Prescribing in general practice and the provision of drug information

J. G. HAMLEY, B.SC, S. V. BROWN, MB, CH.B, J. CROOKS, MD, FRCP, J. D. E. KNOX, MD, FRCGP, J. C. MURDOCH, MD, MRCGP, A. W. PATTERSON, MPS, and 20 Tayside general practitioners

SUMMARY. Duplicate prescriptions were used to monitor patient prescribing and morbidity data for 20 Tayside general practitioners during a two-year study. Each participant took part in two periods of active monitoring separated by a three-month gap. Prescribing statistics collected during the first period of monitoring formed the basis of drug information which was circulated to participants shortly after the start of the second period. Some of this information was purely statistical; other information included comments as well as statistics. Subsequent monitoring assessed any changes in prescribing. The results indicate that drug information of this kind can influence general practitioner prescribing but that there were no differences in response to information which was purely statistical and information which included comments.

Introduction

THE need to keep pace with the ever-increasing range of available drugs, and with the information required to prescribe them safely and efficiently, is a recognized problem for the prescribing doctor (Crooks, 1975). The drug information explosion is complicated by the problem of selecting from the wide range of available information, which often originates from extra-professional sources, such as the pharmaceutical industry and the DHSS (Eaton and Parish, 1976).

In 1979 the NHS spent £723 million on drugs. This level of expenditure caused concern in Parliament (*Lancet,* 1980).However, the principle that decisions governing prescribing should be based on the cost of drugs alone is incompatible with clinical freedom and with providing the best patient care. Considerations of efficacy and safety are also reflected in rational prescribing, and the medical profession itself is best qualified to develop methods of auditing prescribing practice.

The essence of any form of audit is information on past performance. It has been suggested that this information is best provided in a form that identifies and highlights differences between individuals or peer groups (Royal College of General Practitioners, 1977). This paper describes an attempt to analyse and assess the effect of drug prescribing information which enables general practitioners to compare their prescribing practice with that of their colleagues.

Method

The study lasted two years. It involved nine general practitioners during 1978/79, and a further 11 one year later. Duplicate prescriptions were used to monitor prescribing and morbidity data and to link them to age and sex (Hamley *et al.,* 1981). Confidentiality was maintained.

Each doctor took part in two periods of monitoring separated by a gap of three months, during which data processing, assessment of prescribing patterns, identification of prescribing problems and preparation of information packages took place.

For each problem identified, two types of information package were prepared:

1. *Comparative Prescribing Statistics.* This information was designed to enable individuals to identify their own prescribing practices and to compare them with those of their colleagues. Where a particular problem was identified minimal additional factual information, such as the manufacturer's recommended dosage range, was also included in the package.

2. *Comparative Prescribing Statistics with Comments.* This package contained the above comparative data but also included brief comments on the problem. These comments were the consensus view of the project team,

J. G. Hamley, Director, S. V. Brown, Research Fellow, J. Crooks, Professor of Therapeutics, Medicines Evaluation and Monitoring Unit and Department of Pharmacology and Therapeutics, University of Dundee; J. D. E. Knox, Professor of General Practice, J. C. Murdoch, Senior Lecturer in General Practice, University of Dundee; A. W. Patterson, Director, Unit for Research into Drug Usage, Department of Pharmacy, Heriot-Watt University, Edinburgh.

© *Journal of the Royal College of General Practitioners,* 1981, **31**, 654-660.

Table 1. Summary of messages and desired responses.

Topics and messages	Desired responses
Package 1: Hypnotics	
1. Hypnotic doses of nitrazepam for elderly patients.	*Increase* in the percentage of elderly patients receiving doses of nitrazepam within the manufacturers' recommended range.
2. The use of permissive regimes for nitrazepam in the elderly.	*Decrease* in the percentage of patients prescribed nitrazepam as before, as desired, etc.
3. Prescribing of nitrazepam by approved name.	*Increase* in the percentage of nitrazepam prescriptions written by approved name.
4. Barbiturates and methaqualone for treatment of insomnia.	*Decrease* in the percentage of hypnotic prescriptions for preparations containing barbiturates or methaqualone.
Package 2: Minor analgesics	
1. Once-only prescriptions for preparations containing dextropropoxyphene.	*Decrease* in the percentage of once-only minor analgesic prescriptions written for preparations containing dextropropoxyphene.
2. Repeat prescriptions for preparations containing dextropropoxyphene.	*Decrease* in percentage of repeat prescriptions written for preparations containing dextropropoxyphene.
Package 3: Antibiotics in treatment of UTIs	
1. Use of co-trimoxazole.	Proportionally *greater use* of co-trimoxazole for the treatment of UTIs.
2. Use of ampicillin.	Proportionally */ess use* of ampicillin for treatment of UTIs.
Package 4: (1978 group of participants only)	
Diuretics in hypertension.	For patients being treated with diuretics, proportionally *greater use* of the thiazides.
Package 4: (1979 group of participants only)	
Diuretics and potassium supplementation.	Proportionally */ess use* of potassium supplementation in patients not receiving a digitalis preparation.

who took into account current literature and the views of local specialists.

Every doctor involved in the study was sent four information packages which altogether contained nine messages (Table 1); two of these packages contained statistics alone and two comprised statistics with comments. This information was distributed at the start of the second monitoring period, the remainder of which was used to assess prescriber response. Where more than one doctor in a group practice was involved, they received identical information.

Table 2. Overall prescribing trends following feedback—all messages.

	Trend		Significance of difference
	As desired	Opposite	
Group 1			$p < 0.025$
9 participants (1978)	43	22	($\chi^2 = 6.154$)
Group 2			$p < 0.001$
11 participants (1979)	58	25	($\chi^2 = 12.337$)
			$p < 0.001$
All 20 participants	101	47	($\chi^2 = 18.980$)

For each message the individual prescribing habits of participants were compared before and after feedback in order to determine any changes in prescribing. For example, with a message aimed at reducing further the use of barbiturate hypnotics, the percentages of hypnotic prescriptions represented by barbiturates were compared before and after feedback. Results were expressed as change "as desired", "in the opposite direction" or as "no change". Any change of less than 2 per cent was regarded as no change. To prevent the overall results being biased by prescribers who demonstrated large changes in prescribing, no other measure of degree of change was considered.

As there were nine doctors in the first group and 11 in the second, and each doctor received nine messages, there were 81 possible opportunities for change for the first group and 99 for the second, making 180 opportunities for change overall. In each case changes "as desired" were compared with those in the opposite direction. Where numbers were sufficient, chi-squared (χ^2) tests were used to determine the significance of difference, otherwise one-tailed sign tests were used.

Results

Comparison of prescribing patterns before and after feedback showed an overall trend towards change in the desired direction. This trend was significant ($p < 0{\cdot}025$) for each of the two groups of doctors and for all 20 participants considered together (Table 2).

There was no significant difference in apparent response to messages with or without comments (Table 3). Nor was there any difference in response to "positive" messages (where the desired response was to increase use of a particular drug or drug group) and "negative" ones (aimed at reducing the use of a particular drug or drug group) (Table 4).

For both groups, more doctors changed their prescribing in line with the suggestions given than in the opposite direction (Table 5). For the second group and for the 20 doctors considered as a whole, this trend was more pronounced than might have been expected to occur purely by chance.

Table 3. Impact of feedback with and without comment. Trend as desired/opposite.

	Type of feedback		Significance of difference
	No comment	Comment	
Group 1	22/10	21/12	Not significant ($\chi^2 = 0.03$)
Group 2	35/9	23/16	Not significant ($\chi^2 = 3.237$)
All 20 participants	57/19	44/28	Not significant ($\chi^2 = 2.681$)

Table 4. Response to positive and negative messages. Trend as desired/opposite.

	Suggested response		Significance of difference
	Positive	Negative	
Group 1	20/9	23/13	Not significant ($\chi^2 = 0.027$)
Group 2	21/5	37/20	Not significant ($\chi^2 = 1.445$)
All 20 participants	41/14	60/33	Not significant ($\chi^2 = 1.175$)

There were significant trends towards change as desired for three individual packages: hypnotics, the treatment of urinary tract infections and the use of potassium supplements. There were similar trends for the remaining two packages, although the results were not significant (Table 6).

Table 5. Individual responses

	Trend			Significance of difference between changes "as desired" and "opposite"
	No Change	As desired	Opposite	
Group 1	1	6	2	Not significant
Group 2	2	9	-	p = 0.0020 (one-tailed sign test)
Group 3	3	15	2	p = 0.0011 (one-tailed sign test)

Table 6. Response to individual information packages—all 20 participants.

Information package	Trend		Significance of difference
	As desired	Opposite	
1. Hypnotics (four messages)	42	22	$p<0.05$ ($\chi^2 = 5.640$)
2. Minor analgesics (two messages)	20	15	Not significant ($\chi^2 = 0.4571$)
3. Treatment of UTIs (two messages)	28	6	$p<0.005$ ($\chi^2 = 12.97$)
4. Use of potassium supplements (one message)	7	1	$p<0.05$ (one-tailed sign test)
5. Use of thiazide diuretics in hypertension (one message)	4	3	Not significant

Discussion

Two shortcomings of most forms of drug information are that, while individual doctors may be presented with facts about the topic in question, they frequently lack hard evidence about their own prescribing practices, and that it is rarely possible for them to make direct comparisons between their own prescribing performance and that of their colleagues. Patterson (1972), in a retrospective study of his own prescribing, demonstrated clearly that the impression of one's prescribing patterns may be somewhat different from the true picture.

Our project shows that by using duplicate prescriptions, it is possible to identify problem areas in drug use and to circulate individual doctors with drug information containing comparative prescribing statistics.

Our results indicate that, in line with the findings of workers carrying out drug audit in hospital (Christopher *et al.*, 1976), this type of information can influence prescribing. It must be noted, however, that, due to cost, the present study was of limited duration and made no attempt to find out for how long any changes which did occur were maintained.

Response to drug information of the type described will necessarily vary and be subject to the influences of many factors, some of which are listed below:

1. Where information is directed towards drugs most commonly used for long-term treatment of chronic disease, the problems involved in restabilizing patients may prevent any striking short-term changes. In such cases it may be unrealistic to expect radical changes in prescribing to show in a study of such short duration.

2. Although we believed that comments would increase the impact of otherwise purely statistical packages, this was not demonstrated in our study. However, our results may not give a true indication of the usefulness of such comments, because many of the study topics (such as barbiturate hypnotics and analgesics containing dextropropoxyphene) required no additional explanation, having been the subject of extensive publicity. It

would be difficult, however, to assess accurately the effectiveness of comments, since it would be necessary to choose topics which had not received prior publicity.

Circulating comparative prescribing statistics alone could, in certain circumstances, have a detrimental effect: individuals may be swayed towards using the most commonly prescribed medication, which need not necessarily be the most appropriate.

3. Positive suggestions (recommending use of a particular drug or drug group) might be expected to be more likely to elicit the desired response than negative ones (aimed at discouraging use of a drug), particularly if negative comment is not accompanied by a suggested alternative treatment. Although this was not demonstrated, it is interesting to note that in the overall results of this project, despite the widespread adverse publicity which dextropropoxyphene has been given, post-feedback prescribing of preparations containing this drug remained unaltered in both groups of doctors (Table 6). Perhaps this was partly due to the fact that no alternative was recommended.

4. Other factors outside the scope of the study (such as the influence of drug representatives or the date of qualification of the doctor) may affect prescriber responses to drug information. By circulating identical information to two different groups of doctors with a one-year gap between the two groups, it was hoped that the effects of such external factors would be highlighted. As the overall response of the two groups was similar, it is unlikely that the changes which did occur were due to such external influences.

Although our findings indicate that change in prescribing patterns can result from drug information of this type, the project involved a large data-processing exercise and was therefore expensive. Should the proposals of the Tricker Report (1977) be accepted, however, computerization of the Prescription Pricing Authority may make it possible to provide doctors with prescribing information relatively cheaply.

Meanwhile, our experience in hospital (Bateson *et al.*, 1981) indicates that local drug formularies may represent a more powerful and cost-effective tool which groups of interested doctors can use to assess their prescribing and rationalize drug use. It is to this end that our present research is continuing.

References

Bateson, M. C., Crooks, J., Hamley J. G. *et al.* (1981). Experience with a hospital formulary. *Health Bulletin,* **39,** 45-50.

Christopher, L. J., Henne, C. R., Moir, D. C. *et al.* (1976). Experience with the Aberdeen-Dundee drug monitoring system. *Clinical Pharmacy and Clinical Pharmacology.* Eds. Gouveia, W. A., Tognoni, G. and Kleijn, E. Van der. Pp.165-178. Amsterdam: Elsevier/North Holland.

Crooks, J. (1975). The drug explosion. In *Topics in Therapeutics, 1.* Ed. Breckenridge, A. M. Pp.115-118. Tunbridge Wells: Pitman Medical.

Eaton, G. & Parish, P. (1976). Sources of drug information used by general practitioners. In *Prescribing in General Practice. Journal of the Royal College of General Practitioners,* **26,** Suppl. 1, 58-64.

Hamley, J. G., Brown, S. V., Crooks, J. *et al.* (1981). Duplicate prescriptions: an aid to research and review in general practice. In press.

Lancet (1980). The 'generic' prescribing list. Editorial, **1,** 323-324.

Patterson, J. S. (1972). How many drugs do I use? *Journal of the Royal College of General Practitioners,* **22,** 191-194.

Royal College of General Practitioners, Birmingham Research Unit (1977). Self-evaluation in general practice. *Journal of the Royal College of General Practitioners,* **27,** 265-270.

Tricker, R. I. (1977). *Report of the Inquiry into the Prescription Pricing Authority.* London: HMSO.

Acknowledgements

The authors wish to acknowledge the Scottish Home and Health Department, the Department of Health and Social Security and the Tayside Health Board for funding the project, the Primary Care Division of the Tayside Health Board for their help in over-printing prescription forms, the clerical assistants and practice receptionists, the unit secretary and Miss Dingwall-Fordyce for her statistical advice.

Address for reprints

J. G. Hamley, Department of Pharmacology and Therapeutics, Ninewells Hospital, Dundee DD2 1UB.

Pink puffers on diazepam and promethazine

Fifteen out of 18 'pink and puffing' patients completed a double-blind, placebo-controlled cross-over trial of diazepam and promethazine for breathlessness and reduced exercise tolerance. Dosages were 25 mg and 125 mg daily respectively, and each course lasted two weeks. Patients with psychiatric or other major medical histories were excluded.

Of the three patients who did not complete the trial, one died during an exacerbation of breathlessness while taking diazepam, one was withdrawn because of mild hypercapnia while taking placebo, and one suffered intolerable drowsiness while taking diazepam. Of the remaining 15 patients, six needed a reduction in dosage because of drowsiness: one of these was taking promethazine, five diazepam. Diazepam had no effect on breathlessness and noticeably reduced exercise tolerance. Promethazine reduced breathlessness and improved exercise tolerance without altering lung function.

From these results diazepam is contra-indicated for breathlessness and reduced exercise tolerance in fixed airways obstruction, but promethazine may be beneficial.

Source: Woodcock, A. A., Gross, E. R. & Geddes, D. M. (1981). Drug treatment of breathlessness: contrasting effects of diazepam and promethazine in pink puffers. *British Medical Journal,* **283,** 343-346.