

A qualitative comparative investigation of variation in general practitioners' prescribing patterns

Chrys Jaye and Murray Tilyard

SUMMARY

Background: In New Zealand there is increasing interest in the variation in the prescribing behaviours of general practitioners (GPs). Research conducted to date has focused primarily on the quantifiable aspects of prescribing variation.

Aim: To investigate the qualitative aspects that may help explain variations in prescribing behaviour between GPs.

Design of study: Qualitative and comparative interviews.

Setting: Thirty New Zealand GPs.

Method: A sample of 60 GPs (comprising 20 low, 20 medium, and 20 high-cost prescribers) was selected. Half of this sample (10 GPs in each prescribing category) was recruited to the study. Responders participated in a 60-minute interview.

Results: Low-cost prescribers reported more experience in practice and appeared to have a more 'relaxed' attitude towards medicine. They were more comfortable with refusing patients and they responded to patient expectations with education and explanation. In addition, they viewed the prescription as a pragmatic means of delivering health care to patients. Low and medium-cost prescribers did more formal counselling and emphasised the 'listening' aspects of general practice. High-cost prescribers appeared to be more highly motivated and to have a more 'serious' attitude toward medicine. They tended to view their obligations and responsibilities to the patient in terms of medical competence. They described their roles with patients in terms of service provision and suggested that patients viewed the prescription as a signifier of the GP's service to the patient.

Conclusion: This study suggests that there are discernible, non-quantifiable differences between low, medium, and high-cost prescribers in the Otago and Southland areas of New Zealand.

Keywords: prescribing behaviour; general practitioners.

Introduction

IN New Zealand there is increasing interest in variation in prescribing behaviour between general practitioners (GPs). This interest is set against the context of the increasing cost of pharmaceuticals to the Pharmaceutical Management Agency Ltd (PHARMAC) — the government-funded agency responsible for managing the New Zealand pharmaceutical schedule — and a political environment that has seen a move to budget holding by some Independent Practitioners' Associations (IPAs).^{1,2} It is also set against the desire by IPAs to promote appropriate and high quality prescribing in general practice.

Previous research into prescribing has had a predominantly quantitative focus. These studies have provided analyses of the variations in the particular drugs prescribed and their volume and cost,^{1,3-7} the influence on prescribing by capitation or fundholding schemes,⁸⁻¹⁰ and variations in practice demographics and practice styles.¹¹⁻¹⁶ The cost of consultations has been shown to be associated with the increasing age of patients and with diagnosis; in particular, asthma, hypertension, diabetes, and endocrine and hormonal problems.¹⁷⁻¹⁹

Studies that focus on qualitative aspects of prescribing have analysed decision-making processes by doctors, relational and social aspects that centre on the doctor-patient relationship, personal or unique doctor characteristics and attitudes, and symbolic aspects associated with the prescription itself.²⁰⁻²³

Recent research has explored patients' expectations and doctors' perceptions of their expectations. Virji and Britten²⁴ suggested that doctors may be aware of the pressure from patients to prescribe. Three recent studies have shown that whether or not a GP gave a prescription was significantly associated with the patient's expectations of receiving a prescription.²⁵⁻²⁷ Some studies have also concluded that there is a symbolic aspect to prescribing.²⁸⁻³³

While the literature outlined above yields insight into non-quantifiable aspects of prescribing, to date there has been no comparative qualitative research of variation in prescribing behaviours between high, medium, and low-cost prescribers. The purpose of this study was to investigate the non-quantifiable or qualitative aspects that might explain variations in prescribing behaviour between GPs in the Otago and Southland areas of New Zealand.

Method

This research was commissioned and funded by the Best Practice Advocacy Centre (BPAC), a government-funded organisation, one of the aims of which is to improve the qual-

C Jaye, PhD, lecturer; and Murray Tilyard, BSc, MD, FRNZCGP, Elaine Gurr Professor of General Practice, Department of General Practice, Dunedin School of Medicine, University of Otago, New Zealand.

Address for correspondence

Dr Chrys Jaye, Department of General Practice, Dunedin School of Medicine, University of Otago, PO Box 913, Dunedin, New Zealand. E-mail: cjaye@gp.otago.ac.nz

Submitted: 20 February 2001; Editor's response: 12 July 2001; final acceptance: 14 December 2001.

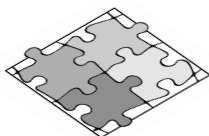
©British Journal of General Practice, 2002, 52, 381-386.

HOW THIS FITS IN*What do we know?*

Previous research into prescribing behaviour has been predominantly quantitative, focusing on variations in the types of drugs prescribed, volume and cost, the influence on prescribing by capitation and fundholding schemes, and variation in practice demographics and practice styles. Recent research has explored patients' expectations and doctors' perception of their expectation.

What does this paper add?

Until the research described in this paper there had been no comparative qualitative research of variation in prescribing behaviours between high, medium, and low-cost prescribers.



ity of prescribing. BPAC defined the sample using New Zealand Health Information Services (NZHIS) data and also recruited participants to the study. The NZHIS collects data on the prescribing of individual GPs and on the numbers of patients seen by each GP. These data were weighted for volume of patients, age (adults over 18 years of age), and part-time practice, and they provided a prescribing profile for each GP in New Zealand. A purposive sample was drawn from the 220 GPs in the Otago and Southland regions of New Zealand. This sample comprised the 20 highest, 20 mid-range, and 20 lowest cost prescribers, matched for patient demographics and totaling 60 GPs. Ethical approval was obtained from the Otago Ethics Committee.

Low-cost prescribers were defined as those who annually prescribed less than the value of \$NZ90 000 (approximately £30 000) of all classes of pharmaceuticals and fewer than 2.3 scripts per General Medical Subsidy (GMS) claim. Medium-cost prescribers were defined as those who annually prescribed to the value of between \$NZ148 000 and \$NZ198 000 (approximately £49 333 and £66 000) of all classes of pharmaceuticals and between 2.3 and 3.5 scripts per GMS claim. High-cost prescribers were defined as those who annually prescribed to the value of more than \$NZ200 000 (approximately £66 666) of all classes of pharmaceuticals and more than four scripts per GMS claim.

An invitation to participate and an information sheet was posted, and this was followed up by telephone calls to arrange interviews for those who agreed to participate. The researcher/interviewer was blinded as to which prescribing category participants belonged to until the final interview had been conducted.

Thirty participants were recruited to the study. This group was relatively homogenous. All but five responders had completed their medical qualification at the University of Otago, New Zealand. All but five were male, and all participants were in the same social class and profession and were practicing medicine within a relatively small geographical area of New Zealand. The discriminating heterogeneous feature in this sample at the outset of the project was the prescribing profile.

The interview schedule was designed to take no longer than one hour to complete, allowing for reflective but con-

cise responses. Because of the comparative nature of the research the interview guide was relatively structured, although within this format there was room for flexibility and free narrative, allowing the participant to make links and offer insights that were inclusive of several questions. The interview schedule was divided into seven sections and questions were arranged so that participants were asked to think about some issues in increasing depth. The schedule included questions about their practice and medical education, how they learned about new drugs, and what influenced their choice of drug. Some questions were designed to elicit opinions about uncertainty in making diagnoses and of critical incidents in practice. Questions about the doctor-patient relationship and consulting experiences were also asked. The final set of questions asked responders directly about their prescribing behaviours. This interview schedule was pre-tested. During the initial interviews the interview schedule was constantly evaluated and as a result of this some modifications were made. This flexibility is a feature of qualitative research.³⁴ Interviews were conducted both by telephone and face-to-face. Upon completion of the project, face-to-face interviews had been conducted with 11 participants and telephone interviews with 19 participants. All face-to-face interviews were conducted at the participants' practices. These two interviewing techniques are considered to have their own strengths and weaknesses.^{35,36} In the present study, little difference was discerned in the quality of interviews conducted by either method. This may have been because of the responders' medical backgrounds and familiarity with clinical interviewing, or because of the conversational style of interviewing adopted by the researcher. All interviews were conducted by a researcher who is a medical anthropologist in a department of general practice but is not a GP. All responders were reimbursed for the time spent participating in the study. It is not known to what extent this influenced the decision to participate.

The analytical process began with thorough reading of transcripts as these became available, and recording of initial comments and memoranda in the margins of each transcript. The thematic analysis combined a process similar to the template-organising style described by Crabtree and Miller,³⁷ with an immersion/crystallisation style of hermeneutic interpretation.³⁸ This involved clustering related pieces of text, initially within each subgroup and then between the three groups of responders. Consistencies and differences were identified within each comparative set of responses and common overarching explanatory themes developed. In this way, a profile was developed for each group based upon points of distinction within themes. Once this process was complete, the results were presented at a series of seminars attended by GPs, many of whom had participated in the study. Feedback from these forums was incorporated into the interpretation of the results.

Results

The findings of this research suggest that there are discernible, non-quantifiable differences between low, medium, and high-cost prescribers in the Otago and Southland regions of New Zealand. Five interrelated themes were identified that may help to explain variations in prescribing

behaviour between GPs.

Experience in practice

Low-cost prescribers in this study reported being in medical practice for longer than other responders. The average year of medical qualification reported by low, medium, and high-cost prescribers was 1974, 1983, and 1980, respectively. This corresponds to the average year of first registration on the New Zealand General Medical Register for each group of responders (1976, 1986, and 1983, respectively, for low, medium and high-cost prescribers). Reported periods of time spent in general practice could not be verified because not all responders were vocationally registered. However, the average number of years spent in their current practice reported by responders was 15, eight, and nine years for low, medium, and high-cost prescribers, respectively.

Attitudes toward medicine and general practice

Differences were discerned in personal attitudes towards the practice of medicine between the three subgroups. While low-cost prescribers appeared to have a 'relaxed' attitude towards medicine, high-cost prescribers tended to be more motivated. This was associated with fewer reported attendances at continuing medical education (CME) meetings and less participation in Preferred Medicines Centre (PreMec) educational surveys for low-cost prescribers, and, conversely, for high and medium-cost prescribers, more frequent reported attendance at CME meetings, greater participation in PreMeC surveys, and reports of more frequent use of practice guidelines:

'I don't necessarily [follow guidelines]. I still follow my own criteria.' (Low-cost prescriber.)

'I do read them – I might refer to them after a consult to check what I've done.' (High-cost prescriber.)

Although there was no difference in the reported influence of pharmaceutical representatives on prescribing, responders reported being influenced to varying degrees by the educational visits of BPAC representatives. Most of the high-cost prescribers reported that their prescribing was greatly influenced by BPAC representatives' regular visits to discuss feedback on prescribing patterns, while the majority of low and medium-cost prescribers reported that these visits had little effect on their prescribing patterns. Low-cost prescribers generally described their prescribing as conservative.

'They keep me aware of costs but I don't think I've felt that I'd change my prescribing because of what they've said.' (Low-cost prescriber.)

'[My prescribing is] conservative. I tend to use drugs that I'm familiar with and I try to prescribe for valid reasons.' (Low-cost prescriber.)

'[BPAC] reps are marvellous. They give me feedback on prescribing that is useful.' (High-cost prescriber.)

High-cost prescribers in this study were less comfortable

about being unable to diagnose than low and medium-cost prescribers. Most low-cost prescribers commented that they were unconcerned if they could not make a diagnosis.

'No. I don't think [making a diagnosis] is your aim. If a patient presents you try to diagnose within the first 30 seconds and then to reinforce that. It's nice if you can but you can't always.' (Low-cost prescriber.)

'I try to. I can exclude things. A lot of the time I don't know what's going on.' (High-cost prescriber.)

Motivating principles in practice

Several principles were identified that underlie and motivate GPs' practice and that are also associated with the cost of their prescribing. High-cost prescribers reported more often that their practice bookings were based on 10-minute consultations, while low-cost prescribers most often reported 15-minute bookings.

High and medium-cost prescribers tended to view their obligations and responsibilities to the patient in terms of medical competence, and tended to be driven by a more aggressive desire to find out what the patient's problem was and to 'fix' it.

'[The doctor's responsibility to the patient is] to provide as good medical care as you are competent to do so.' (High-cost prescriber.)

'I have a compulsion to solve the problem at the first visit.' (High-cost prescriber.)

Low-cost prescribers tended to describe their responsibilities to patients in terms of honesty, respect, and loyalty.

'I would put it both ways that they [both doctor and patient] have to respect each other as individuals and human beings in the broadest sense of that.' (Low-cost prescriber.)

Low and medium-cost prescribers considered that most presenting patients would recover without their intervention. However, high-cost prescribers considered that most presenting patients required their active intervention or treatment.

'All those who come need treatment.' (High-cost prescriber.)

'I'm realistic. We're not the "be-all and end-all" of health and cures, and chemicals aren't the answer for health either.' (Low-cost prescriber.)

All responders across all subgroups considered that general practice was evidence-based to a minor degree. However, high-cost prescribers considered that their own personal practice was evidence-based more often than low and medium-cost prescribers did.

'[I've] become a firm believer of EBM as the best way of practicing.' (High-cost prescriber.)

'I don't kid myself that it is a lot of the time. I think an awful lot of our medicine is handed down from generation to generation. It works out empirically and that doesn't mean it isn't right.' (Low-cost prescriber.)

Low and medium-cost prescribers reported that they did more formal counselling in their practice, which suggests that they were more willing to use alternatives to medication in problem solving.

'It doesn't happen very often. It would take at least half an hour. But I would strike that situation once or twice a day. I may deal with it differently if pushed for time. I might get them back or just deal with it at the time.' (Low-cost prescriber.)

'I might ask them to come back at 5.30 pm for a longer appointment but I usually refer them.' (High-cost prescriber.)

GPs' perception of their role with patients

High-cost prescribers in this study more often described their role with patients in terms of professional service, and this had an explicit exchange component for many responders. Part of this service included preventive and screening responsibilities.

'It's a business exchange. They pay and I provide a service – this means I will prescribe things they can get over the counter. It's clinical best practice.' (High-cost prescriber.)

'I often prescribe something; for example, cough mixes, for patients as part of my service to them. I think this is legitimate. It's a business decision.' (High-cost prescriber.)

High-cost prescribers were more ambivalent about saying 'no' to patients than were other responders.

'It depends on how likely you [sic] are to be right. If I'm dubious they might be right [I prescribe] but I don't feel obligated when it won't do them any good.' (High-cost prescriber.)

'I find it hard to say "no". I like to be popular with patients. Sometimes it makes me prescribe where others wouldn't. I feel it's a weakness of mine.' (High-cost prescriber.)

Medium-cost prescribers tended to describe their role with patients more in 'patient-centred' terms of listening to the patient. They most often described responding to patient expectations with education and explanation.

'I try to explain and educate. It has added value if I'm not prescribing.' (Low-cost prescriber.)

'I feel okay about that now [saying 'no' to patients]. Ten years ago it might not have been okay. So long as you give clear communication and feel like I've done my job in explaining why I've done all I can.' (Medium-cost

prescriber.)

What the prescription represents

High-cost prescribers reported most often that they wrote a prescription as a means of closing the consultation.

'The prescription is a useful signal that things are drawing to a close. I guess the majority of consultations end with some sort of piece of paper from the doctor to the patient.' (High-cost prescriber.)

All responders were aware of the 'value for money' aspect of the prescription, an aspect that is perhaps unique to a partially subsidised primary health care setting. Low-cost prescribers more often described the prescription as an objective and impersonal tool for delivering health care to patients, while high-cost prescribers more often suggested that the prescription signified a business transaction to the patient.

'A prescription pad is our tool. It's our workshop and you've got to keep telling yourself that they don't have to have a prescription on the go.' (Low-cost prescriber.)

'I think doctors probably attach a lot [of significance] to prescribing because it's such a useful tool for making you feel like you've done something ... it's something tangible that they get to take away ... a transaction I think.' (High-cost prescriber.)

Discussion

Limitations of this research

The findings of this research are largely based upon self-reporting, personal insight, and disclosure by responders. It was not possible to validate whether responses were honest and/or accurate. However, we do not believe that this invalidates our findings. In qualitative research, self-reported estimates and opinions offer a view on the attitudes and behaviours of responders from their own perspectives.³⁹ There was internal consistency in the data within each subgroup of responders, and external validity in that many of these findings are supported by previous research. As IPA members, responders were given regular updates on their own prescribing profiles, therefore there was little incentive for responders to be deliberately misleading about their prescribing patterns.

Profiling prescribers

This study suggests that there are discernible, non-quantifiable differences between low, medium, and high-cost prescribers in the Otago and Southland areas of New Zealand.

Low-cost prescribers

Experience in practice has been variously associated with prescribing behaviour.⁴⁰⁻⁴² It has been suggested that as GPs become more established in practice they tend to rely on their own experience to a greater degree.^{22,43} Low-cost prescribing, in this study was associated more time in practice. It should be noted that time spent in practice does not

necessarily equate to experience in practice that is linked to relationships with patients. However, low-cost prescribers in this study also placed a high value on their own experience and were more self-reliant in practice. This is supported by their lack of participation in CME, infrequent use of clinical guidelines, and prescribing conservatism in using a relatively small repertoire of familiar medications.

Low-cost prescribers appeared to be less perturbed when unable to diagnose, less influenced by patient expectations, and more comfortable about refusing patients' requests for medication even if it might result in the loss of that patient from the practice. Research conducted in Norway on benzodiazepine and minor opiate prescribing also found that low and medium-cost prescribers perceived the ability to refuse patients to be a necessary part of practice and that they were not afraid of losing patients to other doctors.⁴⁴

Low-cost prescribers in this study were more comfortable with using alternatives to prescribing, such as patient education and counselling. This supports research suggesting that prescription costs are lower if counselling activities are undertaken during the consultation.¹⁸ It is also consistent with the utilitarian and pragmatic view of the prescription expressed by this group of participants.

Medium-cost prescribers

The primary distinguishing characteristic of medium-cost prescribers was their overt 'patient centred' orientation with a greater emphasis on listening to and understanding the patient than given by other responders.

High-cost prescribers

High-cost prescribing was associated with a greater awareness of service provision as a business transaction to patients who are also consumers, and of problem-oriented aggressive medical practice, as well as an attitude that highly values medical intervention. This perhaps explains why high-cost prescribers were more likely to attend CME, but it is not known whether responders were referring to CME sponsored by pharmaceutical companies, IPAs, or the professional colleges. Low-cost prescribers who attended fewer CME meetings may have been more discerning about the CME they attended, while high-cost prescribers may have attended the more frequent CME meetings held by pharmaceutical companies.

The activist approach by high-cost prescribers in their practice was consistent with their estimations that a lower proportion of their patients would recover without the consultation compared with those of low and medium-cost prescribers. It also suggests that they perceived themselves to be needed by their patients to a greater degree than responders in other subgroups. It perhaps also indicates that high-cost prescribers were less comfortable with medical uncertainty than low-cost prescribers.

High-cost prescribers were acutely aware of pressure from patient expectations and of their prescribing as a response to this pressure. This supports previous research suggesting a strong association between patient expectation and doctors' prescribing behaviour.²⁵⁻²⁷ It also supports the notion that the prescription represents the doctor's interest in the patient; by writing a prescription the doctor is

assured that he/she is treating the patient.^{32,45} In the context of 10-minute consultations and the resulting time pressure, it is easy for the prescription to become a convenient means of closing the consultation.

Finally, there is a need for caution in interpreting these results. Prescribing that is appropriate, effective, and cost efficient is the objective of many stakeholders, including health funding bodies, medical educators, and practitioners. However, it would be naïve and simplistic to associate 'best' practice with 'cheap' practice. The authors set forward several qualitative factors associated with extremes in prescribing behaviour that are currently unexplained by quantifiable correlations. Yet, as with most research, more questions are raised than are necessarily answered.

The New Zealand primary health care setting is characterised by an ideology of 'user pays', in which patients pay a proportion of the cost of a consultation and GPs claim a government subsidy to recover the remainder required to maintain economically viable practices. The transferability of these findings to other settings depends upon similarities in the provision of primary health care and on the similarity of the demographic profile of GPs. Further research will explore the findings of this study with particular interest in high-cost prescribing by GPs.

References

1. Malcolm L, Wright L, Seers M, Guthrie J. An evaluation of pharmaceutical management and budget holding in Pegasus Medical Group. *N Z Med J* 1999; **112**: 162-164.
2. Malcolm L. GP budget holding in New Zealand: lessons for Britain and elsewhere? *BMJ* 1997; **314**: 1890-1892.
3. Steffensen F, Schonheyder H, Sorenson H. High cost prescribers of antibiotics among general practitioners in relation to prescribing habits of other drugs and use of microbiological diagnostics. *Scand J Infect Dis* 1997; **29**: 409-413.
4. Nyquist A, Gonzales R, Steiner J, Sande M. Antibiotic prescribing for adults with colds, upper respiratory tract infections, and bronchitis by ambulatory care physicians. *JAMA* 1997; **278**: 901-904.
5. Quinn R, Kelly A. How much of a general practitioner's prescribing is outside his/her control? *Ir Med J* 1998; **91**: 168-172.
6. Rokstad K, Straand J. Drug prescribing during direct and indirect contacts with patients in general practice: a report from the More & Romsdal Prescription Study. *Scand J Prim Health Care* 1997; **15**(2): 103-108.
7. Walzak D, Swindells S, Bhardwaj A. Primary care physicians and the cost of drugs: a study of prescribing practices based on recognition and information sources. *J Clin Pharmacol* 1994; **34**: 1159-1163.
8. Eccles M, Soutter J, Bateman D, *et al*. Influences on prescribing in non-fundholding general practices. *Br J Gen Pract* 1996; **46**: 287-290.
9. Gross R, Nirel N, Bnoussidan S, *et al*. The influence of budget-holding on cost containment and work procedures in primary care clinics. *Soc Sci Med* 1996; **43**: 173-186.
10. Bradlow J, Coulter A. Effect of fundholding and indicative prescribing schemes on general practitioners' prescribing costs. *BMJ* 1993; **307**: 1186-1189.
11. Avery A, Heron T, Lloyd D, *et al*. Investigating relationships between a range of potential indicators of general practice prescribing: an observational study. *J Clin Pharm Ther* 1998; **23**: 441-450.
12. Bishop N, Maling T. Variability within general practitioner prescribing over time. *N Z Med J* 2000; **113**: 14-16.
13. Salisbury C, Bosanquet N, Wilkinson E, *et al*. The implementation of evidence-based medicine in general practice prescribing. *Br J Gen Pract* 1998; **48**: 1849-1852.
14. Rokstad K, Straand J, Fugelli P. General practitioners' drug prescribing practice and diagnoses for prescribing: the More & Romsdal Prescription Study. *J Clin Epidemiol* 1997; **50**: 485-494.
15. Davidson W, Molloy D, Bedard M. Physician characteristics and prescribing for elderly people in New Brunswick: relation to patient outcomes. *CMAJ* 1995; **152**: 1227-1234.
16. Sleator D. Towards accurate prescribing analysis in general prac-

- tice: accounting for the effects of practice demography. *Br J Gen Pract* 1991; **43**: 102-106.
17. McGavock H. Some patterns of prescribing by urban general practitioners. *BMJ* 1988; **296**: 900-902.
 18. Isherwood J, Malcolm L, Hornblow A. Factors associated with variations in general practitioner prescribing costs. *N Z Med J* 1982; **95**: 14-17.
 19. Simpson J, Squires I. The distribution of pharmaceutical costs across general practitioner consultations. *N Z Fam Physician* 1985; **12**: 3-6.
 20. Bradley C. Decision making and prescribing patterns: a literature review. *Fam Pract* 1991; **8**: 276-287.
 21. Clark J, Potter D, McKinlay J. Bringing social structure back into clinical decision making. *Soc Sci Med* 1991; **32**: 853-866.
 22. Denig P, Bradley C. How doctors choose drugs. Hobbs R, Bradle C (eds). In: *Prescribing in primary care*. Oxford: Oxford University Press, 1998.
 23. Davis P, Yee R, Millar J. Accounting for medical variation: the case of prescribing activity in a New Zealand general practice sample. *Soc Sci Med* 1994; **39**: 367-374.
 24. Virji A, Britten N. A study of the relationship between patients' attitudes and doctors' prescribing. *Fam Pract* 1991; **8**: 314-319.
 25. Webb S, Lloyd M. Prescribing and referral in general practice: a study of patients' expectation and doctors' actions. *Br J Gen Pract* 1994; **44**: 165-169.
 26. Britten N, Ukoumunne O. The influence of patients' hopes of receiving a prescription on doctors' perceptions and the decision to prescribe: a questionnaire survey. *BMJ* 1997; **315**: 1506-1510.
 27. Cockburn J, Pit S. Prescribing behaviour in clinical practice: patients' expectations and doctors' perceptions of patients' expectations: a questionnaire study. *BMJ* 1997; **315**: 520-523.
 28. Butler C, Rollnick S, Pill R, et al. Understanding the culture of prescribing: qualitative study of general practitioners' and patients' perceptions of antibiotics for sore throats. *BMJ* 1998; **317**: 637-642.
 29. Hall D. Prescribing as social exchange. Mapes R (ed). In: *Prescribing practice and drug usage*. London: Croom Helm, 1980.
 30. Heath C. On prescription writing in social interaction. Mapes R (ed). In: *Prescribing practice and drug usage*. London: Croom Helm, 1980.
 31. Hemminki E. Review of the literature on the factors affecting drug prescribing. *Soc Sci Med* 1975; **9**: 111-115.
 32. Harris C. Personal view. *BMJ* 1980; **2**: 57.
 33. O'Hagan J. What influences our prescribing? Some non-pharmacological issues. *N Z Med J* 1984; **97**: 331-332.
 34. Sarantakos S. *Social research*. (2nd edition.) South Yarra, Australia: Macmillan Education, 1998.
 35. Frey JH. *Survey research by telephone*. (2nd edition.) London: Sage, 1989.
 36. Lavrakas PJ. *Telephone survey methods: sampling, selection, and supervision*. London: Sage, 1987.
 37. Crabtree BF, Miller WL. Using codes and code manuals: a template organising style of interpretation. Crabtree BF, Miller WL (eds). In: *Doing qualitative research*. (2nd edition.) London: Sage, 1999.
 38. Borkan J. Immersion/crystallisation. Crabtree BF, Miller WL (eds). In: *Doing qualitative research*. (2nd edition.) London: Sage, 1999.
 39. Kvale S. Interpretation of the qualitative research interview. van Zuuren FJ, Wertz FJ, Mook B (eds). In: *Advances in qualitative psychology: themes and variations*. Berwyn: Swets North America Inc., 1987.
 40. Kuyvenhoven M, de Melker R, van der Velden K. Prescription of antibiotics and prescribers' characteristics. A study into prescription of antibiotics in upper respiratory tract infections in general practice. *Fam Pract* 1993; **10**: 366-370.
 41. Christensen D, Bush P. Drug prescribing: patterns, problems and proposals. *Soc Sci Med* 1981; **15(A)**: 343-355.
 42. Stolley P, Becker M, Lasagna L, et al. The relationship between physician characteristics and prescribing appropriateness. *Med Care* 1972; **10**: 17.
 43. Haayer F. Rational prescribing and sources of information. *Soc Sci Med* 1982; **16**: 811-824.
 44. Dybwad T, Kjolsrod L, Eskerud J, Laerum E. Why are some doctors high-prescribers of benzodiazepines and minor opiates? A qualitative study of GPs in Norway. *Fam Pract* 1996; **14**: 361-368.
 45. Parsons T. *The social system*. New York: The Free Press, 1951.

Acknowledgements

The Best Practice Advocacy Centre initiated and funded this research. The authors are grateful for their ongoing advice during and after the completion of the project. We are also grateful to the participants in this research project and all those who had input into the research design.