

**Prescribing Information Resources:
Use and preference by general
practitioners**

**An exploratory survey of general
practitioners**

The Overview

Report to the Ministry of Health

by

The Centre for Health Services Research and Policy

and

Department of General Practice and Primary Health Care

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1 Introduction

The Ministry of Health (the Ministry) through the New Zealand Medicines and Medical Devices Safety Authority (Medsafe), along with other agencies and bodies such as the Medical Schools, the Pharmaceutical Management Agency of New Zealand (PHARMAC), and the Best Practice Advocacy Centre (bpac^{nz} – providers of ‘best practice’ information), provides resources that aim to assist general practitioners (GPs) to be informed about the most appropriate medicines to prescribe for patients. The nature of information resources used and those that would be preferred has not to date been established.

The Ministry commissioned this study. The study phases included survey design, questionnaire development, participant recruitment, data collection, analysis, and dissemination.

A prescribing decision may have several dimensions. At a basic level, such a decision may be determined by choosing from amongst the different types of medicines funded by PHARMAC, or choosing those that attract the highest subsidies. In a wider sense, a prescribing decision is one that a GP makes based on his or her assessment of what is therapeutically most appropriate for the patient, and may include a wide range of inputs. The Ministry sought knowledge about prescribing decisions as understood in these and other senses. It commissioned this study to explore the sources that GPs use to inform themselves on prescribing decisions, once they have left medical school, and the related but separate issue of how GPs keep their information up to date.

The fact that information is available does not necessarily mean that it is used, or that it is available in a format that GPs wish to use. The Ministry sought the types of information, to inform prescribing decisions, that GPs would like to see made available, as well as those that were currently available. For example, GPs may prefer to see changes to the information currently provided by the Ministry, or other sources, in the areas of delivery, content, format and/or range. Preferences between present information sources and any desired sources not currently available are important.

The Ministry sought this information to help in shaping the development of policy, the provision of information that GPs seek and, in a wider sense, the implementation of the Primary Health Care Strategy. With the establishment of Primary Health Organisations (PHOs), and the Performance Framework to be implemented in 2005/6,¹ there will be the possibility for further development of clinical governance capability.

This report is the *Overview*, a companion to the full report (Arroll et al 2005), which provides many more descriptive tables and more extensive discussion around the literature review and the outcomes of the survey.

1.1 Aims of study

The survey had three key aims:

- 1.1 To establish sources GPs use to inform themselves on prescribing decisions
- 1.2 To describe how GPs keep their information up to date
- 1.3 To establish what other factors influence GPs’ prescribing decisions.

The survey addressed the following six research questions.

1. What types of information sources do GPs use at present?
2. What factors impact on the GP’s decision to use a particular source?

¹ Draft operational framework for PHO performance management, Ministry of Health, April 2004.

3. What sources do GPs use to keep up to date on changes?
4. What importance do GPs attribute to each source?
5. What further information might GPs like to assist them to make decisions about what and when to prescribe medicines to their patients?
6. What sources do GPs value the most?

2 Summary of Literature Review

The literature review examined sources of information that GPs use to update their knowledge; their adoption of a new drug for a specific treatment; and factors that influence their prescribing patterns. Most of the accessed research was international, but New Zealand studies were referred to when available. The accumulated evidence indicates that GPs face a considerable challenge in keeping up-to-date with the rapidly increasing knowledge base of medicine.

2.1 Information sources for GPs

Sources used by doctors to find medical knowledge include textbooks, journals and electronic databases, but it is difficult for GPs to find up-to-date information to match individual patients, and they may be overwhelmed by the volume of information provided (Smith 1996). Clinical questions with information needs regularly arise when doctors see patients. Many of these are about drugs and are complex and multi-dimensional, requiring more than just medical knowledge – doctors are looking for guidance, support, affirmation and feedback. Most questions arising during a consultation are answered, although mostly not using electronic sources. Arroll et al, in a survey of New Zealand family physicians conducted during the years 1999–2000, found only six of 113 answered questions (out of a total 122 questions) asked by patients were answered using a computerised source (Arroll et al 2002).

Important features of information sources are their credibility, availability, searchability, understandability and applicability (Connelly 1990). Cost factors such as time and energy needed to conduct a search may be viewed as more important than the quality of the information. Most GPs use a small range of information sources that are summaries in the form of desktop sources.

GPs are most likely to use drug reference books such as the *Merck Manual* and Harrison's *Principles of Internal Medicine* for prescribing information (Connelly 1990). New Zealand GPs frequently use the *British National Formulary (BNF)* or the *Monthly Index of Medical Specialties (MIMS (MIMS New Ethicals))* to check doses and interactions, but while textbooks are consulted most frequently, they are rated as less valuable than colleagues and specialists as information sources (Cullen 1997). Non-peer-reviewed publications are more likely to influence GP prescribing than scientific peer-reviewed journals.

The Internet offers huge potential for doctors to access information but can be time-consuming, and the sheer amount of information can be confusing. Studies indicate that GPs require training in basic information literacy, identifying evidence-based sources and critical appraisal skills. Portals to guide GPs to selected resources, and a document delivery service, would help GPs to get useful information with little delay or cost. By 1999, most New Zealand rural GPs had internet access either at home or at work (Kerse 2001), but a 2003 survey of rural GPs found that only one-third were using the Internet for help with patient care at least once a week (Janes 2004). The speed of internet access, or the lack thereof, is also a very important factor for effective clinical decision support – often more so than the actual quality of the information source.

Computer-based clinical decision support systems may improve clinician performance, although outcomes such as drug dose determination have not shown consistent improvement (Hunt et al 1998). While electronic prompts and alerts may assist prescribing, GPs may experience 'flag fatigue' if such electronic prompts are too frequent, of little clinical significance or inappropriate for particular patients (Ahearn 2003). GPs need to be trained in the use of these decision-making tools to be able to use them to their full extent.

2.2 New drug adoption by GPs

Introduction of a new drug usually occurs proactively by means of extensive advertising and academic detailing provided by the pharmaceutical industry rather than dissemination of independent scientific data. Initial use of a drug is on a personal 'trial' basis, and future use of a drug is strongly influenced by the initial experience of prescribing the drug to a particular patient, as well as information obtained from credible sources (Prosser et al 2003; Jones 2001). A GP's own assessment of what influences their prescribing behaviour is not a reliable measure of actual influencing forces (Avorn 1982).

2.3 Factors beyond clinical presentation that influence prescribing decisions by GPs

There is a tendency for GPs to be reactive recipients rather than active searchers of drug information. New Zealand GPs mainly use resources that they have available to them at the office – textbooks are most preferred, then colleagues (in their own practice and specialists or consultants) and journal articles that they have filed in the office (Cullen 1997). They tend not to use medical libraries because of access problems, a lack of skill in using catalogues and databases, and/or difficulty in applying research literature to clinical situations. In this study, GPs ranked the Internet higher than medical libraries as a source of information (Cullen 2002).

Pharmaceutical company information, especially that provided by a visiting representative, may be a very important prescribing influence (Prosser and Walley 2003). GPs may not self-report this accurately and drug company information may influence them more than they realise (McGettigan 2001, Avorn 1982). Of concern is the fact that most drug advertising material and marketing brochures contain information with no basis in scientific evidence (Tuffs 2004).

Community pharmacists can influence prescribing by recommending to prescribers at regular yet infrequent intervals that they initiate, discontinue or change drug therapy – GPs usually accept and implement their suggestions (Carroll 2003).

GPs both in New Zealand and overseas are influenced by hospital prescribing, with respected colleagues being influential as prescribing leaders (Cullen 1997, Jones 2001, Prosser et al 2003). Advice from a colleague has been rated as more important than that from written pharmaceutical references (Avorn et al 1982), and the medium (i.e. via people) may be more important than the message (McGettigan 2001).

New Zealand is one of only two industrialised countries that permit direct-to-consumer advertising (DTCA) for pharmaceuticals. A survey of New Zealand GPs found that 90% had had consultations specifically generated by DTCA. Only 10% believed that DTCA of prescription drugs was positive (Toop et al 2003). New Zealand GPs have petitioned the Minister of Health to ban DTCA (Kmietowicz 2003).

Changes in funding arrangements influence GP prescribing. Studies on prescribing in general practices in the United Kingdom, before and after they became fund-holders, found that fund-holders had a lower rate of increase in prescribing costs (Wilson 1995). In New Zealand, PHARMAC uses reference pricing of pharmaceuticals to achieve a balance between access to pharmaceuticals and cost containment. PHARMAC does this by paying the same subsidy for all drugs that have the same or similar clinical therapeutic effects for treating the same or similar conditions, achieving cost containment by reimbursing drugs at the lowest price ruling for a therapeutic sub-group.

Academic detailing visits are effective in influencing prescribing behaviour, whether performed alone or in combination with other interventions (Thomson O'Brien 2002). Audits and feedback to health care professionals also have the potential to change prescribing behaviour (Jamtvedt 2003), but merely posting aggregated feedback data is unlikely to effect behaviour change (O'Connell 1999).

A single continuing medical education (CME) session is unlikely to change behaviour; rather, change is evolutionary in response to acquiring new knowledge from a variety of different credible sources (Goodyear-Smith 2003). Effective strategies include reminders, patient-mediated interventions, outreach visits, opinion leaders and multifaceted activities (Davis 1995). CME meetings within the New Zealand setting may give GPs access to specialist knowledge, which has a significant influence on GPs' practice (Cullen 1997).

3 Methodology

3.1 Information collection – questionnaire design

A review of national and international literature was conducted to ascertain key indicators, measures, and questions for the study. This ensured that the data collection would answer relevant research questions and ensure comparability with similar international research. In addition, consultation with key stakeholder representatives was undertaken. The Ministry reviewed and commented on the study questionnaire. Potential sources of information for prescribing, and factors and sources of information that might have influenced prescribing behaviour, were ascertained from previous studies. Additionally, potential sources unique to New Zealand, or under-researched in previous approaches, were added.

Data collection was carried out using Computer Assisted Telephone Interviewing (CATI), providing an interviewer with questions electronically on screen with responses entered directly into a database during interviews. Interviews averaged 28 minutes in length and covered topics specific to the use of prescribing information sources, factors influencing prescribing, demographics and selected clinical cases. CATI uses specific software to manage surveys – this study was managed using Survey Systems version 8.1, by Creative Research Systems. A pilot CATI survey, with a 10% sub-sample of GPs (N = 11) with differing characteristics and backgrounds, was conducted, to test for comprehension and questionnaire structure and to allow for error-trapping within the CATI software.

As a result of the pilot interviews, the questionnaire was refined. These pilot interviews are not included in the results presented within this report. In addition, the pilot survey process guaranteed that the instrument was able to meet the aims set out for this project and ensured that the questionnaire was well-structured and would be easily comprehended by study participants.

The final questionnaire is available on request.²

3.1.1 Sampling

The survey comprised two sampling frames as outlined below.

Main survey

A random, nationally representative sample of 300 New Zealand GP contacts, including telephone and fax numbers, was purchased from MediMedia (NZ) Ltd (now CMPMedica (NZ) Ltd). Only 199 of the GPs in this sample were required to be contacted, to achieve the desired sample size. This study ascertains various percentages of interest, and for a sample size of 100, the standard error of such percentages would be less than $\frac{1}{2\sqrt{100}} \times 100\% = 5\%$. The margin of error, approximately twice the standard error (95% confidence interval), would be less than 10%. The eventual sample size of the main survey was 99 GPs due to contacted GPs being ineligible to partake, refusing or not completing the interview (see the full report for more details (Arroll et al 2005)). An incomplete interview occurred when a GP was unable to finish an interview due to unforeseen circumstances.

² Contact Daniel Patrick, email: d.patrick@auckland.ac.nz.

Trainee survey

In addition to the random national sample (main survey) a separate sub-study was conducted of recent trainees, defined as those who had graduated with their medical degree within the last eight years. The sampling process used for this sub-study made use of the regionally-based lists for the Royal New Zealand College of General Practitioners (RNZCGP) training programme requested from programme coordinators, therefore enabling access to new graduates. Furthermore, to ensure a high response, an invitation to recent graduates to be involved in the study was advertised in *ePulse* (ePulse Vol. 6 No. 15, an RNZCGP electronic newsletter). The total number of recent GP trainees participating was 17. This was a self-selected sample; hence potential biases need to be considered when interpreting findings from this sub-sample.

3.1.2 Recruitment and data collection processes

GPs were recruited by way of a faxed letter and Participant Information Sheet (PIS) followed up by a personal phone call from one of the researchers. CATI interviews were then conducted at a time suitable to the GP. For their participation, GPs were paid a small fee (equivalent to that of one adult consultation) in recognition of time spent and contribution to research.

Inclusion criteria allowed all full-time and part-time GPs, including locum tenets. Doctors working exclusively at Accident and Medical Clinics and sub-specialty practitioners (for example sports medicine doctors) were excluded.

Real-time audio and visual monitoring of CATI interviews (as data were input) was conducted, ensuring excellent accuracy and quality of interviews. Responses were entered directly with no need for subsequent data entry. This real-time data set construction enabled analysis of preliminary data at early stages and the preparation of an analytical framework. The resulting data set underwent final validation and specific data logic checks to ensure data integrity.

3.1.3 Data processing

Data coding was automatically performed for a large number of questions as interviewers entered data into pre-coded fields and collated data were readily transferred to statistical software (SAS). The free-text fields (questions) were coded retrospectively using meaningful categories/coding frames for each question set. Analysis was undertaken using the SAS software package. A GP and a pharmacist auditor selected a 50% random sample of observations for quality control audits of free-text codes. This helped to ensure a high level of data quality and integrity. All data collected were made anonymous following the completion of interviews and then stored on a secure network drive.

Ethical approval was received from The University of Auckland Human Subjects Ethics Committee, reference 2004/167, for a period of three years.

4 Description of the Sample

4.1 Random national sample

In all, 199 GPs were approached to participate in the main survey, of whom 39 declined to participate and 60 were ineligible (53 were either not contactable, on leave, no longer at the practice, or not part of a true GP service; four had left general practice; two were practitioners at Accident and Medical (A&M) clinics and one was deemed to be a specialist). There was also one GP who made it to the data collection phase but for whom only partial collection was obtained – this case was withdrawn, giving a final sample size of $N = 99$. The response rate (RR), defined as:

$$RR = \frac{P}{P + R + W},$$

where P = participants, R = refusals, and W = withdrawals, was therefore 71.7%.

Table 4.1 below describes the characteristics of the GP participants in the main survey. The percentages of males (70.1%) and females (29.9%) were consistent with the proportions within the wider GP population. The GPs' age, qualifications and practice characteristics (computerisation, size, etc) were in similar proportions to those found in the National Primary Medical Care Survey (NatMedCa) carried out in 2001/02, which involved a nationally representative sample of GPs (Raymont et al 2004). As expected, the majority of practitioners had completed a postgraduate training programme, and over half had done so with the RNZCGP. The median number of sessions worked was high at nine sessions per week. This reflects the further observation that although nearly half the sample identified themselves as part-time workers they still worked a median of seven sessions per week.

Table 4.1: Participant characteristics

Characteristic	GP participants (N = 97)
Gender (percent)	
Male	70.1
Female	29.9
Age group (percent)	
20–29	0
30–39	20.6
40–49	42.3
50–59	29.9
60–65	5.2
66 and over	2.1
Median time since graduation (years)	21.0
(Range)	(40.0)
Mean time in practice (years)	16.7
(Standard deviation)	(8.9)
Postgraduate training (percent)	
RNZCGP / Fellow of the RNZCGP	59.8
Other	35.1
None	5.2
Median number sessions per week	9.0
(Range)	(13.0)
Fully computerised (percent)	52.6
Computerised prescribing (percent)	94.8

The characteristics of the surveyed GPs' practices are outlined in Table 4.2 below. A large proportion of the participants worked in urban practices and, irrespective of practice setting, a large proportion worked as part of a Primary Health Organisation (PHO) or an Independent Practitioners' Association (IPA).

Table 4.2: Practice characteristics of survey respondents

Characteristic	GP participants
Practice setting (percent)	(N = 94)
Rural	21.3
Urban	73.4
Both	5.3
Organisation type (percent)	(N = 97)
PHO	55.7
PCO (Primary Care Organisation)	1.0
IPA	36.1
Small independent	2.1
None of these	3.1
Not known	2.1
Practice size	
Median number GPs in practice	3
(Range)	(12)
Median number nurses in practice	3
(Range)	(15)

Four main Practice Management Systems (PMSes) were identified as being used by the GPs, with MedTech32 the most commonly used (by nearly two-thirds of practices) (Table 4.3).

Table 4.3: Practice Management System (PMS) used

System	Responses percent (N = 99)
MedTech32	61.6
Houston	11.1
Profile	10.1
GP Dat / Next Generation / My practice	4.0
MedCen	5.1
Other	6.0
Don't have PMS	2.0

There is a high uptake of computerisation by general practices in New Zealand. Of the participants' practices, 52.6% had become paperless (had fully computerised/electronic record-keeping in the practice) (Table 4.4). Among the remaining (paper) practices, there was almost complete adoption of computerised age/sex registers and very high uptake of computerised patient records, lab reporting and prescribing. The area of variation between paper and paperless practices was in the adoption of document scanning for computerised records: only 5.3% of non-paperless practices were reported to scan documents. Most of the participants had access to computerised prescribing systems (all of those from paperless practices and 89.1% of others) although only about one-third of those used fully computerised PMSes.

Table 4.4: Degree of computerisation

Percent	Yes	No
Paperless practice (N = 97)	52.6	47.4
Computerised information systems		
Computerised age/sex register (N = 45)	97.8	2.2
Computerised patient records (N = 46)	76.1	23.9
Computerisation of labs (N = 46)	80.4	19.6
Computerised prescribing (N = 46)	89.1	10.9
Scanned letters from hospitals and specialists (N = 38)	5.3	94.7

Whilst the majority of participants had access to the Internet at home, only 63.9% had access in their consultation rooms (Table 4.5). Of that 63.9%, almost two-thirds (62.8%) reported using the Internet for clinic-related activities. A quarter of all GPs had broadband access, and there was a trend towards increased use of prescribing websites among those GPs, although the number of users was constant irrespective of connection speed.

Table 4.5: Internet access

Access site Percent	Yes	No	Internet work related to clinic activities (internet users only)
Access at home (N = 97)	92.8	7.2	57.9 (N = 76)
Access at clinic (N = 94)	77.7	22.3	18.8 (N = 64)
Access in consulting room (N = 97)	63.9	36.1	62.8 (N = 51)

4.2 Self-selected GP trainee sample

As expected, GPs who were “new trainees” tended to be younger, had qualified more recently, had less experience and were less likely to have had postgraduate training than the main group of GPs (reported above). However, they were similar by gender and workload. Table 4.6 summarises the characteristics of this group.

Table 4.6: Participant characteristics for new trainees

Characteristic	Trainee GP participants (N = 17)
Gender (percent)	
Male	70.6
Female	29.4
Age group (percent)	
20–29	0
30–39	41.2
40–49	52.9
50–59	5.9
60–65	0
66 and over	0
Median time since graduation (years) (Range)	18.0 (20.0)
Mean time in practice (years) (Standard deviation)	7.5 (6.4)
Postgraduate training (percent)	
RNZCGP / Fellow of the RNZCGP	35.3
Other	58.8
None	5.9
Median number sessions per week (Range)	9.0 (7.0)
Fully computerised (percent)	52.9
Computerised prescribing (percent)	100.0

Although statistical comparisons cannot be reliably made because of small numbers, similar proportions of new trainees and GPs from the main group were working with rural providers, and they were working in practices of similar computerisation and size, although the umbrella organisation was more likely to be a PHO than an IPA for the new trainees. Table 4.7 summarises the practice characteristics for the trainee group.

Table 4.7: Practice characteristics for new trainees

Characteristic	Trainee GP participants (N = 17)
Practice setting (percent)	
Rural	23.5
Urban	70.6
Both	5.9
Organisation type (percent)	
PHO	76.5
PCO (Primary Care Organisation)	0
IPA	23.5
Small independent	0
None of these	0
Not known	0
Practice size	
Median number of GPs in practice	3.0
(Range)	(9.0)
Median number of nurses in practice	2.0
(Range)	(19.0)

Although new trainees were more likely than the GPs from the main group to have internet access at home, they were less likely to have that facility in the clinic or consulting room (Table 4.8).

Table 4.8: Internet access for new trainees

Access site Percent (N = 17)	Yes	No
Access at home	100.0	0
Access at clinic	64.7	35.3
Access in consulting room	47.1	52.9

5 Key Findings

The following sections report on the findings from the main survey group of 99 GPs. The sample of ‘new trainees’ is reported on separately at the end of this findings section. Missing data are omitted from the tables presented.

5.1 Resources used

5.1.1 Primary prescribing resources

The *MIMS New Ethicals* drug information book was, not surprisingly, the most commonly used source of prescribing information (86.9% of GP respondents). Other written sources of information included the *BNF*, PHARMAC, bpac^{nz}, Medsafe, IPA/PHO guidelines and pharmaceutical information (Table 5.1).

Table 5.1: Frequency of usage of standard prescribing resources

Prescribing resource	Frequency of usage (percent)				
	Daily	Weekly	Monthly	Yearly	Never
<i>MIMS / New Ethicals Small Book</i> (N = 99)	63.6	11.1	1.0	1.0	23.2
<i>New Ethicals Compendium</i> (N = 99)	5.1	16.2	14.1	1.0	63.6
MIMS CD-ROM (N = 99)	20.2	4.0	4.0	0	71.7
<i>BNF</i> (N = 99)	9.1	9.1	24.2	15.2	42.4
PHARMAC schedule (or update) (N = 99)	13.1	15.2	39.4	10.1	22.2
bpac ^{nz} (N = 98)	4.1	10.2	40.8	7.1	37.8
IPA and PHO CME guidelines (N = 99)	5.1	19.2	35.4	9.1	31.3

Most of the GPs who used the *MIMS / New Ethicals Small Book* felt that it was useful or very useful (82.9% of users) (Table 5.2). The *BNF* was used as an infrequent source of drug prescribing information, with most users reporting only monthly or yearly usage, but users were positive about it, with 72% of them judging it as useful or very useful. PHARMAC prescribing information was used mainly for funding-related information and was felt to be of limited use or not useful by 52% of users. The national educational service for GPs, bpac^{nz}, was used by approximately two-thirds of the GPs surveyed (62.2%). Those who did use it felt it was of intermediate usefulness – 62.9% regarded it as useful or very useful. Medsafe information (particularly web-based datasheets) was used on a monthly basis by half the GPs but was felt to be of limited use.

Table 5.2: Perceived usefulness of standard prescribing resources

Prescribing resource	Usefulness (percent)				
	Not useful	Of limited use	Useful	Very useful	No response
<i>MIMS / New Ethicals Small Book</i> (N = 76)	5.3	10.5	30.3	52.6	1.3
<i>New Ethicals Compendium</i> (N = 31)	0	3.2	54.8	41.9	0
MIMS CD-ROM (N = 27)	0	3.7	33.3	63.0	0
<i>BNF</i> (N = 57)	0	26.3	31.6	40.4	1.8
PHARMAC schedule (or update) (N = 77)	22.1	29.9	35.1	13.0	0
bpac ^{nz} (N = 62)	6.5	29.0	45.2	17.7	1.6
IPA and PHO CME guidelines (N = 68)	8.8	16.2	44.1	30.9	0

While the *MIMS / New Ethicals Small Book* was the most commonly used source of information on drug dosage, drug interaction and adverse reactions, other sources were accessed for information about complex prescribing situations such as hepatic or renal impairment and use of medications in pregnancy (Tables 5.3 and 5.4).

Table 5.3: Most commonly used data sources when seeking prescribing information

Information need	Most commonly used source	Percent (N = 99)
To prescribe a medication immediately	<i>MIMS / New Ethicals</i>	86.9
	Text sources	2.0
	<i>BNF</i>	1.0
	Contact for advice	1.0
	Guidelines / data sheets	1.0
	PHARMAC	1.0
	Known	1.0
	Unsure	6.1

Table 5.4: Different source to that most commonly used when seeking specific prescribing information

Specific information need	Use different source to that most commonly used (N = 99) %
Dose	34.3
Drug interactions	43.4
Adverse drug reaction	41.4
Dosing in renal impairment	49.5
Dosing in hepatic impairment	31.3
Drug use in pregnancy	72.7
Drug use in breastfeeding	55.6
Funding-related information	56.6

5.1.2 Journals

Two-thirds of GPs indicated that they used medical journals to inform their prescribing. All of those GPs who used the *New Ethicals Journal* (24.5%) found it to be of some use, with 78.2% of users rating it as useful or very useful, so the recent demise of this publication leaves a significant gap in GPs' text resources.

5.1.3 Internet

Internet-based sources of prescribing information were used by nearly half of the GPs surveyed (43.5%). When used, websites were infrequently utilised (mainly only monthly or yearly) but considered to be very useful. The Medsafe website was the one most commonly used, by 61.1% of those GPs who used websites.

5.1.4 People sources

People sources of prescribing information included pharmacists, GP colleagues, hospital staff and private specialists (Table 5.5). Pharmacists (all community pharmacists) were used by most GPs on a weekly or monthly basis for advice and were felt to be of high value. GP colleagues were also, in the main, accessed on a weekly or monthly basis and were felt to be very useful. Hospital staff were accessed less frequently (most commonly monthly or yearly) but when accessed were felt to be very useful. Private specialists were accessed less often (most commonly monthly or yearly) but were also regarded to be very useful when used for prescribing advice.

Pharmaceutical representatives were seen by over 70% of all GPs, who all used pharmaceutical representative information (particularly written material) about new and existing drugs. GPs received daily mailed information from the pharmaceutical industry but felt the information was of limited use or no use at all.

Table 5.5: Frequency and usefulness of colleagues and other health professionals for prescribing

	Frequency of contact for prescribing (Percent)				
	Daily	Weekly	Monthly	Yearly	Never
Pharmacists (N = 99)	11.1	47.5	28.3	7.1	6.1
GP colleagues (N = 99)	8.1	40.4	31.3	13.1	7.1
Specialists (N = 98)	0	3.1	48.0	22.5	26.5
Hospital staff (N = 99)	0	17.2	49.5	18.2	15.2
Pharmacy facilitators (N = 99)	0	2.0	18.2	13.1	66.7
	Usefulness (Percent)				
	Not useful	Of limited use	Useful	Very useful	No response
Pharmacists (N = 93)	4.3	11.8	33.3	49.5	1.1
GP colleagues (N = 92)	2.2	7.6	29.4	60.9	0
Specialists (N = 73)	0	8.2	30.1	60.3	1.4
Hospital staff (N = 84)	0	8.3	38.1	53.6	0
Pharmacy facilitators (N = 33)	6.1	12.1	33.3	48.5	0

5.2 Influences on prescribing

Influences on GP prescribing were largely judged to be a combination of patient factors and cost to patients. DTCA was not often deemed to have a significant impact on prescribing by the GPs (58% reported it to have no influence at all), but it was acknowledged by GPs to be a factor that influenced patients' expectations of prescribing (77% reported it to have some or a strong influence). Perceived patient expectations in themselves were often considered influential on prescribing, suggesting that DTCA may in fact exert an indirect influence on prescribing. Costs of drugs to the patient were frequently reported to have some or a strong influence on prescribing. GPs who followed 'recommended practice' in their prescribing were slightly more likely to have broadband (fast) internet access in their clinics and, to a lesser extent, in their consulting rooms.

5.3 Analysis of factors that might influence the use of resources

An attempt was made to distinguish GPs who follow 'recommended practice' (that which fits accepted best practice guidelines) from those who may not. We chose two unambiguous cases of initial treatment for high blood pressure (hypertension) and initial medication and duration for proven *Streptococcal* tonsillitis (strep throat). The New Zealand cardiovascular guidelines recommend that diuretics and beta-blockers should be the first-line drugs for uncomplicated hypertension. The National Heart Foundation of New Zealand recommends 10 days of a penicillin-like medication for patients with clinical and swab-proven strep throat. There were few distinguishing characteristics among those GPs who followed recommended practice (defined by their reported practice of prescribing for the scenarios above). 'Recommended practice' GPs were only slightly more likely to have broadband internet connections in the primary care setting. There was virtually no difference between overseas- and New Zealand-trained GPs in regard to their following of recommended practice. However, younger doctors were significantly more likely to be using recommended practice than those aged 50 years or more.

A number of respondents answered the question about using *MIMS New Ethicals* as a source of information for chloroquine-resistant malaria in spite of the stem question stating that this information was no longer contained in that source. We were concerned that almost half the respondents were using text-based sources for chloroquine-resistant malaria advice when this information could easily be out of date. A similar number were using either websites or government/international agencies as sources of information. A minority were using 'human' contacts (for example, Medical Officers of Health), which although likely to be accurate nevertheless would be time-consuming and hence possibly not efficient.

No clear differences were seen between rural and urban GPs in the use of prescribing resources, although rural GPs tended to use medical journals and websites less frequently than their urban colleagues. The rural practitioners tended to have been in practice for fewer years than their urban counterparts. They were less likely to have a New Zealand qualification and this may represent the fact that many rural doctors were trained in overseas countries. They were as likely to be using computerised prescribing but paradoxically less likely to be fully computerised.

There was a higher proportion of younger GPs in rural practice. The historical pattern has been for young doctors to work in rural areas and then move to cities or provincial towns when their children started high school. A slightly higher proportion of younger doctors reported using the *BNF* daily or weekly. Younger doctors were slightly more likely to have paperless practices and to electronically scan in paper reports. This may reflect their being more computer literate, or their having 'shorter' patient records and hence being able to transition to a paperless practice easier. It was surprising that younger doctors were less likely to have internet access in the

consulting room but that they were more likely to use the Internet in relation to a clinical situation in their consulting room than older doctors.

Overseas-trained doctors tended to be slightly younger than New Zealand graduates and were more likely to be in rural practice. They were also more likely to use the *BNF* and find it useful. This may reflect the number of United Kingdom graduates who have had exposure to the *BNF* and can appreciate its qualities. Overseas graduates were more likely to think that family medicine publications (including the *New Zealand Medical Journal*) were not useful at all and to find the major international journals very useful. They were also less likely to find *New Ethicals Journal* very useful. While overseas graduates were more likely to use a prescribing website they were less likely to have internet access in their consulting room. Ironically, they were more likely to use the Internet for a clinical activity in the consulting room.

Part-time GPs tended to be slightly younger than full-time GPs which may explain why they were more likely to be in fully computerised practices. They were much more likely to be female practitioners and to consider family medicine journals and *New Ethicals* magazines of some value. They were also slightly less likely to be following recommended guidelines but more likely to have paperless practices and to electronically scan in paper reports. Part-time practitioners were more likely to have internet access in their consulting rooms but less likely to use the internet in relation to clinical issues.

Male GPs were more likely to use *MIMS New Ethicals* and the *BNF* on a daily basis, and they were also more likely to use a pharmacist on a daily basis than their female counterparts. Male doctors were more likely to be full-time, and hence in a position to ask for information from a pharmacist on a daily basis.

It should be noted that with the overall small number of GPs surveyed, there might be differences not detectable with this sample size.

5.4 New trainee GPs

This group of volunteers was chosen to compensate for the lack of younger GPs in the main survey sample. The new trainee GPs were more likely to use *MIMS New Ethicals* and the *BNF* than the main group. They were more likely to be in paperless practices and they all had internet access at home – but only 47.1% of them had internet access in the consulting room. In addition, the new trainees were much more likely to use websites for prescribing information than the main group. However, these differences need to be interpreted with caution, because the new trainee GPs were a self-selected rather than a random sample and because a GP's age, years of practice, nature of practice (partner or employee) and degree of computer-literacy are all likely to be inter-related factors.

5.5 Reasons for use/non-use of resources

MIMS New Ethicals is the most accessible source of information. It is provided free to GPs nationally, with regular updates. The content is applicable to New Zealand's prescribing environment, and text (e.g. *MIMS / New Ethicals Small Book*) can easily be taken and referred to outside the individual's usual practice location. Although only 28.2% of GPs used the CD version of *MIMS New Ethicals*, those who did use it indicated both high daily use and a high level of usefulness (63% found it very useful). The CD-ROM was reported by its users to be the most useful standard prescribing resource.

The *New Ethicals Compendium* was less frequently used by GPs (only one-third ever used it), although those who used it found it useful or very useful (96.7%). This suggests that GP use this resource for specific reasons, such as when they know that it contains the information they

require. Previously the *New Ethicals Compendium* was supplied free to GPs, but now it is an expensive resource that GPs must purchase for themselves.

Most of the GPs used the PHARMAC schedule and/or updates (77.8%), although of these users, only 48.1% considered it useful or very useful. In contrast, 63.9% of bpac^{nz} users, 72% of *BNF* users, 75% of IPA/PHO CME guideline users and 96.7% of *New Ethicals Compendium* users rated the respective prescribing resources as useful or very useful.

Over one-third (35.1%) of respondents indicated lack of awareness as a reason for not using bpac^{nz} as an information source, while one-sixth cited lack of accessibility as being a deterrent. Nevertheless, 66% of the GPs thought that bpac^{nz} feedback was an important influence on their prescribing behaviour. Of those GPs, 17.2% were specifically influenced with respect to decisions on dosage and medication, 10.9% on awareness of drug costs, 4.7% on drug choice, and 3.1% on awareness of drug side effects. More generally, 15.6% thought that bpac^{nz} was a useful reference, 12.5% said that it gave further consideration to their prescribing, and 3.1% found that it made them more aware of best/recommended practice.

Of those GP respondents who did not use PHARMAC schedules or monthly updates (N = 22), 31.8% saw no use or need for them, 22.7% thought they were not user-friendly and 22.7% considered them to be overwhelming in size and/or frequency of delivery/update. Lack of access, incompleteness and poor structuring were cited as barriers to usage by one GP each, and another GP preferred to use alternative information sources to PHARMAC.

Medsafe was reported as being used for prescribing information by 54.5% of GPs but the majority of these did so infrequently (31.3% monthly; 10.1% yearly). The reasons given by GPs for not using Medsafe were inaccessibility (26.2%), lack of awareness (16.7%), lack of need or usefulness (11.9%), and inefficiency (4.8%). Another 11.9% preferred to use alternative information sources and 2.4% were not habitual users. Information content (2.4%) and lack of user-friendliness (2.4%) were also noted.

Only one of the GPs surveyed used a personal digital assistant (PDA) so no analysis was done on use of this resource, although it is likely to be increasingly utilised over the next decade.

Two-thirds of GPs indicated that they read medical journals to assist with their prescribing decisions. Of those GPs, the majority judged a wide range of publications as useful or very useful.

GPs listed journals most commonly used and rated their usefulness under five publication type categories – Family medicine, Major international, GP magazines, *New Ethicals* and Other. Family medicine and *New Ethicals* had the highest readership with 28.7% and 24.5% respectively. Although the remaining publication types had lower readership, their usefulness was ranked higher; 91% found major international journals useful or very useful versus 55.5% for family medicine journals. Overall *New Ethicals* was rated highly (24.5% readership; 78.2% rating it useful or very useful). Thus the recent demise of this publication leaves a significant gap in GPs' text resources.

Only 43.5% of GPs reported using prescribing websites, and most of these did so infrequently. Only five GPs reported using websites daily, and 31% monthly or less frequently. Among those GPs who did report website usage, the Medsafe website was the most commonly used (61.1%), predominantly to access drug data sheets. Generally, the main reasons given for not using websites for prescribing information were lack of time to do so; inefficiency of access or no access in the practice; and GPs' computer literacy. A small number commented on the use of the internet and the impact on patient interaction, referring in particular to the computer being a distraction to the consultation.

5.6 Resources GPs would like to use or access

Source types that GPs indicated they would like were electronic, text and support people or agencies. Electronic sources constituted computer databases (CDs) and online/Internet or a combination of the two. Many GPs suggested integrating computer sources (e.g. with PMSes). The benefits and advantages of having electronic sources were mainly attributed to collating of information resources and easily keeping sources up to date. Information items commonly indicated as being available from an electronic source were the costs of drugs and dosage. Problems with access to computer sources, particularly the Internet and internet speed, were an apparent barrier for many GPs, and the notion of free/funded web access and broadband (fast internet access) was discussed by several GPs.

The information GPs require for prescribing includes drug data sheets that specify drug uses, dosage, contraindications, drug interactions, and adverse reactions. GPs require information about complex prescribing situations such as hepatic or renal impairment; use of medications in pregnancy and during breastfeeding and paediatric dosage calculations. GPs have reported the cost of drugs to the patient to be a significant influence on their prescribing. They require easily accessible updated information of the PHARMAC schedule and drug subsidy information. They also require health information for the international traveller, such as immunisations required and a list of countries with chloroquine-resistant malaria.

Our study shows that there is no one resource available where GPs can access this range of information. Because some of the information is subject to frequent change (for example, scheduled drugs or traveller health information), paper-based resources tend to go out of date rapidly. Overall preference for a centralised information source/portal of up-to-date and reliable information that is accessible and user-friendly, via the computer, emerged from GP interviews. One GP summed it up as a need for 'an online one-stop shop'.

6 Conclusions and Policy Implications

The literature review suggested the following factors might encourage evidence-based prescribing.

- Providing a number of interventions in combination with multi-faceted interventions and reinforcement from different sources which may combine to reach a ‘critical mass’ encouraging GPs to change prescribing behaviour (Goodyear-Smith 2003).
- Encouraging GPs to formally identify, review and rationalise their personal formularies, basing evaluation on the World Health Organization (WHO) principles of comparative efficacy, safety, suitability and cost of the treatment alternatives. This may be best done within the context of managing particular clinical conditions, in conjunction with clinical guidelines (Robertson 2001).
- As new drug prescribing by GPs often follows that initiated by hospital colleagues, a joint approach to new drug introduction across primary and secondary health care should be used by primary health care bodies (Prosser et al 2003).
- Ensuring that medical specialists have up-to-date and reliable knowledge and that they are aware of their influence and role in passing this knowledge on to GPs (Cullen 1997).
- Providing evidence-based information in advertisement form (Avorn et al 1982).
- Limiting the educational activities of the pharmaceutical industry (Figueiras 2000).
- Distributing drug prescription information from independent agencies using educational strategies that require personal contact and generate positive attitudes among GPs towards these sources (Figueiras 2000).
- Training pharmacists to provide pharmaceutical care and encourage recommendations to GPs (Carroll 2003).
- Repeating/reinforcing messages at 12- to 24-month intervals to help to sustain changes in prescribing practice after an educational intervention, the effect of which tends to decay over time (Richards et al 2003).
- Providing scientifically-based drug information to GPs (Habraken 2003).
- Using a proactive approach to disseminating independent scientific data, rather than relying on information being spread by diffusion (Arroll et al 2003).
- Training GPs in basic information literacy skills; identifying evidence-based sources and critical appraisal skills (Cullen 2002).
- Providing internet portals to guide GPs to selected resources and providing a document delivery service that allows GPs to access useful citations from Medline without delay or cost (Cullen 2002).
- Developing the desirable features of an effective prescribing tool, including alphabetical and class-based organisation; search functions; point-of-care accessibility; regular updating; regular checks on interactions; specifying contraindications; identifying lactation and obstetric hazards and providing adult and paediatric dosing information, appropriate travel information and advice on renal and liver problems.

Our study indicates that there is no single source of prescribing information available to New Zealand GPs that provides all the information GPs require or want to have available. In assessing both the reviewed literature and the findings of our study, we offer the following suggestions.

- A joint integrated source could be achieved without the expense and effort of creating a new prescribing resource by working with *MIMS* publishers to make it a more useful

source of information with additional detail on pregnancy, lactation and renal and liver dysfunction. An alternative option is a companion resource covering those areas not well documented by *MIMS*. If such a resource contained information on the abovementioned deficient areas along with malaria and travel health information and pricing information (PHARMAC issues), GPs would have two sources for most of their prescribing needs. This could also be a repository for New Zealand Guidelines Group (NZGG) information.

- ‘Recommended practice’ prescribers were more likely to have broadband internet access available, suggesting that such a facility assists recommended practice. Therefore, there may be some merit in making it mandatory for GPs to have some form of fast internet access and providing some resources to ensure this happens.
- Malaria and travel health information: the forerunner to *MIMS* was the *New Ethicals* booklet, which contained information on malaria prophylaxis and geographical areas that were chloroquine-resistant. This is no longer available in *MIMS New Ethicals*. Instead, the GP respondents used a wide and unsatisfactory range of sources, many involving contacting other health professionals. Finding this information is potentially a time-consuming activity. There would be some advantage in recommending that GPs refer to a website such as WHO or Centers for Disease Control and Prevention in Atlanta. This would solve the problem of trying to maintain an up-to-date source. Providing GPs with access to rapid broadband internet services would facilitate this.
- A number of GPs were not aware that *BNF* is available online (at <http://www.bnf.org>). Making this and similar useful websites known and available to GPs would be helpful.
- Further research, investigating the impact of patients’ expectations, where they are influenced by DTCA, on GPs’ prescribing, is warranted.
- The impact that the cost of drugs to patients has on GPs’ prescribing needs to be further investigated, as this was reported to be a significant influence by GPs in this study.
- Strategies to improve prescribing would be best to target not only GPs but also pharmacists and patients.

In conclusion we feel that the following merit consideration:

- ‘One-stop shop’ concept – combining information from *bpac*^{nz}, Medsafe and PHARMAC into one respected publication available through a single conduit would make prescribing information more accessible.
- Further research – it would be useful to examine actual prescribing rather than reported practice.
- Inter-sectoral strategies – would aid prescribing support, with information access targeted as well as educational strategies.
- Internet sources – information from the Internet has the potential to be available and useable. Current use could be improved. Consideration is required of providing broadband (high speed) Internet access to all GPs, especially rural GPs, and then directing them to appropriate websites to increase access to quality information. This may necessitate some training in the use of the Internet.
- Personal Digital Assistant (PDA) technology – web-based resources should be designed, mindful of possible access through PDAs.
- The Ministry should regularly recommend preferred websites, e.g. WHO, *BNF*, *bpac*^{nz}, NZGG.

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