

## Association between availability of non-Prescription B2 agonist inhalers and undertreatment of asthma?

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**Publication details:**

British medical journal  
v. 306  
pp. 1514-8

**Publication Date:**

1993

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*BMJ* 1993;306:1514-1518  
doi:10.1136/bmj.306.6891.1514

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## Association between availability of non-prescription $\beta_2$ agonist inhalers and undertreatment of asthma

Peter Gibson, David Henry, Lynn Francis, Duncan Cruickshank, Fiona Dupen, Nick Higginbotham, Richard Henry, David Sutherland

### Abstract

**Objective**—To determine whether the availability of  $\beta_2$  agonist inhalers without prescription leads to undertreatment of asthma.

**Design**—Cross sectional study of adequacy of treatment in asthmatic subjects who purchased  $\beta_2$  agonist inhalers and subjects who obtained inhalers by prescription.

**Setting**—Community pharmacies in New South Wales, Australia.

**Subjects**—403 eligible consecutive asthmatic subjects aged 13 to 55 purchasing salbutamol metered dose inhalers over the counter or by prescription; 197 attended for follow up and spirometry and 139 returned 14 day symptom, peak flow, and medication diaries.

**Main outcome measures**—Severity of asthma assessed on frequency of day time and night time wheezing, frequency of inhaler use, and peak expiratory flow rates. Adequacy of treatment according to published guidelines.

**Results**—Of the 139 patients who completed the diary 83, (60%) purchased their inhalers without prescription and 83 were undertreated. The characteristics of patients in the prescription and purchasing groups were similar. Multiple logistic regression analysis identified use of non-prescribed salbutamol as being associated with a 2.9-fold increase in the odds of undertreatment (95% confidence interval 1.3 to 6.8). Smoking increased the odds of undertreatment (3.3, 1.2 to 9.5) and use of a peak flow meter reduced the odds (0.11, 0.04 to 0.34). Adjustment for frequency of consultation made use of non-prescription salbutamol insignificant (1.4, 0.55 to 3.8). Attitudes to services provided by doctors and pharmacists were favourable and not associated with undertreatment.

**Conclusion**—Over the counter purchase of salbutamol is associated with infrequent consultation with doctors and undertreatment of asthma.

### Introduction

In most developed countries drugs that are commonly used to treat asthma are available only with a prescription from a registered medical practitioner. Deregulation of bronchodilator aerosols was considered in the early 1980s in the United States and more recently in the United Kingdom but was abandoned because of lack of medical support.<sup>1,2</sup> This conservatism contrasts with an international trend to deregulate the supply of a range of drugs—for instance, non-steroidal anti-inflammatory drugs, histamine  $H_1$  and  $H_2$  receptor antagonists, and antifungal drugs.<sup>3,4</sup> The pressure for deregulation has come from manufacturers of proprietary medicines but has been supported by governments, who have seen it as an opportunity to cut health

expenditure,<sup>5</sup> and by pharmacists, who view this as a way to expand their professional role.

The reluctance to make inhaled bronchodilators available without prescription probably reflects concern about their role in the management of asthma, particularly when they are used as sole therapy. Non-prescription sales, and a possible attendant reduction in medical supervision, might be expected to lead to undertreatment, with overreliance on inhaled bronchodilators and underuse of anti-inflammatory and prophylactic drugs—notably oral and inhaled steroids and cromoglycate.<sup>6</sup> Such undertreatment is widespread and has been identified as a risk factor in studies of deaths and near deaths from asthma.<sup>7-9</sup> In addition, recent research has highlighted the possible toxicity of  $\beta_2$  agonists and linked this to epidemics of deaths from asthma. In the case of fenoterol chronic use has been shown to worsen asthma control and be associated with an increased risk of death from asthma.<sup>10-12</sup>

In Australia selective  $\beta_2$  agonist inhalers were made available without prescription in New South Wales in the late 1970s, long before the controversy regarding their role in treatment.<sup>6</sup> Since 1985 these drugs have been available in all Australian states without a prescription. Bronchodilator aerosol sprays can be purchased only from a pharmacist who, under state regulations, must dispense the drug in person. In some states with more restrictive schedules the pharmacist must label the product and counsel patients on correct use.

We have previously shown that in the Hunter area of New South Wales many patients with asthma chose to purchase their bronchodilator inhalers without prescription.<sup>6</sup> We report here a study of the relation between mode of acquisition of these drugs and undertreatment of asthma.

### Subjects and methods

We performed a cross sectional study to assess the adequacy of treatment of asthmatic patients in the Hunter area, New South Wales, Australia. Our primary interest was whether patients whose treatment was considered to be inadequate were more likely than those with adequate treatment to obtain their inhalers without prescription. We also studied the association between undertreatment and a range of other variables.

Subjects were recruited from 46 of the 129 community pharmacies in the Hunter area. In Australia most asthmatic patients use inhaled bronchodilators, with salbutamol being the commonest drug.<sup>13</sup> Consecutive patients who presented to a study pharmacy requesting a salbutamol metered dose inhaler were given an asthma questionnaire to complete at home and return to the pharmacy. As an inducement to complete the questionnaire pharmacists offered participants a

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BMJ 1993;306:1514-8

free salbutamol inhaler on its return. Pharmacists sent reminder letters and duplicate questionnaires to non-respondents. Questionnaires were returned in sealed envelopes and pharmacists remained unaware of their contents. Subjects indicated on the questionnaire whether they had had asthma diagnosed previously and whether they were willing to attend for interview.

Subjects who considered themselves to have asthma, who were aged between 13 and 55 years, and who stated that they were prepared to attend for interview were invited to undertake the next phase of the study. These subjects completed an additional questionnaire concerning their knowledge of asthma. Spirometry was performed and subjects were instructed in the use of a peak flow meter and asked to keep a symptom, peak flow, and medication diary. The study methods were approved by the Hunter area research ethics committee.

#### ASTHMA QUESTIONNAIRE

The self administered 52 item screening questionnaire was similar to that we used in a previous study<sup>6</sup> and included questions on demographic characteristics, smoking history, duration of asthma, frequency and severity of symptoms, history of admission to hospital for asthma, frequency of consultation with a doctor in the past six months, use of a peak expiratory flow meter, and details of current drug treatment. The last question required participants to categorise how they acquired salbutamol inhalers as (a) always without prescription, (b) usually without prescription, (c) usually with prescription, or (d) always with prescription. Subjects who always or usually obtained inhalers without prescription became the "purchase" group and the remaining subjects became the "prescription" group. This categorisation took no account of the frequency of use of inhalers or the use of other drugs and was independent of the study outcome.

#### ASSESSMENT OF ADEQUACY OF TREATMENT

The adequacy of treatment of asthma was examined by assessing the severity of each patient's asthma and comparing current treatment with what would be recommended by published guidelines for optimal asthma treatment. The published standards for asthma treatment are similar in Australia, Canada, and the United Kingdom.<sup>14-16</sup> The Canadian treatment guidelines were the most explicit, describing asthma severity in four grades and linking this to recommended minimum treatment (table I).<sup>15</sup> Asthma severity was classified into one of four levels based on symptoms, frequency of use of  $\beta_2$  agonist, airflow rates, and the variability of serial measurements of peak expiratory flow rates. The severity and treatment data were

obtained from the 14 day symptom, medication, and peak flow diary. If the dose of drug was unavailable from the diary the subject was contacted by telephone to obtain this information.

Each day for 14 days subjects recorded the severity of nocturnal and day time asthma symptoms, medication type, and the number of doses used. Cough, wheeze, and breathlessness were rated on a four point scale. Subjects were given a mini-Wright peak flow meter and recorded in the diary the best of three peak expiratory flow rate measurements in the morning and evening. Diurnal peak flow variability was calculated as the daily amplitude expressed as a percentage of the highest daily value and averaged for the 14 days. Criteria indicating the highest level (most severe) were used. Current asthma treatment was then compared with the recommended minimum treatment for that particular severity level. Treatment was considered inadequate if the treatment received was less than the minimum recommended treatment. These classifications and comparisons were performed by using a computer algorithm independent of information regarding the mode of acquisition of treatment.

#### ASTHMA KNOWLEDGE, BELIEFS, AND ATTITUDES

Patients completed a self administered 27 item questionnaire to assess their knowledge of asthma and the application of this knowledge of common clinical scenarios. This questionnaire shared 21 items with a previously validated questionnaire.<sup>17</sup>

The value and importance that subjects attached to visits to the doctor and the pharmacist were also evaluated by questionnaire. The questionnaire included items relating to the expectation of services provided by the doctor (five items) and the pharmacist (five items) and the importance of the services provided by the doctor (five items) and pharmacist (five items). These items were presented as nine point Likert scales. Items evaluating the subjects' attitude to visits with the doctor (five items) and pharmacist (five items) were presented as semantic differential scales. We piloted the questionnaire and factor analysis showed it to be a reliable psychometric instrument (F Dupen *et al*, unpublished data).

#### STATISTICAL ANALYSES

Categorical variables were analysed by using contingency tables with the appropriate corresponding measures of association ( $\chi^2$  tests of association, odds ratios). Scores from the asthma knowledge questionnaire and attitude scales were summarised as means with standard deviation. The means of continuous variables from the full responder and part responder groups and the undertreated and adequately treated groups were compared by *t* tests. Multiple logistic regression models were used to determine the independent predictors of undertreatment. Variables were selected for the initial logistic regression model based on the results of univariate analysis with the outcome variable, undertreatment. Any variable whose univariate test of association had a *p* value less than 0.25 was included in the initial model.<sup>18</sup> A stepwise elimination procedure was then used to refine the model. All variables were adjusted for age and sex by including these factors in the final model.

#### Results

Of 718 asthma questionnaires that were issued, 606 were returned. A total of 203 were rejected because the subject's age was outside the specified range or because asthma was not identified in the questionnaire as the reason for using a salbutamol inhaler. Thus 403 asthmatic subjects aged 13 to 55 years were eligible for the second phase of the study, 151 of whom indicated

TABLE I—Recommended treatment of asthma according to severity\*

Asthma severity	Recommended treatment
1. Little or no daytime and no nocturnal asthma symptoms $\beta_2$ agonist use < 2 times daily Airflow rates > 85% predicted Peak expiratory flow rate variability < 20%	Inhaled $\beta_2$ agonist
2. Nocturnal symptoms (2/4) or moderate (> 2/4) daytime symptoms, or both $\beta_2$ agonist use < 4 times daily Airflow rates > 85% predicted Peak expiratory flow rate variability 20-30%	Inhaled $\beta_2$ agonist plus cromoglycate or low dose inhaled corticosteroid (< 800 $\mu$ g/day)
3. Symptoms as for level 2. $\beta_2$ agonists use > 4 times a day Airflow rates 60-85% predicted Peak expiratory flow rate variability > 30%	Inhaled $\beta_2$ agonist. High dose inhaled corticosteroid (> 800 $\mu$ g/day) $\pm$ theophylline, ipratropium
4. Symptoms as for level 2. $\beta_2$ agonist use > 4 times daily Airflow rates < 60% predicted Peak expiratory flow rate variability > 30%	Same as for level 3 plus ingested corticosteroid (for example, prednisone)

\*Adapted from Hargreave *et al*.<sup>15</sup>



that they were not available for interview. Of the remaining 252 eligible consenting subjects, 197 attended for follow up interview and spirometry. Symptom and peak flow diaries were returned by 139 subjects.

Table II compares the characteristics of subjects who returned diaries (n=139) with those of subjects who completed the asthma questionnaire but did not enter or complete the second phase of the study. The two groups were similar in terms of asthma severity, sex, smoking status, and mode of acquisition of inhalers. However, subjects completing the diary were slightly older and were more likely to have completed tertiary education ( $p < 0.05$ ).

#### UNDERTREATMENT OF ASTHMA

Eight three (60%) of subjects in the final study group were undertreated. Undertreated subjects were more likely than those who were adequately treated to be

TABLE II—Characteristics of subjects who completed asthma questionnaire and those who continued with the study and completed a 14 day diary. Values are numbers (percentages) unless stated otherwise

	Diary and asthma questionnaire (n=139)	Asthma questionnaire only (n=264)
Purchased inhalers without prescription	83 (60)	174 (66)
Mean (SD) age, (years)	33 (11)	30 (11)
Sex, male	74 (53)	137 (52)
Current smoking	35 (25)	55 (21)
Tertiary education	50 (36)	66 (25)*
Median (range) duration of asthma (years)	20 (1-51)	18 (1-55)
Daily wheeze	43 (31)	76 (29)
Activities limited by asthma	53 (38)	82 (31)
Nocturnal waking, most nights	71 (51)	140 (53)
Emergency visit for asthma in past six months	46 (33)	67 (25)
Ever admitted to hospital for asthma	68 (49)	143 (54)

\* $p < 0.05$ , by  $\chi^2$ .

TABLE III—Characteristics of 135 patients for whom complete data were available according to adequacy of treatment of asthma

	Undertreated (n=83)	Adequately treated (n=52)	p Value
No (%) purchased inhalers without prescription	57 (69)	26 (50)	0.03
Mean (SD) (years)	34 (11)	32 (10)	0.30
No (%) of men	42 (51)	29 (56)	0.65
No (%) who smoked	28 (34)	6 (12)	0.003
No (%) married	52 (63)	33 (63)	0.94
No (%) employed full time	48 (58)	33 (63)	0.53
No (%) who had tertiary education	25 (30)	23 (44)	0.07
Mean (SD) asthma knowledge score	12 (4)	13 (4)	0.08
No (%) visited doctor in past six months:			
0 times	41 (49)	6 (12)	
1-2 times	32 (39)	27 (52)	0.001
≥ 3 times	10 (12)	19 (37)	
No (%) used peak flow meter	6 (7)	20 (38)	0.001
Mean (SD) score for relationship with doctor*:			
Expectation of services	6.3 (1.6)	6.5 (1.8)	0.43
Importance of services	5.4 (1.3)	5.5 (1.3)	0.55
Attitude to time with doctor	7.0 (1.5)	7.1 (1.2)	0.63
Mean (SD) score for relationship with chemist*:			
Importance of services	7.0 (1.3)	6.8 (1.6)	0.56
Attitude to time with chemist	6.6 (1.6)	6.7 (1.5)	0.79

\*Mean score of five items for each domain. Scores indicated on 9 point scale 1=highly unfavourable, 9=highly favourable.

TABLE IV—Numbers of asthmatic subjects receiving adequate treatment according to how they obtained treatment and severity of asthma

Severity of asthma*	Purchase only		Purchase plus prescription		Prescription only	
	Undertreated	Adequately treated	Undertreated	Adequately treated	Undertreated	Adequately treated
1		1		2		1
2	24	1	6	18	14	18
3	12		9	5	6	7
4	2		3	1	8	1
Total (%)	38 (95)	2 (5)	18 (41)	26 (59)	28 (51)	27 (49)

See table I for details. Level 1 is least severe.

smokers and to obtain their inhalers over the counter (table III). Undertreated subjects visited their doctors for asthma less often and were less likely to be using a peak flow meter. There was a non-significant trend for these subjects to have lower scores for asthma knowledge than adequately treated subjects. Undertreated subjects held neutral to favourable attitudes towards visits to the doctor. Attitudes to the doctor and to the pharmacist were similarly favourable in both undertreated and adequately treated subjects ( $p > 0.05$ ), and both groups had similar expectations of services which would be provided during a visit to the doctor ( $p > 0.05$ ). Other socioeconomic and personal characteristics were not associated with undertreatment (table III).

Forty subjects in the purchase group (48%) used inhaled salbutamol as their only form of therapy and 43 combined over the counter salbutamol with other prescribed drugs. The remaining 52 subjects obtained all of their asthma drugs by prescription. Table IV shows the severity of asthma in these three groups, as assessed by symptoms and peak expiratory flow diary. Most subjects had grade 2 or 3 asthma (see table I). In the purchase only group, all of the subjects with grade 3 and 4 asthma, and all but one with grade 2 were undertreated. Overall, 95% of the purchase only group were inadequately treated by current standards compared with 41%, and 55% of subjects in the other two groups.

The purchase and prescription groups were compared and found to be similar in terms of age, sex, education, marital status, smoking, employment status, and occupational grouping. Though the purchase only group had statistically different attitude scores (table V), the values represent neutral to mildly favourable attitudes to health care providers. These features do not support the possibility that people who purchase drugs over the counter use health care differently.

#### MULTIVARIATE ANALYSIS

Table VI summarises the factors that were found to be independently associated with undertreatment of asthma by stepwise logistic regression analysis. These analyses were adjusted for age and sex. Both purchase of salbutamol inhalers without prescription and smoking were associated with an increased odds of undertreatment, while use of a peak flow meter was associated with a reduced odds of undertreatment. Asthma knowledge score was not significantly associated with the outcome.

Frequency of consultation with a medical practitioner was not included in this version of the model. This variable was strongly associated with mode of acquisition of inhalers (Table VII). When consultation frequency was entered in the logistic regression model inhaler purchase was no longer significantly associated with the outcome (odds ratio 1.4, 95% confidence interval 0.55 to 3.8). Frequency of consultation was associated with a reduced odds of undertreatment: odds ratio of undertreatment 0.23 (0.08 to 0.67) for 1-2 consultations in past six months and 0.12 (0.03 to 0.49) for three or more consultations compared with no consultations. The odds ratios for undertreatment with smoking (3.6, 1.2 to 10.8) and use of a peak flow meter (0.18, 0.06 to 0.55) were unaffected by adjustment for frequency of consultation.

#### Discussion

We have shown that undertreatment of asthma is common in an adult population recruited from the Australian community. This finding agrees with previously published results<sup>10</sup> and provides objective evidence for undertreatment. Asthmatic subjects who

TABLE V—Attitudes to health care providers of subjects according to how asthma drugs were obtained

Mean (SD) score*	Purchase only (n=39)	Purchase and prescription (n=44)	Prescription only (n=55)	p Value
Importance of doctors' services	5.1 (1.2)	5.3 (1.2)	5.8 (1.4)	0.04
Attitude to time with doctor	6.7 (1.5)	6.9 (1.4)	7.5 (1.3)	0.02
Importance of chemist services	7.0 (1.2)	6.6 (1.5)	7.1 (1.4)	0.16
Attitude to time with chemist	6.6 (1.6)	6.4 (1.4)	7.1 (1.5)	0.13

\*Mean of five items for each domain.

TABLE VI—Factors independently associated with undertreatment of asthma

	Unadjusted odds ratio* (95% confidence interval)	Multivariate odds ratio (95% confidence interval)
Purchased inhalers without prescription	2.2 (1.1 to 4.5)	2.9 (1.3 to 6.8)
Smoking	4.0 (1.5 to 10.4)	3.3 (1.2 to 9.5)
Uses peak flow meter	0.12 (0.04 to 0.33)	0.11 (0.04 to 0.34)

\*Odds ratios calculated with a stepwise logistic regression model. Variables included in the model were purchase without prescription, smoking, use of peak flow meter, age, and sex.

TABLE VII—Association between mode of acquisition of inhalers and frequency of consultation

Mode of acquisition of inhalers	No of visits to doctor in past 6 months		
	0	1-2	≥ 3
Prescription	7	23	22
Purchase	40	36	7

 $\chi^2=28.2$  for comparison of purchase and prescription groups ( $p<0.0001$ ).

chose to purchase their inhalers without prescription were about three times more likely to be undertreated compared with those who usually obtained inhalers by prescription. Because undertreatment was common the odds ratio overestimates the relative risk, which was about 1.6 for purchasers compared with users of prescription salbutamol. Cigarette smoking and not using a peak flow meter were also independently associated with undertreatment of asthma.

Using a stepwise logistic regression analysis we found that the association between use of non-prescription inhalers and undertreatment was no longer significant after adjustment for the frequency of consultation with family doctors. This was because inhaler purchase and frequency of consultation were highly correlated, indicating that asthmatic subjects who choose to purchase without a prescription attend their doctors infrequently. Consequently they have fewer opportunities to obtain additional drugs that are necessary for optimum control of their asthma.

#### CAUSE OF ASSOCIATION

The frequency of medical consultation and over the counter purchase of salbutamol were closely associated with undertreatment. This association could occur if over the counter purchase of  $\beta$  agonist led to reduced medical consultation. Alternatively, both over the counter purchase and infrequent consultation may be markers for a difficult patient with poor use of conventional medical services. Our study is cross sectional and insufficient to determine causation. In a previous study most patients who purchased salbutamol without a prescription valued the convenience of being able to obtain the drug without having to make an appointment with a doctor.<sup>6</sup> In New South Wales this practice carries no financial penalty as the cost of the inhalers is about the same however they are obtained. The purchase only group placed less

value on time spent with a doctor and on the importance of services provided by a doctor than prescription users, which supports the possibility that attitudes held by the subjects led to reduced medical consultation and consequently undertreatment. However, the differences in attitude were not large and these variables were not associated with undertreatment. Attitudes to doctors should not therefore confound the relation between mode of acquisition of medication and undertreatment. If inhaler purchase does lead to undertreatment our data suggest that about a quarter of undertreatment in the study population resulted from asthmatic patients choosing to purchase their inhalers without a prescription.

The finding that smoking was associated with inadequate treatment is not surprising considering the evidence that inhaled tobacco smoke can worsen asthma control.<sup>20,21</sup> The association can be interpreted as indicating either that smoking worsens the severity of asthma or that smokers seek, or receive, less medical care. As the statistical association remained unaffected by adjustment for frequency of consultation with doctors we favour the former explanation.

#### IMPROVING CARE FOR ASTHMATIC PATIENTS

Standards of practice have changed since the supply of selective  $\beta_2$  agonist was deregulated in Australian states during the 1980s.<sup>6</sup> Bronchodilators, on their own, are now considered adequate treatment for only the mildest forms of asthma, equivalent to severity level 1 in the categorisation that we used. Most of our subjects had more severe forms of asthma, indicating the need for more aggressive treatment. Yet almost half of the subjects who purchased salbutamol over the counter took no other drugs. Optimal asthma control for patients with asthma graded as 2-4 requires medical consultation, prescription of anti-inflammatory drugs where appropriate, and compliance with the prescribed management plan.

Objective assessment of asthma severity has been highlighted as an important adjunct to asthma control.<sup>14-16</sup> Overall, the prevalence of use of peak flow meters was low in this study. Patients who used peak flow meters, however, were much less likely to be undertreated than those who did not. Unlike purchase of inhalers, this relation was relatively unaffected by adjustment for the frequency of consultation with doctors, suggesting that the explanation is not a higher level of medical supervision. Clearly the use of peak flow meters provides information that improves the decisions made by patients and their providers. Peak flow meters are also available in Australia without a doctor's prescription but only 3% of subjects who relied on purchased salbutamol as their sole therapy used peak flow meters. Educational programmes directed at pharmacists should target this problem and emphasise the importance of objective assessment of asthma severity.

#### VALIDITY

The main threat to the validity of the conclusions of this study is the low response rate in the second phase. Our final study sample (139) represented only 34% of the eligible population. In contrast, the response rate in the first phase of the study was high, around 84%. The main reason for subjects not progressing to the second phase was the feeling that they had already contributed to the research and they were reluctant to give up more time and undergo the inconvenience of completing additional questionnaires and attending the department during office hours for spirometry and instruction in the use of the diary and peak flow meter. Fortunately the high response rate in the first phase meant that we had a lot of information with which to compare responders and non-responders. We found no

major differences between the groups that were likely to bias the relation between the main study factors and the outcome.

In conclusion, this study confirms the impression that over the counter availability of inhaled bronchodilators is associated with reduced consultation rates and inadequate treatment for asthma. This information is relevant not only in Australia but in other countries where deregulation of the supply of these drugs may be contemplated.<sup>1 2 4</sup> We believe that deregulation would result in a deterioration in the quality of care. In Australia the decisions are now more complex as many asthmatic patients have used non-prescription inhalers apparently safely for many years. The inconvenience to these patients caused by making inhalers available only by prescription has to be set against the risks of continuing to legitimise the unsupervised use of bronchodilators. Our study also indicates a high overall level of undertreatment of asthma in the Australian community and has important educational messages both for doctors who prescribe these drugs and pharmacists who dispense them.

We thank community pharmacists throughout the Hunter area, New South Wales, who participated in this study.

The study was supported by a grant from Glaxo Australia. In April 1993 the National Health and Medical Research Council of Australia decided not to recommend rescheduling of  $\beta$  agonists as prescription only drugs.

1 Hendeles L, Weinberger M. Non-prescription sale of inhaled metaproterenol—*déjà vu*. *N Engl J Med* 1984;310:207-8.

2 Pressure to ease POM status in UK. *SCRIP* 1991;1609:4.

3 McLeod DC. Non-prescription drug approval: therapeutic strategy or marketing decision? *Annals of Pharmacotherapy* 1989;23:606-9.

4 Madhavan S, Schondelmeyer SW. Pharmacists' evaluations of the non-prescription availability of metaproterenol, cimetidine, ibuprofen, and nystatin. *Am J Hosp Pharm* 1989;46:2486-92.

5 Cranz H. Over the counter drugs. The issues. *Drug Safety* 1990;5(suppl 1):120-5.

6 Henry DA, Sutherland D, Francis L, Newcastle Retail Pharmacy Research Group. The use of non-prescription salbutamol inhalers by asthmatic patients in the Hunter valley, New South Wales. *Med J Aust* 1989;150:445-9.

7 Rea HH, Scragg R, Jackson R, Beaglehole R, Fenwick J, Sutherland D. A case control study of deaths from asthma. *Thorax* 1986;41:833-9.

8 Johnson AJ, Nunn AJ, Somner AR, Stableforth DE, Stewart CJ. Circumstances of death from asthma. *BMJ* 1984;288:1870-2.

9 Ruffin RE, Latimer KM, Schembri DA. Longitudinal study of near fatal asthma. *Chest* 1991;99:77-83.

10 Beasley R, Pearce N, Crane J, Windom H, Burgess C. Asthma mortality and inhaled beta-agonist therapy. *Aust NZ J Med* 1991;21:753-63.

11 Sears MR, Taylor DR, Print CG, Lake DC, Li Q, Flannery EM, et al. Regular inhaled beta-agonist treatment in bronchial asthma. *Lancet* 1990;336:1391-6.

12 Spitzer WO, Suissa S, Ernst P, Horwitz RJ, Habrick B, Cockcroft D et al. The use of beta-agonists and the risk of death and near death from asthma. *N Engl J Med* 1992;326:501-6.

13 Jenkins MA, Hurley SF, Bowes G, McNeill JJ. Use of anti-asthmatic drugs in Australia. *Med J Aust* 1990;153:323-8.

14 Woolcock A, Rubinfeld AR, Seale JP, Landau L, Antic R, Mitchell C, et al. Thoracic Society of Australia and New Zealand. Asthma Management Plan 1989. *Med J Aust* 1989;151:650-3.

15 Hargreave FE, Dolovich J, Newhouse MT. The assessment and treatment of asthma: a conference report. *J Allergy Clin Immunol* 1990;85:1098-111.

16 British Thoracic Society, Research Unit of Royal College of Physicians, King's Fund Centre, National Asthma Campaign. Guidelines for management of asthma in adults. 1 Chronic persistent asthma. *BMJ* 1990;301:651-3.

17 Fitzclarence CAB, Henry RL. Validation of an asthma knowledge questionnaire. *J Paediatr Child Health* 1990;26:200-4.

18 Hosmer DW, Lemeshow S. *Applied logistic regression*. New York: Wiley, 1989.

19 Bauman A, Young L, Peat JK, Hunt J, Larkin P. Asthma under recognition and under-treatment in an Australian community. *Aust NZ J Med* 1992;22:36-40.

20 Knight A, Breslin ABX. Passive cigarette smoking and patients with asthma. *Med J Aust* 1985;142:194-5.

21 Fennerty AG, Banks J, Ebdon P, Bevan C. The effect of cigarette withdrawal on asthmatics who smoke. *Eur J Respir Dis* 1987;71:395-9.

(Accepted 29 March 1993)

## Citizens' advice in general practice

Jim A G Paris, David Player

### Abstract

**Objective**—To examine the introduction of citizens advice bureau sessions into general practice.

**Design**—Prospective survey of 150 consecutive attenders.

**Setting**—10 Practices in south Birmingham that volunteered to participate.

**Outcome measures**—The social characteristics of the population attending, the problems presented, the social security and other payments obtained, and the health problems mentioned during the sessions.

**Results**—Advice requested covered the whole range offered by the citizens advice bureaux. Thirty nine of 150 attenders obtained payments totalling £58 300.58 for year 1991-2, of which £54 929.58 was recurring. People mentioning health problems were significantly more likely to be entitled to unclaimed benefits.

**Conclusions**—The provision of citizens advice bureau sessions in general practice is an effective way of providing advice on life problems and securing proper payment of benefits, particularly to patients with health problems. This service complements rather than detracts from other citizens advice bureau activities.

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BMJ 1993;306:1518-20

### Introduction

The importance of primary care workers in facilitating the uptake of benefits was emphasised by Simon Ennals in the first of a series of articles published by the *BMJ* in conjunction with the Child Poverty Action Group.<sup>1</sup> The link between high general practitioner workload and deprivation and underprivileged people

was established by Jarman.<sup>2</sup> Many claimants expect their general practitioner to inform them about benefits—in Buckle's study 20% of claimants had missed five years of benefit.<sup>3</sup> Further, Marks showed that patients discharged from hospital were not always given advice on benefits and many ended up in debt as a result.<sup>4</sup>

The links between poverty and ill health have been fully explored.<sup>5-7</sup> The impact of poverty on health, the impact of ill health on economic status, the increasing complexity of the social security system, and the evidence that underprivilege and poverty increase demand for health care persuaded the South Birmingham Health Authority to attempt a direct approach to the problem.

A project providing advice and counselling sponsored by citizens advice bureaux in general practices was designed. Funding was obtained through the Inner City Partnership and South Birmingham Health Authority. Two half time, fully trained citizens advice bureau advisers were recruited, and the project started in November 1990. This paper reports an assessment of the project undertaken in July, August, and September 1991.

### Method

Ten practices were chosen by one of us (DP) from practices that volunteered to participate. Criteria included a high level of deprivation in the practice population, adequate facilities for a citizens advice bureau worker, and a willingness to include the worker as a full member of the practice team. The practices chosen contained 39 general practitioner principals serving a list population of 64 779.