Setting standards of prescribing performance in primary care: use of a consensus group of general practitioners and application of standards to practices in the north of England

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SUMMARY

Background. *There is considerable variation in prescribing, and existing standards against which primary care prescribing is routinely judged consist largely of local or national averages. There is thus a need for more sophisticated standards, which must be widely applicable and have credibility among the general practice profession.*

Aim. *A study aimed to develop a range of criteria of prescribing quality, to set standards of performance for these criteria, and apply these standards to practices.*

Method. *A consensus group consisting of eight general practitioners and a resource team was convened to develop and define criteria and set standards of prescribing performance using prescribing analyses and cost (PACT) data. The standards were applied to 1992–93 prescribing data from all 518 practices in the former Northern Regional Health Authority.*

Results. *The group developed criteria and set numeric standards for 13 aspects of prescribing performance in four areas: generic prescribing, prescribing within specific therapeutic groups, drugs of limited clinical value and standards based on prescribing volume. Except for generic prescribing, standards for individual criteria were achieved by between 9% and 34% of practices. For each criterion, a score was allocated based on whether the standard was achieved or not. Total scores showed considerable variation between practices. The distribution of scores was similar between fundholding and non-fundholding practices, and also between dispensing and non-dispensing practices.*

Conclusion. *Using a consensus group of general practitioners it is possible to agree criteria and standards of prescribing performance. This novel approach offers a professionally driven method for assessing the quality of prescribing in primary care.*

Keywords: prescribing; prescribing rates; informal protocols; quality in general practice.

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Submitted: 22 December 1994; accepted: 5 May 1995.

© *British Journal of General Practice*, 1996, **46**, 20-25.

Introduction

TRADITIONAL teaching suggests that a prescription for a medicine should be necessary, safe, effective and economical.[1] In practice, however, there is considerable variation in prescribing. In the north of England there is a more than fourfold variation between individual general practices in both prescribing frequency and cost per patient, and there is little evidence that these differences are justified on clinical or demographic grounds.

Existing standards against which primary care prescribing is routinely judged consist largely of local or national averages. It is generally acknowledged that there is a need for more sophisticated agreed standards of prescribing performance, both to inform individual prescribers and to provide assurance that public expenditure is being committed in an efficient manner.

Many putative criteria for more rational and economical prescribing have been suggested,[2] but the derivation by practising general practitioners of numeric standards of prescribing performance and the application of these to a regional dataset have not been reported. This approach would differ from other methods for assessing the quality of prescribing, such as examination of the number of prescriptions issued for symptomatic treatment compared with those for management of chronic conditions,[3] compliance with a formulary,[4] or evaluation of cost changes.[5]

A study was carried out which had two aims. First, to use a consensus group of practising general practitioners from one National Health Service region to derive criteria of prescribing quality, and then to ascribe numeric standards to each criterion, based on the individual members' own experience and on information from external resources. Secondly, to apply these standards to the prescribing analyses and cost (PACT) data of general practices in the region in which the general practitioners practised.

Method

Consensus group

The group comprised eight general practitioners (six men) drawn from across the former Northern Regional Health Authority area. It was intended to reflect a wide spectrum of practice. Four members were aged under 35 years, three were aged 35 to 45 years, and one was aged over 45 years. Seven were members of the Royal College of General Practitioners, and all were principals, with experience ranging from one to over 10 years. Practice locations were mixed (three inner city, four urban or urban/rural and one rural) and size varied (three had fewer than 5000 patients, and four had more than 10 000 patients). Two members were from fundholding practices and one was from a dispensing practice. One member had sat on the General Medical Services Committee prescribing subcommittee, but no other group member had prescribing-related experience except for practice-related tasks such as formulary development and registrar teaching.

At the time of the study, October to December 1993, none of the members had a postgraduate qualification in pharmacology

or therapeutics. Their decisions could, if they wished, be resourced by a pharmacist (M C) and a clinical pharmacologist (D B). In addition the group was led by a skilled small group leader (M E). Two research associates, who were non-participating observers, provided information support. Thus the group was provided with expert technical assistance to inform its decisions. The decision making process was that of informal consensus, chosen both because of its speed and its ability to develop and use the group process, a feature felt to be particularly important in ensuring adequate discussion of the issues.

Criteria selection

The intention was that the results should be widely and readily applicable, and so the only precondition was that the criteria and standards chosen had to be derived from and applied to only PACT data; other practice characteristics could not be used in any assessment.

At the first meeting the group members were asked to introduce themselves and to state their attitudes to the assessment of the quality of prescribing. The initial discussion was concerned with clarifying the task. This included raising concerns such as the possible limitations of PACT data and of the transfer of prescribing from secondary care, including the perceived cost-shifting of secondary care when prescribing expensive treatments such as erythropoietin. There were overriding concerns that prescribing was judged mainly on cost, that better methods of assessing prescribing quality were needed and that these methods should be led by the general practice profession. The discussion served to allow the group to discover members' attitudes and to clarify the facilitatory role of the pharmacist and the clinical pharmacologist.

The general practitioners then presented their own views of potential criteria of prescribing quality from a major therapeutic area, based on *British national formulary*[6] chapters, that they had been asked to consider before the meeting. These chapters were chosen because PACT data are based on the *British national formulary* format. By the end of the first meeting there was agreement on more than 20 potential criteria.

Between the first and second meetings the research team (M C and D B) extracted (from PACT data analyses) actual prescribing frequency and cost data for these criteria for a sample of 94 individual practices in the region, and aggregate data for each of the nine family health services authorities in the region, for the period April 1992 to March 1993. These data were used as the basis of discussion by the group at the second meeting, at which criteria were accepted or rejected.

The 13 accepted criteria are shown in Appendix 1. A number of potential criteria were rejected by the group because: suitable data were not available (appropriate treatment review period); the range of drugs available was too large and confusing (dermatological preparations); or there were considerable external influences on prescribing (hormone replacement therapy). However, the most common reasons for rejection were: considerable hospital influence on prescribing (the use of compound diuretics, the ratio of isosorbide dinitrate to isosorbide mononitrate and the ratio of cimetidine to ranitidine); and difficulty in setting a defensible numeric standard (for frequencies of antidiarrhoeal, analgesic and antimicrobial prescribing and for ratios of inhaled bronchodilators to inhaled steroids, oral to inhaled steroids, first-line to second-line antirheumatic drugs, and selective to non-selective bronchodilators).

Setting standards of performance

The group set provisional numeric standards for each criterion accepted, based on members' perceptions of good practice, their own personal experience and the prescribing data for the 94 practices and nine family health services authorities. The aim in setting the standards was to choose a level which, when achieved, would reflect good prescribing. It was regarded as inevitable that for some criteria, where the group felt there was widespread poor prescribing, the standard would be achieved by only a small proportion of practices. Numeric standards were set in three ways: first, from the rate of generic prescribing; secondly, setting the proportion of a specific therapeutic area accounted for by 'preferred' drug(s); and thirdly, for markers of poor prescribing, by setting absolute levels of prescribing.

For some markers of poor prescribing, the standard was based on a general practitioner issuing just over one prescription per month (15 items or fewer per year), which translated to 0.6 items per 100 prescribing units per year. (The prescribing unit is a weighting which allows for the difference in the proportion of elderly people between particular populations. It has a value of one for patients aged under 65 years, and three for those aged 65 years and over). For other criteria, where the baseline prescribing volume was low, the group preferred to set an absolute number of items per year.

Benzodiazepine prescribing represented a particular problem for standard setting, since the number of prescription items did not differentiate short-term from longer-term prescribing. The group therefore asked to be provided with defined daily doses per prescribing unit, calculated using the method published by the World Health Organization Collaborating Centre for Drug Statistics Methodology.[7] This was then applied to data provided by the Prescription Pricing Authority. Standards were set at the mean for the lowest family health services authority rate for overall benzodiazepine prescribing, and for lorazepam at 1% of this level.

Refining standards

Having set criteria of prescribing and standards using a regional subset and family health services authority means, the group wished to test the application of the criteria by applying the criteria to all practices in the region. Before the third meeting, prescribing data for the accepted criteria were obtained, from the Prescription Pricing Authority, for all 518 individual practices in the Northern Regional Health Authority for the period April 1992 to March 1993. This dataset was therefore different, and considerably enlarged, from the dataset on which the criteria were developed. For each proposed criterion, the group was shown a frequency distribution of the 518 practices in the region showing the range of prescribing.

At the third meeting, the group discussed the results of applying the criteria to the regional dataset. This discussion resulted in some minor refinements to criteria, based around the practicality of their application, but no substantive changes.

The use of the criteria was further explored by the research team by applying the criteria to the regional dataset and obtaining the characteristics of practices that achieved different scores.

Results

Criteria and standards

The criteria and standards developed by the consensus group are shown in Table 1. The 13 criteria fell into four categories: the overall generic prescribing rate; the choice of drug within a therapeutic group; drugs or drug groups of limited clinical value; and therapeutic areas where the volume of prescribing might indicate good or bad prescribing. The criteria and standards were adopted

Table 1. Final criteria and standards of prescribing adopted by consensus group of general practitioners and achievements of 518 practices in the former Northern Regional Health Authority on application of the criteria.

Criterion	Standard	% of 518 practices achieving standard
Generic prescribing		
Overall rate (%)	*<40*	*29*
	40–55	*47*
	55–70	*20*
	⩾70	*3*
Drug choice within a therapeutic group		
Frusemide and bendrofluazide (as % of *BNF* section 2.2 drugs)	*⩾55*	*17*
Atenolol and propranolol (as % of *BNF* section 2.4 drugs)	*⩾75*	*34*
Amitriptyline, dothiepin, imipramine and lofepramine (as % of *BNF* section 4.3 drugs)	*⩾75*	*25*
Twelve antibacterials[a] (as % of *BNF* section 5.1 drugs)	*⩾90*	*20*
Diclofenac, ibuprofen, indomethacin and naproxen (as % of *BNF* section 10.1.1 drugs)	*⩾80*	*16*
Drugs of limited clinical value		
Diuretic–potassium combinations (*BNF* section 2.2.8)	⩽0.6 items/100 PUs per year	*11*
Cerebral and peripheral vasodilators (*BNF* sections 2.6.3/2.6.4)	⩽0.6 items/100 PUs per year	*9*
Compound antidepressants[a] (*BNF* section 4.3.3)	⩽2 items per year	*24*
Appetite suppressants (*BNF* section 4.5)	⩽2 items per year	*18*
Topical NSAIDs (*BNF* section 10.3)	⩽2.88 items/100 PUs per year[b]	*10*
Prescribing volume		
Benzodiazepines	⩽5.59 DDD/PU per year[c]	*31*
Lorazepam	⩽0.0559 DDD/PU per year[d]	*12*

BNF = British national formulary.[6] PU = prescribing unit. NSAID = non-steroidal anti-inflammatory drug. DDD = defined daily doses. [a]See Appendix 1 for details. [b]10th centile of regional range. [c]Lowest family health services authority rate in region. [d]1% of overall benzodiazepine standard.

by a unanimous decision; the group had little difficulty achieving unanimity of opinion.

For all the criteria except generic prescribing, it was agreed that each practice would be allocated a score of one if the standard was achieved and zero otherwise. Each of these 12 standards was achieved by at least 9% of practices (Table 1). The highest achievement rate was 34% for the beta-blocker (atenolol and propranolol) criterion. However, the group felt that the level of generic prescribing could be stratified, and chose to allocate a score of minus one for generic prescribing rates below 40%, zero for 40% to 55%, one for 55% to 70% and two for 70% and above; the negative mark was allocated since it was felt by the group that this level of generic prescribing was an indicator of poor quality. Thus, possible total practice scores, for all the criteria, ranged from minus one to 14. The frequency distribution of total scores over 518 practices is shown in Figure 1. There was a wide distribution of scores and the distribution was skewed to the left. No practice achieved the maximum score of 14 and only a few achieved a score of eight or more. The median score for the skewed distribution was two.

Pairwise correlations were used to assess the relationships between individual criteria. Rank correlation coefficients were calculated from the actual practice prescribing rates for criteria, rather than from the scores assigned to these rates. With the exception of the pairing of generic prescribing and the numbers of prescriptions for compound antidepressants (Spearman's rho (ρ) = –0.15), all the possible pairs of criteria had positive rank correlation coefficients. The highest correlation (ρ = 0.53) was between the prescribing rates for benzodiazepines overall and those for lorazepam, but, interestingly, the two criteria relating to antidepressant prescribing (selected tricyclic antidepressants as a proportion of total antidepressants, and overall prescribing of compound antidepressants) were not significantly correlated (ρ = 0.09).

Application of standards

Relationships between prescribing indicator scores and other practice characteristics were examined. Practices were allocated to one of three scoring bands: low scoring prescribers, scoring less than one; average scoring prescribers, scoring one to four; and high scoring prescribers, scoring five and over (Table 2). Of the 518 practices, 27% were low scoring prescribers, 56% were average scoring prescribers and 17% were high scoring prescribers.

A smaller proportion of fundholding practices than non-fundholding practices were low scoring, 13% versus 28%, but the proportion of practices scoring five or more was similar for fundholding and non-fundholding practices and the distributions across low, average or high scores were not significantly different. Non-fundholding practices were more likely than fundholding practices to meet the standard for compound antidepressants (chi square (χ^2), 1 degree of freedom (df), $P<0.05$). Fundholding practices had higher scores for generic prescribing rates than non-fundholding practices (χ^2, 3 df, $P<0.05$).

There was no difference in the distribution across low, average or high scores between dispensing and non-dispensing practices (Table 2). Dispensing practices had lower scores for generic prescribing than non-dispensing practices (χ^2, 3 df, $P<0.05$) but were more likely to meet the standards for the prescribing of frusemide and bendrofluazide, lorazepam, compound antidepressants, and topical non-steroidal anti-inflammatory drugs (χ^2, 1 df, $P<0.05$ for each).

Table 3 shows the relationship between net ingredient cost per prescribing unit for April 1992 to March 1993 and practices' total scores. Although the costs were generally lower for high scoring practices, the cost distributions within each score group overlapped substantially. Some high scoring practices had relatively high prescribing costs and a few practices with scores of minus one or zero had low prescribing costs.

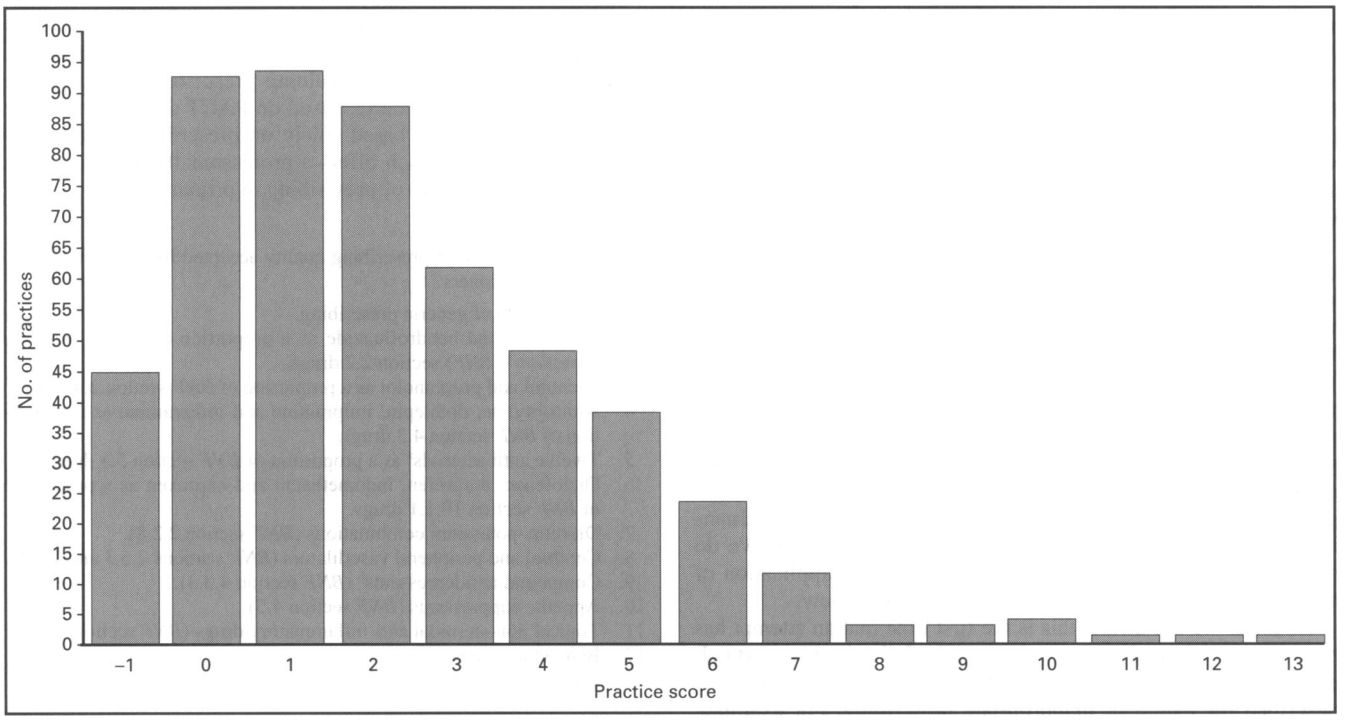

Figure 1. *Frequency distribution of practice scores, for 13 prescribing criteria, over 518 practices.*

There was an almost fivefold variation between individual family health services authorities in the proportion of practices achieving a total score of five or more (Table 2). There were also marked variations in the proportion of practices within different family health services authorities which attained particular standards. For example, in Cumbria, which had a smaller proportion of practices with low scores than the region overall, the proportion of practices that achieved the standard for cerebral and peripheral vasodilators was less than one eighth of the proportion in the region as a whole, whereas for the criterion for the prescribing of frusemide and bendrofluazide the proportion achieving the standard was more than twice the proportion in the region.

Table 2. Distribution of practice prescribing indicator scores, by practice characteristics and by family health services authority (FHSA).

	% of practices within prescribing scoring band[a]		
Practice characteristic/FHSA	−1 or 0	1–4	5–14
Characteristic			
Fundholding (*n* = 40)	*13*	*70*	*18*
Non-fundholding (*n* = 478)	*28*	*55*	*17*
Dispensing (*n* = 84)	*30*	*52*	*18*
Non-dispensing (*n* = 434)	*26*	*57*	*17*
FHSA			
Cleveland (*n* = 88)	*31*	*58*	*11*
Cumbria (*n* = 97)	*18*	*65*	*18*
Durham (*n* = 84)	*39*	*49*	*12*
Northumberland (*n* = 51)	*25*	*47*	*27*
Gateshead (*n* = 34)	*15*	*65*	*21*
Newcastle (*n* = 46)	*11*	*50*	*39*
North Tyneside (*n* = 36)	*31*	*56*	*14*
South Tyneside (*n* = 30)	*23*	*63*	*13*
Sunderland (*n* = 52)	*38*	*54*	*8*

n = number of practices with characteristic/in FHSA. [a]Scoring bands: −1 or 0, low scoring prescribers; 1–4, average scoring prescribers; ≥5, high scoring prescribers.

Discussion

It has been possible, with a consensus group of general practitioners, using PACT data and a specialist resource, to select criteria of prescribing quality and set numeric standards of performance. The criteria selected appear valid since there is considerable overlap between the standards chosen by general practitioners in this study and those proposed by other groups external to the medical profession, such as the Audit Commission[2] (which published its report after completion of this work). However, our group rejected several commonly suggested markers of prescribing quality, particularly those involving ratios, whose use, without consideration of absolute prescribing rates, was felt to be inappropriate. Thus for asthma, where the ratio of inhaled

Table 3. Net ingredient cost (NIC) per prescribing unit (PU) for 518 practices, by practice prescribing scoring band, for April 1992 to March 1993.

	No. of practices within prescribing scoring band		
NIC/PU(£)	−1 or 0	1–4	5–14
<30	0	4	2
30–35	1	3	5
35–40	1	27	26
40–45	14	63	31
45–50	22	95	19
50–55	39	60	2
55–60	26	28	2
60–65	20	8	1
65–70	5	2	1
70–75	4	0	0
>75	6	1	0

steroids to bronchodilators has been proposed as an indicator of prescribing quality,[2] there is no agreement about how much prescribing meets the needs of asthmatic patients; prescribing patterns are changing markedly, and at least some of the variation in prescribing rates is a result of practice demographics, data for which are not included in PACT data. Similar concerns also apply to, for example, H_2-antagonist ratios and prescribing frequency of simple analgesics.

The method used to develop the criteria and standards was that of informal consensus within a resourced group. Consensus methods, either as conferences or Delphi surveys, have been criticized for lacking a formal decision making structure[8] and for having their outcome influenced by their panel composition.[9,10] We dealt with the first of these issues by requiring unanimity within the group on the choice of criteria and standards and the second by convening a group of practising general practitioners so that decisions on general practice prescribing were being made by a peer group. This, and the discussions within the group, have resulted in the criteria having face validity. Unanimity could have resulted in the setting of weak targets. We do not, however, believe this to be the case, and the application of the standards to the regional dataset supports this view.

As far as we are aware, this is the first time that an attempt has been made to set and apply professionally derived numeric standards of prescribing performance. Some studies have, however, described the extent of inappropriate prescribing. For example, Catford found that 42% of a sample of 72 general practitioners in Wessex had, as defined by explicit criteria, prescribed a 'hazardous' or 'undesirable' drug for children in a single month.[11] In 778 patients with asthma or obstructive lung disease in the Netherlands who were studied for a year, almost 2% received ephedrine or a combination of isoprenaline and cromoglycate, both of which treatments were deemed inappropriate.[12] In addition, 258 patients (33%) received oral corticosteroids, of whom 69 were not already receiving inhaled steroids. No numeric quality standards were applied in these studies, which were not designed to define an acceptable, or appropriate, prescribing rate.

We are aware that individual general practitioners may take issue with particular standards set by the group in this study. By allocating a simple scoring system we have given equal weight to all the criteria apart from generic prescribing; this may be an oversimplification. Some therapeutic areas, for example prescribing of diuretics, benzodiazepines, antidepressants and non-steroidal anti-inflammatory drugs provide two standards. In each of these areas, the group developed one standard that they felt reflected good prescribing (the choice of drugs) and one standard that they felt reflected poor prescribing (drugs of limited clinical value). We therefore believe that the presence of more than one standard in the same therapeutic area adds robustness to the assessment, by reducing the risk of a misleading evaluation of individual practices who have idiosyncratic prescribing patterns in one area but score well in others. Results from this study indicate that net ingredient cost per prescribing unit alone cannot be used as a guide to prescribing quality, although the costs for practices with high prescribing indicator scores were generally lower than for low scoring practices.

As they were developed by general practitioners for use with PACT data the criteria are widely applicable. The numeric standards, however, which were set for the former Northern Regional Health Authority may require adaptation to take account of different local or regional population needs and therefore of prescribing patterns. Similarly, the numeric standards were set using prescribing data for the period 1992–93 and are based on drug usage according to contemporary clinical standards and the range of available therapies; any changes in these will need to be reflected by adjustment of the standards used. Nevertheless, by providing a range of criteria across a variety of therapeutic areas, we believe it is possible to evaluate prescribing performance according to agreed standards based on PACT data, and to move away from judgements based solely on prescribing cost or volume. This novel approach offers a professionally driven method for assessing the quality of prescribing in primary care.

Appendix 1. Criteria of prescribing quality accepted by consensus group of general practitioners.

1. Overall rate of generic prescribing.
2. Frusemide and bendrofluazide as a proportion of *British national formulary*[6] (*BNF*) section 2.2 drugs.
3. Atenolol and propranolol as a proportion of *BNF* section 2.4 drugs.
4. Amitriptyline, dothiepin, imipramine and lofepramine as a proportion of *BNF* section 4.3 drugs.
5. Twelve antibacterials[a] as a proportion of *BNF* section 5.1 drugs.
6. Diclofenac, ibuprofen, indomethacin and naproxen as a proportion of *BNF* section 10.1.1 drugs.
7. Diuretic–potassium combinations (*BNF* section 2.2.8).
8. Cerebral and peripheral vasodilators (*BNF* sections 2.6.3 and 2.6.4).
9. Compound antidepressants[b] (*BNF* section 4.3.3).
10. Appetite suppressants (*BNF* section 4.5).
11. Topical non-steroidal anti-inflammatory drugs (*BNF* section 10.3).
12. Benzodiazepines.
13. Lorazepam as a proportion of all benzodiazepines.

[a]Amoxycillin, ampicillin, cephalexin, co-amoxiclav, erythromycin, flucloxacillin, metronidazole, nitrofurantoin, oxytetracycline, phenoxymethylpenicillin, tetracycline and trimethoprim. [b]Combinations of amitriptyline and perphenazine, nortriptyline and fluphenazine, and tranylcypromine and trifluoperazine.

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Acknowledgements

We thank the members of the consensus group for their hard work and enthusiasm. We are grateful to the Prescription Pricing Authority for sup-

plying prescribing data and to Gary Romain for technical help. We thank the Northern Regional Health Authority for funding this project and Dr T van Zwanenberg (formerly director of primary care, NRHA) for helpful discussion.

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