significant fall ( $p=0.06$ ). The change was significant in the other group, being from 15% (4/27) to 0% (0/27) ( $p=0.05$ ). Again the difference between the two groups was not significant ( $p=0.77$ ).

#### NUMBERS OF CONSULTATIONS, COURSES, AND TREATMENTS

Table III shows the number of consultations with doctors, courses of oral steroids, and short term nebulised salbutamol treatments per patient per year in the two groups and the changes with the formation of the asthma clinic.

**All patients**—In the peak flow group the median number of asthma consultations with the doctor fell significantly from 8.0 to 2.0 consultations per patient per year ( $p<0.001$ ), and the fall in the symptoms only group from 4.5 to 1.0 consultations per patient per year was also significant ( $p<0.001$ ). The result of the Mann-Whitney U test comparing the difference between the two groups was not significant ( $p=0.78$ ) (table IV). The median number of courses of oral steroids fell significantly in both groups but the difference between the two groups with the Mann-Whitney U test was not significant ( $p=0.31$ ) (table IV). The median number of nebulised salbutamol treatments in the peak flow group fell significantly ( $p<0.01$ ), but the fall was not significant in the other group ( $p=0.08$ ). The difference between the two groups was not significant ( $p=0.09$ ) (table IV).

**Adults**—The median number of asthma consultations with the doctor and number of courses of oral steroids fell significantly for the adult patients in both groups, but the differences between the two groups were not significant (table IV). In both groups the median number of nebulised salbutamol treatments did not fall significantly, but again the difference between the groups was not significant by the Mann-Whitney U test.

**Children**—The median number of asthma consultations with the doctor for each child fell significantly in

TABLE II—Comparison between peak flow and symptoms only groups of changes in number of patients requiring doctor consultation, courses of oral steroids, and short term nebulised salbutamol

	Difference in proportions between groups (95% confidence interval)	$\chi^2$ With Yates's correction factor	Degrees of freedom	p Value
<i>All patients</i>				
Doctor consultation	0.00 (-0.14 to 0.15)	0.30	1	0.59
Oral steroids	-0.16 (-0.37 to 0.05)	1.28	1	0.26
Nebulised salbutamol	0.08 (-0.28 to 0.45)	0.01	1	0.91
<i>Adults</i>				
Doctor consultation	0.05 (-0.18 to 0.28)	0.04	1	0.84
Oral steroids	-0.15 (-0.44 to 0.14)	0.31	1	0.58
Nebulised salbutamol	0.30 (-0.30 to 0.90)	0.06	1	0.81
<i>Children</i>				
Doctor consultation	0.00 (0.00 to 0.00)	0.00	1	1.00
Oral steroids	-0.14 (-0.40 to 0.12)	0.06	1	0.81
Nebulised salbutamol	-0.14 (-0.40 to 0.12)	0.09	1	0.77

TABLE III—Comparisons within peak flow and symptoms only groups of changes in number of doctor consultations, courses of oral steroids, and short term nebulised salbutamol treatments before and after formation of asthma clinic

Group		Median (interquartile range)		Estimated difference of after - before (95% confidence interval)	Wilcoxon signed rank sum test	p Value
		12 months before clinic	12 months after clinic			
<i>All patients</i>						
Doctor consultations	{ Peak flow (n=51)	8.0 (5.0 to 12.0)	2.0 (0.0 to 8.0)	-4.0 (-5.5 to -2.0)	234.5	<0.001
	{ Symptoms only (n=64)	4.5 (2.0 to 8.0)	1.0 (0.0 to 2.0)	-3.5 (-4.5 to -2.5)	145.0	<0.001
Oral steroids	{ Peak flow (n=46)	1.0 (0.0 to 3.0)	0.0 (0.0 to 2.0)	-1.0 (-1.5 to -0.5)	131.0	<0.01
	{ Symptoms only (n=60)	0.0 (0.0 to 2.0)	0.0 (0.0 to 0.0)	-0.5 (-1.0 to -0.5)	15.0	<0.001
Nebulised salbutamol	{ Peak flow (n=45)	0.0 (0.0 to 1.0)	0.0 (0.0 to 0.0)	0.0 (-0.5 to 0.0)	13.5	<0.01
	{ Symptoms only (n=64)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	5.0	0.08
<i>Adults</i>						
Doctor consultations	{ Peak flow (n=32)	8.0 (4.0 to 13.5)	2.0 (0.0 to 11.8)	-3.5 (-5.5 to -1.0)	100.5	0.01
	{ Symptoms only (n=37)	3.0 (2.0 to 6.0)	1.0 (0.0 to 3.0)	-2.0 (-3.0 to -1.0)	99.5	<0.01
Oral steroids	{ Peak flow (n=27)	2.0 (0.0 to 4.0)	0.0 (0.0 to 2.0)	-1.5 (-3.0 to 0.5)	54.0	0.01
	{ Symptoms only (n=33)	1.0 (0.0 to 2.0)	0.0 (0.0 to 0.0)	-1.0 (-1.5 to -0.5)	10.0	0.001
Nebulised salbutamol	{ Peak flow (n=28)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (-0.5 to -0.0)	5.0	0.15
	{ Symptoms only (n=37)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	3.0	0.58
<i>Children</i>						
Doctor consultations	{ Peak flow (n=19)	7.0 (5.0 to 10.0)	2.0 (0.0 to 7.0)	-4.0 (-6.5 to -1.5)	29.0	0.02
	{ Symptoms only (n=27)	6.0 (4.0 to 9.0)	0.0 (0.0 to 2.0)	-5.5 (-6.5 to -4.0)	1.5	<0.001
Oral steroids	{ Peak flow (n=19)	1.0 (0.0 to 3.0)	0.0 (0.0 to 1.0)	-0.5 (-1.5 to 0.0)	17.5	0.06
	{ Symptoms only (n=27)	0.0 (0.0 to 1.0)	0.0 (0.0 to 0.0)	-0.5 (-1.5 to 0.0)	0.0	<0.01
Nebulised salbutamol	{ Peak flow (n=17)	0.0 (0.0 to 1.5)	0.0 (0.0 to 0.0)	-0.5 (-1.5 to 0.0)	2.5	0.04
	{ Symptoms only (n=27)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0	0.10

TABLE IV—Comparison between peak flow and symptoms only groups of changes in number of doctor consultations, courses of oral steroids, and short term nebulised salbutamol treatments before and after formation of asthma clinic

Group	Median difference after—before (interquartile range)	Estimated difference of peak flow—symptoms only (95% confidence interval)	Mann-Whitney U test statistic	p Value
<i>All patients</i>				
Doctor consultations	{ Peak flow (n=51)	-4.0 (-8.0 to 0.0)	2909.0	0.78
	{ Symptoms only (n=64)	-3.0 (-6.0 to -1.0)		
Oral steroids	{ Peak flow (n=46)	-1.0 (-2.0 to 0.0)	2306.5	0.31
	{ Symptoms only (n=60)	0.0 (-1.8 to 0.0)		
Nebulised salbutamol	{ Peak flow (n=45)	0.0 (-1.0 to 0.0)	2275.0	0.09
	{ Symptoms only (n=64)	0.0 (0.0 to 0.0)		
<i>Adults</i>				
Doctor consultations	{ Peak flow (n=32)	-3.5 (-8.0 to 0.0)	1021.0	0.23
	{ Symptoms only (n=37)	-2.0 (-3.5 to 0.0)		
Oral steroids	{ Peak flow (n=27)	-1.0 (-3.0 to 0.0)	735.5	0.18
	{ Symptoms only (n=33)	0.0 (-2.0 to 0.0)		
Nebulised salbutamol	{ Peak flow (n=28)	0.0 (0.0 to 0.0)	872.5	0.30
	{ Symptoms only (n=37)	0.0 (0.0 to 0.0)		
<i>Children</i>				
Doctor consultations	{ Peak flow (n=19)	-5.0 (-6.0 to -2.0)	504.5	0.20
	{ Symptoms only (n=27)	-6.0 (-7.0 to -3.0)		
Oral steroids	{ Peak flow (n=19)	-1.0 (-2.0 to 0.0)	450.5	0.93
	{ Symptoms only (n=27)	0.0 (-1.0 to 0.0)		
Nebulised salbutamol	{ Peak flow (n=17)	0.0 (-1.5 to 0.0)	329.5	0.11
	{ Symptoms only (n=27)	0.0 (0.0 to 0.0)		

both groups; the result of the Mann-Whitney U test comparing the difference between the two groups was not significant ( $p=0.20$ ) (table IV). The fall in the median number of courses of oral steroids just failed to reach significance in the peak flow group ( $p=0.06$ ), and in the symptoms only group it was significant ( $p<0.01$ ). The difference between the two groups was not significant ( $p=0.93$ ). The median number of nebulised salbutamol treatments fell significantly in the peak flow group but not in the symptoms only group. The difference between the two groups, however, was not significant ( $p=0.11$ ).

### Discussion

We found that self management plans for asthma can make a valuable contribution to the care of asthma but that the peak flow meter is not necessarily the key to improved illness. Although at first this may seem surprising, on reflection it is understandable. Our patients were provided with a package of care that included a specially trained nurse practitioner, longer consultation times, review of inhaler technique, regular follow up, self management plans, education, and invariably more appropriate use of inhaled steroids. Overall, the nurse run asthma clinic was associated with considerable improvements in the illness of both adults and children. Doctor consultations, the number of oral steroid courses, and the use of nebulised salbutamol fell regardless of which self management plan patients were issued with. Viewed in the light of these changes to patient care and the similarity in outcome between our two treatment groups, we think that the peak flow meters used in the context of this study did not bestow a significant advantage.

We recognise that the peak flow meter is an invaluable tool for the diagnosis and assessment of asthma in general practice. Its widespread distribution may not, however, be the only method by which the illness from asthma can be reduced. The possibility that a symptoms only self management plan, effectively administered by a nurse, can bring about a reduction in such illness in both adults and children is suggested by our results.

The cost of purchasing a peak flow meter and the ability to use it also needs consideration. Although our patients showed a willingness to purchase peak flow meters once their purpose had been fully explained, this may not be the case in other areas. Very young and very old people may have difficulty coordinating a breath to register a reproducible result. An alternative

to a peak flow meter may have merit for certain groups of patients.

The similarity in outcome between our two groups may be explained by the fact that the patients were taught the importance of their symptoms through discussions with the nurse and regular checks on a spirometer. A study by Rubinfeld and Pain found that 15% of patients were unaware of the degree of their airways obstruction.<sup>7</sup> Sibbald found that 17% of patients tested with a hypothetical asthma attack delayed seeking medical help despite having severe symptoms.<sup>12</sup> Our study raises the possibility that these patients are amenable to being taught the importance of their symptoms and more appropriate self management. The results also raise the possibility that only the more severe asthmatic patients or those requiring nebulisers at home may benefit from owning their own peak flow meter. Another possibility is that lending patients a peak flow meter for a few weeks may be a satisfactory way of teaching them the importance of their symptoms, which can then form the basis for appropriate self management.

An interesting subject for future study would be to examine the points at which patients need to make changes in their treatment. We think that the patients who had the symptoms only plan actually implemented the higher dose of inhaled steroid earlier in an attack of asthma than patients who waited until their peak flow fell to 70% of normal. At 70% their asthma attack may have been well advanced and not as amenable to an increase in inhaled steroids. The earlier introduction of inhaled steroids by the symptoms only group may have led to a reduced use of oral steroids. Inhaled steroids take a few days to have their full benefit. Patients in the symptoms only self management group may have had a slightly better outcome because of an earlier introduction of inhaled steroids. This trend was evident in the study. The decrease in the percentage of all patients requiring oral steroids in the peak flow group fell from 73% to 47%, a 26% reduction. The decrease in the other group was from 52% to 12%, a reduction of 40%. Similarly, doctor consultations in the peak flow group fell from 98% to 66%, a reduction of 32%, while the fall was from 97% to 53% in the symptoms only group, a reduction of 44%.

For many patients in general practice who can respond to their symptoms the peak flow meter with its cut off points at 70% and 50% may have delayed their response and allowed their asthma to progress a little further, by which time oral steroids would be needed. Once patients started treatment with oral steroids they

were advised to contact the doctor. A proportion of these patients may have sought a consultation with a doctor, rather than telephoning as we suggested, because the delay in treatment had meant that they were experiencing more asthma than usual.

In their pilot study on hospital patients Beasley *et al* chose 70% as the value at which to implement changes in treatment.<sup>9</sup> Once patients have been taught the importance of their symptoms 75% or 80% may be a more appropriate criterion in general practice. Fifty per cent as the point of introducing oral steroid treatment was selected by Beasley *et al* because it was observed that morning dips with a fall in peak flow of more than 50% of the highest daily peak flow preceded sudden death.<sup>13,14</sup> In general practice, where the patients with asthma may not be so severely affected, a lower cut off point of 45% or possibly 40% may be appropriate. This may reduce the use of oral steroids but increase the need for treatment with nebulised drugs and time lost from work and school. The earlier introduction of inhaled steroids may help compensate for this effect.

The study was carried out on a population of both adults and children. The analysis showed no major differences between the two. This confirms our belief that a standard self management plan whether directed by symptoms or peak flows is applicable to children and adults alike.

The peak flow meter has a well established place in the care of asthma. Peak flow meters are soon to be available on prescription in the NHS. It is a timely reminder that simply prescribing peak flow meters without a system of self management and regular review will be unlikely to improve patient care. Techniques that teach the patients the importance and relevance of their symptoms and how to implement changes in management are vitally important if asthma care is to be improved.

Our study raises some interesting questions about the use of peak flow meters in general practice. In an

attempt to overcome some of these problems we have developed a colour coded peak flow meter<sup>15</sup> which helps the patient easily learn the concepts of self management and modify treatment appropriately. Such a system together with modified cut off points may well help the meter play an important part in the long term management of asthma in general practice.

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## Abuse of elderly people by their carers

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### Abstract

**Objective**—To assess the prevalence of abuse of elderly people by their carers and the characteristics of abusers and the abused.

**Design**—Information on abuse and risk factors was collected over six months from carers and patients. Risk factors were identified in the abused group and compared with those in a non-abused control group.

**Setting**—Carers were interviewed at home; patients were examined in the wards of Putney and Barnes geriatric hospitals, London.

**Subjects**—All patients referred from any source for respite care to the geriatric services over a six month period and their carers.

**Main outcome measures**—Amount of physical and verbal abuse or neglect. Quantification of risk factors and correlation with the presence or absence of abuse.

**Results**—45% Of carers openly admitted to some form of abuse. Few patients admitted abuse. The most significant risk factor for physical abuse was alcohol consumption by the carer ( $p < 0.001$ ). Other significant risk factors were a poor pre-morbid

relationship and previous abuse over many years. Abuse was often reciprocated and was associated with social dysfunction in many patients. Service delivery, respite care, and level of mental and physical disability were not significantly associated with abuse.

**Conclusion**—The high level of abuse found in elderly patients in respite care was particularly associated with alcohol abuse and long term relationships of poor quality, which are difficult to change. Even with increased provision of services, care in the community may not be the best solution for these people.

### Introduction

Although "granny battering" was first described in Britain in 1975,<sup>1</sup> most of the research on abuse of elderly people has been carried out in North America, where statutory requirements to notify authorities of suspected cases facilitates identification for research purposes. The extent of this abuse is not known, but a social services survey in 1988 found 5% of elderly clients were being abused,<sup>2</sup> and this is comparable with

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