

# Prescribers prefer people: The sources of information used by doctors for prescribing suggest that the medium is more important than the message

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**Aims** The sources of prescribing information are legion but there is little knowledge about which are actually used in practice by doctors when prescribing. The aims of this study were to determine the sources of prescribing information considered important by doctors, establish which were used in practice, and investigate if hospital and primary care physicians differed in their use of the sources.

**Methods** Two hundred general practitioners (GPs) and 230 hospital doctors were asked to rate information sources in terms of their importance for prescribing 'old' and 'new' drugs, and then to name the source from which information about the last new drug prescribed was actually derived.

**Results** Among 108 GPs, the Drugs and Therapeutics Bulletin and medical journal articles were most frequently rated as important for information on both old and new drugs while pharmaceutical representatives and hospital/consultant recommendations were more important for information on new drugs, as opposed to old. In practice, information on the last new drug prescribed was derived from pharmaceutical representatives in 42% of cases and hospital/consultant recommendations in 36%, with other sources used infrequently. Among 118 hospital doctors, the British National Formulary (BNF) and senior colleagues were of greatest theoretical importance. In practice, information on the last new drug prescribed was derived from a broad range of sources: colleagues, 29%; pharmaceutical representatives, 18%; hospital clinical meetings, 15%; journal articles, 13%; lectures, 10%. GPs and hospital doctors differed significantly in their use of pharmaceutical representatives (42% vs 18%) and colleagues (7% vs 29%) as sources of prescribing information ( $P < 0.0001$  for both).

**Conclusions** The sources most frequently rated important in theory were not those most used in practice, especially among GPs. Both groups under-estimated the importance of pharmaceutical representatives. Most importantly, the sources of greatest practical importance were those involving the transfer of information through the medium of personal contact.

**Keywords:** prescribers, prescribing information, prescribing, quality use of medicines, rational prescribing

## Introduction

The drug explosion of the past 40 years has given prescribers a wide range of choices in many areas of

therapeutics. It appears, however, that rather than facilitating the ideal of rational drug use, this array of riches has instead posed difficulties as evidenced by studies describing under-dosing, inappropriate or unnecessarily expensive drug use, and polypharmacy [1–6].

The prescribing information resources available to clinicians are many and include their colleagues, pharmaceutical company representatives, formularies, textbooks, data sheets, guidelines, electronic data sources, and medical journals. It is unclear from the literature, however, which

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sources are most widely used in practice. The issue is of some importance given current focus on evidence-based medicine and moves in many countries to encourage quality use of medicines. Prescribing decisions based on information derived from objective or peer-reviewed sources may differ from those based on information that is open to commercial or personal bias.

We sought to establish the sources of information used by prescribers. Hypothesizing that differences might exist between general practitioners (GPs) and hospital doctors, and, among both groups, between theory and practice, we investigated the sources considered important and those actually used.

## Methods

GPs were selected from the national register using random number allocation and sampling at a rate of approximately 1 in 10 ( $n=200$ ). Hospital doctors surveyed comprised all prescribers working in three hospitals affiliated with the Trinity College medical school (omitting 10 among whom a first version of the questionnaire was piloted) ( $n=230$ ). All subjects were mailed a questionnaire that asked them to rate the importance for prescribing 'old' and 'new' drugs of various sources of information. 'Old' drugs were defined as those that had been on the market for more than 5 years at the time of the survey; 'new' drugs were those that had become available within the past 5 years. Potential information sources were listed (Tables 1 and 2) and respondents had the option of indicating other personally used sources. To ensure the list order of the sources was random, placings were determined by a draw. A 5 point scoring system was applied; 1: most important;

2: important; 3: neither important nor unimportant; 4: not very important; 5: unimportant.

Subjects were then asked to name the last new drug prescribed and to indicate the source from which they first derived information about that product. The 'first' source was requested in an attempt to optimize the consistency of responses by making all respondents think about the same specific event. Although the literature search yielded no evidence to validate the opinion, it was also considered that the first source would have been the one most likely to engender awareness and illustrate use of a new product.

GPs were asked to indicate the number of years qualified and practice size (<1000, 1000–3000, >3000 patients); hospital doctors were asked to indicate their level of seniority (intern, senior house officer (SHO), registrar, consultant), and specialty. A letter of introduction and a stamped addressed envelope were included with each questionnaire. Respondents had the option of replying anonymously. A preliminary version of the questionnaire was piloted among 10 GPs and 10 hospital doctors known to the investigators. Amendments were made in response to ambiguities noted during this process. GPs were surveyed first. Two weeks after posting, addressees in both groups were contacted by telephone (GPs) and/or in person (hospital doctors) to check that the questionnaire had been received and to encourage completion and return where it was indicated that no return had yet been made.

## Analyses

We anticipated a 50% response rate from both groups. Assuming a 'worst case' prevalence of 50% rating each information source as important, this would have 80% power to detect a difference of 20% between the two

**Table 1** a) Percentage of GP respondents rating each information source as 'most important' or 'important' in theory. b) Source from which information about the last new drug prescribed was first derived.

Information source	a) Important in theory ( $n=108$ )		b) Source for last 'new' drug prescribed ( $n=90$ )
	'Old' drugs	'New' drugs	
Drugs and Therapeutics Bulletin	81%	83%	0%
Medical journal articles	63%	77%	9%
Monthly Index of Medical Specialties (MIMS)	59%	60%	0%
British National Formulary (BNF)	58%	56%	0%
Non-sponsored clinical meetings	57%	63%	0%
Primary care colleagues	50%	54%	7%
Consultant/hospital recommendation	36%	69%	36%
Pharmaceutical representatives	26%	62%	42%
Sponsored meetings	21%	44%	1%
Direct mail	15%	35%	1%
Journal advertisements	12%	24%	4%
Others	ni	ni	ni

ni = not indicated. Percentages have been rounded.

**Table 2** a) Percentage of hospital doctors rating each information source as 'most important' or 'important' for information on 'old' and 'new' drugs. b) Source from which information about the last new drug prescribed was first derived.

Information source	a) Important in theory (n = 118)		b) Source for last 'new' drug prescribed (n = 112)
	'Old' drugs	'New' drugs	
British National Formulary (BNF)	77%	76%	2%
Senior colleagues	68%	81%	27%
Medical journal articles	59%	71%	13%
Other specialist teams	59%	74%	6%
Monthly Index of Medical Specialties (MIMS)	38%	40%	0%
Hospital clinical meetings	31%	62%	15%
Junior colleagues	31%	40%	2%
Drugs & Therapeutics Bulletin	19%	32%	1%
Pharmaceutical representatives	18%	47%	18%
Sponsored meetings	13%	34%	1%
Journal advertisements	13%	30%	3%
Direct mail	8%	15%	0%
Medical school lectures	ni	ni	10%
Others*	ni	ni	3%

\*hospital pharmacy, laboratory report, clinical trial involvement. ni = not indicated. Percentages have been rounded.

groups for each of the A items (Tables 1 and 2). Power calculations were not undertaken for the 'information source for the last new drug' component. A chi-square analysis was performed to detect if there were differences between GPs and hospital doctors in the sources cited for the last 'new' drug prescribed.

## Results

### General practitioners

Some 108 questionnaires were returned, all anonymously. Respondents' geographical spread, determined by post mark examination, did not differ from that of the 200 who were mailed the questionnaire. The Drugs and Therapeutics Bulletin (DTB), distributed free of charge to GPs, and medical journal articles were the sources most frequently rated as important for prescribing both 'old' and 'new' drugs (Table 1).

Respondents discriminated clearly between the importance of consultant/hospital recommendations and pharmaceutical industry sources, particularly representatives, for information about 'new', as opposed to 'old', drugs. In practice, these were also the sources from which 78% of prescribers first derived information about the last new drug prescribed. Medical journal articles were the source for 9% of new drug information, but other sources were used infrequently or not at all.

There were no differences between small and large practices either in the information sources rated important or in those actually used. GPs in practice for <10 years were more likely than those in practice longer to cite

medical journal articles or primary care colleagues as their source of first information about the last new drug prescribed.

### Hospital doctors

A total of 118 hospital doctors returned questionnaires; 23 were consultants, 48 registrars, 25 senior house officers (SHOs), and 22 interns. All chose to remain anonymous. For both 'old' and 'new' drug information, senior colleagues and the British National Formulary (BNF) were the sources most likely to be rated important (Table 2). With regard to new drugs, other specialist teams and medical journals were also rated important by over 70% of respondents. In contrast to doctors in primary care, the Drugs and Therapeutics Bulletin did not rate highly.

In the case of the last new drug prescribed, the range of sources from which information was first derived was broad, with senior colleagues, pharmaceutical representatives and hospital clinical meetings dominating. Registrars were more likely than other hospital doctors to cite pharmaceutical representatives as the first information source. Consultants and registrars were the main users of medical journals, while lectures were mostly nominated by interns. Overall, information about the last new drug prescribed was derived from hospital-based sources (colleagues, clinical meetings, other teams) in 50% of cases, from academic/reference sources (medical journals, lectures, BNF, DTB) in 26%, and from commercial sources (pharmaceutical representatives, advertisements, sponsored meetings) in 22%.

## Analyses

GPs and hospital doctors were compared in terms of the information sources rated as important in theory for prescribing new drugs (Tables 1 and 2). Chi-Square analysis was performed to compare each of the 10 common items. As multiple testing was undertaken, the *P* value for significance was 0.001 rather than  $<0.05$ . GPs were more likely than hospital doctors to rate as important the Drugs and Therapeutics Bulletin ( $P < 0.0001$ ) and direct mail ( $P = 0.0005$ ). Compared with GPs, however, hospital doctors rated their colleagues ( $P < 0.0001$ ) and the BNF ( $P = 0.001$ ) more highly.

In the chi-square analysis undertaken to determine any differences between GPs and hospital doctors in the sources cited for the last new drug actually prescribed (b items, Tables 1 and 2), it was necessary to combine some categories due to the small cell sizes. A  $5 \times 2$  table was constructed (pharmaceutical representatives, junior and senior colleagues, medical journal articles, journal advertisements, 'other'). There were significant differences in the proportions citing colleagues (29% hospital doctors *vs* 7% GPs) and pharmaceutical representatives (18% *vs* 42%) as the source of information for the last new drug prescribed (chi-square = 24.37, d.f. = 4, *P* value  $< 0.0001$ ). There were no differences for medical journals (13% *vs* 9%) or journal advertisements (3% *vs* 4%).

## Discussion

Doctors in both primary care and hospitals differentiated between the sources of information considered important for prescribing 'old' and 'new' drugs. However, the sources considered important in theory were not those of greatest practical utility, particularly among GPs. Furthermore, primary care and hospital prescribers differed from each other in the extent to which they used the various information sources.

Despite prescribers' perceptions, academic sources of information were of limited importance. The Drugs and Therapeutics Bulletin and medical journal articles were widely nominated as 'important' among GPs, but in practice, they ranked lowly. In a similar fashion, hospital doctors over-estimated the importance of the BNF. Although discriminating between the importance for new drugs, as opposed to old, of industry-based sources of information, both groups, but especially GPs, under-estimated their practical importance. This pattern may be the result of respondents' unwillingness to admit reliance upon such sources or unawareness of their influence [7, 8].

The lesser importance of the industry among hospital doctors would imply that the other main source of information at primary care level, consultant/hospital recommendations, is unlikely to represent a surrogate for the

pharmaceutical industry. The role of consultants/hospitals is in keeping with a previous study in which some 30% of primary care prescriptions were hospital-initiated [9].

There were striking differences in the patterns of usage of the various information sources. In 78% of cases, GPs derived their first information about the last new drug prescribed from just two sources, although the range was comprised of seven. In contrast, hospital based prescribers employed a range of 14 information sources with 83% of usage distributed across five of these. Colleagues were rated highly in theoretical terms and this perception was accurate in that colleagues, other specialist teams, and clinical meetings were together the source of information for half of the new drugs prescribed by hospital doctors. Among GPs, colleagues and clinical meetings accounted for just 7% of new drug prescriptions. This pattern is of interest and may reflect the influences of social systems [10] and communications media [11].

## Social systems

There are marked differences in the social systems or working environments of the two groups of prescribers. GPs often work alone or with just a few colleagues, and pharmaceutical representatives and hospital/consultant contact may represent the main opportunities to encounter 'change agents' [10]. In contrast, in the hospital setting, doctors meet numerous colleagues regularly and may use them as both formal and informal information sources. Their situation exemplifies a social system wherein the members work closely together and where the diffusion of ideas and innovations is facilitated [10]. The more teaching-orientated hospital setting may also contribute to the greater use by these doctors of academic sources of information.

## Communications media

Our findings may also be considered in the context of communications strategies wherein the medium of communication is emphasized. A hierarchy of media richness is considered to exist, with face-to-face communication the most rich, followed by video conference, telephone, electronic mail, personally addressed mail, and finally, formal, unaddressed documents [11]. (Although mass-media communication channels are rapid and efficient means of creating awareness about new products, their use in Ireland and the United Kingdom for the promotion of prescription-only pharmaceuticals is prohibited.) Thus the pharmaceutical industry, with its representatives conveying information on a one-to-one basis to prescribers, has long chosen the richest medium, whilst academia has concentrated largely on weaker methods. Representatives' influence on prescribing has been

documented [7, 12, 13], and such is their success, in market terms, that companies have been reported to assign some 50% of marketing budgets to their employment [7]. Such investment is considerable given that pharmaceutical marketing budgets may exceed research and development costs [14].

The dominance among hospital-based doctors of hospital-based information sources suggests that prescribers can evolve their own 'rich' communication medium, wherein they transfer information on a one-to-one basis among themselves, and thereby 'compete' favourably with the pharmaceutical industry. That the medium might be more important than the message is exemplified by the success of 'academic' representatives and advertising in encouraging more accurate and cost-effective prescribing [15–20].

### Limitations of the study

In a retrospective study based on self-report, there is a risk of recall bias. This may have manifested in the responses to the theoretical part of the survey where prescribers had to rate the importance of the information sources in general, as opposed to specific, terms. In seeking to determine actual practice, we attempted to minimize the effect by making prescribers concentrate on both a specific drug – the last new one – and a specific event – the first source of information. The marked differences between theory and practice that were revealed in the survey, especially among primary care prescribers, suggest that a true difference exists.

The response rates of 54% and 51% reflect one of the perennial problems in undertaking questionnaire surveys [21]. As replies were anonymous, responders and non-responders could not be compared. Through postmark examination, it was possible to determine that in terms of geographical distribution at least, GP responders did not differ from the mailing group as a whole. In making specific efforts through follow-up telephone and face-to-face contact to encourage participation, the effects of this source of bias should have been minimized [22].

### Conclusions

This study draws attention to differences between prescribing theory and practice, and illustrates that the sources of information of greatest practical importance are those based on the richest communication medium, personal contact, operating within a defined social system. Though the importance and influence of pharmaceutical representatives has long been recognized, our findings indicate that in the hospital setting, the medium of personal contact is represented primarily by doctors' peers. This should be of relevance to educators and

strategists promoting rational prescribing and quality use of medicines.

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### References

- 1 Hogerzeil HV. Promoting rational prescribing: an international perspective. *Br J Clin Pharmacol* 1995; **39**: 1–6.
- 2 Donoghue JM, Tylee A. The treatment of depression: prescribing patterns of anti-depressants in primary care in the UK. *Br J Psychiatry* 1996; **168**: 164–168.
- 3 Laumann JM, Bjornson DC. Treatment of Medicaid patients with asthma: comparison with treatment guidelines using disease-based drug utilisation review methodology. *Ann Pharmacother* 1998; **32**: 1290–1294.
- 4 Nyquist AC, Gonzales R, Steiner JF, Sande MA. Antibiotic prescribing for children with colds, upper respiratory tract infections, and bronchitis. *JAMA* 1998; **279**: 875–877.
- 5 Liu Z, Shilkret KL, Finelli L. Initial drug regimens for the treatment of tuberculosis: evaluation of physician prescribing practices in New Jersey 1994–1995. *Chest* 1998; **113**: 1446–1451.
- 6 Strauss WE, Alexis G, Tapley RD. Use of a tiered review for evaluation of appropriate use of hydroxymethylglutaryl coenzyme A reductase-inhibitor therapy. *Clin Ther* 1999; **21**: 422–429.
- 7 Greenwood J. *Marketing Medicines: what works and why*. Remit Consultants Limited. London 1991.
- 8 Armstrong D, Reyburn H, Jones R. A study of general practitioners' reasons for changing their prescribing behaviour. *Br Med J* 1996; **312**: 949–952.
- 9 Chan R, McManus J, O'Shea B, Feely J. Prescribing in general practice and the influence of hospitals. *Br J Clin Pharmacol* 1994; **37**: 514P.
- 10 Rogers Everett M. *Diffusion of innovations*, 5th edn. The Free Press. New York, 1995.
- 11 Mohr J, Nevin JR. Communication strategies in marketing channels: a theoretical perspective. *J Marketing* 1990; **10**: 36–51.
- 12 Avorn J, Chen M, Hartley R. Scientific versus commercial sources of influence on the prescribing behaviour of physicians. *Am J Med* 1982; **73**: 4–8.
- 13 Peay MY, Peay ER. The role of commercial sources in the adoption of a new drug. *Soc Sci Med* 1988; **26**: 1183–1189.
- 14 Angell M. The pharmaceutical industry – to whom is it accountable? *N Engl J Med* 2000; **342**: 1902–1904.
- 15 Newton-Syms FAO, Dawson PH, Cooke J, et al. The influence of an academic representative on prescribing by general practitioners. *Br J Clin Pharmacol* 1992; **33**: 69–73.
- 16 Soumerai SB, Avorn J. Principles of educational outreach ('Academic detailing') to improve clinical decision making. *JAMA* 1990; **263**: 549–555.
- 17 Avorn J, Soumerai SB. Improving drug therapy decisions through educational outreach. *N Engl J Med* 1983; **308**: 1457–1463.
- 18 May F, Gilbert A, Hurley E, Gilbert A, McNeece J. Ongoing evaluation of an educational outreach program for community-based medical practitioners; non-steroidal

- anti-inflammatory drug use. *Pharmacoepidemiol Drug Safety* 1994; **5**: S69.
- 19 Boreen D, Juge D, Stahl J, Torborg S. Effects of a physician education programme on prescribing of HMG-CoA reductase inhibitors. *Hospital Formulary* 1998; **33**: 802–806.
- 20 Thomson O'Brien MA, Oxman AD, Davis DA, Haynes RB, Freemantle N, Harvey EL. Educational outreach visits: effects on professional practice and health care outcomes (Cochrane Review). In *The Cochrane Library, Issue 2*. Oxford: Update Software, 2000.
- 21 McAvoy BR, Kaner EFS. General practice postal surveys: a questionnaire too far? *Br Med J* 1996; **313**: 732–733.
- 22 Templeton L, Deehan A, Taylor C, Drummond C, Strang J. Surveying general practitioners: does a low response rate matter? *Br J Gen Pract* 1997; **47**: 91–94.