

INFLUENCING PRESCRIBING IN A PRIMARY CARE LED NHS

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**A review of the
management of prescribing
and findings from the
MANMED survey**

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GLOSSARY

ACEI	Angiotensin converting enzyme inhibitor
ADQ	Average Daily Quantity
AMQ	Average Monthly Quantity
ASTRO-PU	Age, Sex, Temporary Residents Originated Prescribing Unit (introduced in 1993, more age bands than PU. Readjusted in 1997)
Capitation target	The 'fair share' amount of the PCG prescribing budget for a single practice, based on factors such as deprivation, patient age and sex
CB&A	Controlled before-and-after study
CNS	Central Nervous System
CPN	Community Psychiatric Nurse
CVS	Cardiovascular System
D&T committee	Drug and Therapeutics committee
DDD	Defined Daily Dose (developed by WHO; value represents assumed average maintenance dose per day for a drug used in its main indication in adults; not a recommended dose and may not be a real dose)
DH	Department of Health
DLCV	Drugs of Limited Clinical Value
EC	enteric coated
GP	general medical practitioner (primary care physician)
ITS	Interrupted time-series study
MANMED	MANagement of MEDicines (survey)
MDI	Metered Dose Inhaler
MR	Modified release
NHS	National Health Service
NHS TRUST	National Health Service Trust
NIC	Net Ingredient Cost
NICE	National Institute for Clinical Excellence
NSAIDs	Non-steroidal anti-inflammatory drugs
NSF	National Service Framework
Outturn	The final spend figure at year end
PCG	Primary Care Group
PCO	Primary Care Organisation
PCP	Primary Care Physician
PCT	Primary Care Trust
PPA	Prescription Pricing Authority

8	PPIs	Proton pump inhibitors
	PPPs	Premium Priced Preparations
	PU	Prescribing Unit (age-adjusted – over 65s count as 3 units)
	RCT	Randomised controlled trial
	STAR-PU	Specific Therapeutic group Age-sex Related Prescribing Unit (based on costs within 8 therapeutic groups, which together account for 85% prescribing in England)
	UHD	Ulcer healing drugs
	Uplift	Percentage increase on previous year's forecast outturn

EXECUTIVE SUMMARY

Introduction

- The aim of the project was to evaluate the likely success of medicines management in a primary care led UK National Health Service (NHS). The methods used to achieve this objective included a postal survey and a review of the implementation literature.
- Medicines management is a broad process concerned with optimising patient outcomes, while achieving value for money. The improvement of the quality of prescribing is a central feature of medicines management.
- Although medicines management is a relatively new concept in the NHS, policies to improve the use of medicines in the NHS are not.
- The current organisational structure for primary care in the NHS takes the form of Primary Care Groups (PCGs) and Primary Care Trusts (PCTs), collectively known as Primary Care Organisations (PCOs). These organisations have a unified budget that incorporates primary care prescribing into the overall NHS cash limit.
- About 80% of NHS expenditure on drugs is accounted for by prescriptions dispensed in the community. The focus of this report is therefore on prescribing by doctors in primary care, although influences by secondary care are also considered.

MANMED survey

- The MANMED (MANagement of MEDicines) survey was designed to explore how medicines are currently managed in the NHS in England. Prescribing advisers and prescribing leads of 329 PCOs and chief pharmacists of 275 NHS Hospital Trusts were included in the survey.
- Quality of prescribing was reported as the top priority for most PCOs, followed by budget adherence at both practice and PCO levels. It would appear that while cost considerations are important, quality is perceived as the overriding principle on which PCO prescribing strategy is based.
- There appeared to be few differences between PCGs and PCTs. One might expect PCTs to be exerting more budgetary control

over prescribing costs, but we found no evidence for this. The finding could reflect the relatively early stage in development of PCTs.

- Dissemination of information by both NHS Trusts and PCOs was very common, but most PCOs were following up with visits to both practices and to individual general practitioners (GPs), audits and feedback.
- PCOs appeared to be active in pursuing a wide range of prescribing initiatives, covering an average of seven different therapeutic areas. National targets were the main driver, but other key influences included inappropriate prescribing and clinical governance considerations.
- The most common therapeutic areas for prescribing initiatives were high volume areas – for example, proton pump inhibitors (82% of respondents) and antibacterials (76%) – or areas targeted by government guidance such as generics (76%) and statins (62%).
- With respect to decision making, the level of involvement with secondary care was very variable among PCOs. About a third of PCOs included a hospital pharmacist on their prescribing committees, and even fewer committees included a hospital consultant (7%). Nevertheless evidence from the MANMED (NHS Trust) survey suggested that most PCOs were represented on the Drug and Therapeutics committee of their local NHS Trust.
- Politics about the issuing of private prescriptions in primary care appeared to be uncommon, but where they existed they were typically informal and more likely to be organised within, rather than across practices. Informal arrangements between individual GPs also existed. Respondents generally disagreed with the view that government guidance on medicines would lead to PCO-wide policies on private prescribing.

Prescribing incentive schemes

- It is a legal requirement for all PCGs and PCTs to have and to operate a prescribing incentive scheme in which all practices must participate. PCOs must reward practices that achieve their budg-

etary target and there is discretion for PCOs to specify additional conditions, which may or may not trigger a reward.

- A request for the 2001/02 PCO prescribing incentive scheme was included in the covering survey letter to PCO prescribing advisers. Ninety-one schemes (representing 96 PCOs) were received.
- Despite government directives, there was still considerable diversity in the design of prescribing incentive schemes. Qualifying criteria, budgetary and quality targets varied and schemes covered a wide range of therapeutic areas.
- 13% of schemes had no overall budgetary target. Over 70% of the remaining schemes offered multiple practice-level budgetary targets, in line with the statutory framework. Only 4% of schemes appeared to require practices to achieve a budgetary underspend in order to qualify for any sort of reward.
- All schemes included conditions additional to any budgetary targets specified.
- Most of the 91 schemes included a target for antibacterials (76%), generics (78%), proton pump inhibitors (62%) and non-steroidal anti-inflammatory drugs (60%). Three-quarters of schemes targeted cardiovascular system medications, but fewer than half included an initiative for central nervous system drugs.
- 20% of all the indicators used were cost-based, measuring either expenditure, net ingredient cost or 'spend'. Volume-based indicators, measuring the number of items, were similarly popular (25%).
- There was great variation in prescribing incentive schemes issued by PCOs in terms of the content of targets and consequent requirements for data placed upon general practitioners.

Literature review

- A review of the literature on medicines management examined findings from systematic reviews, studies based in the UK and promotional literature.
- Despite a vast literature on methods of changing professional practice, the evidence on the effectiveness of most prescribing initiatives was limited and leaves important questions unanswered.

- Dissemination of information alone is usually ineffective in modifying prescribing behaviour, although it may be a necessary part of the management process. Multifaceted interventions generally appear to be more effective than single interventions.
- Evidence from studies conducted in the UK indicates that audits of various types and outreach visits (academic detailing) are the most promising approaches. The fundholding literature suggests that greater financial autonomy for general practitioners has some impact on prescribing costs.
- Although performance management and financial incentives are techniques commonly employed in the NHS, their effectiveness does not appear to have been systematically evaluated.

Discussion

- Recent NHS reorganisation has imposed multiple quality initiatives upon PCOs and hospitals through National Service Frameworks (NSFs), guidance from the National Institute of Clinical Excellence (NICE) and local priority setting.
- Although there is consistency in the general approach to the management of prescribing in primary care, PCOs are responding variably to these initiatives in terms of the specific policies they pursue. For example, the level of response for any type of national guidance cited in the MANMED survey ranged from no action to nine types of action.
- In the light of such variations in response by PCOs to central guidance, health policy makers may need to give consideration to the capacity of these organisations to accommodate further change.
- While prescribing incentive schemes appear to be broadly similar, differences in detail may mean that schemes vary in their ability to incentivise prescribing behaviour.
- Improved quality of prescribing is more important to most respondents than staying within budget. This is reflected in the prescribing incentive schemes, most of which allow rewards to be earned without keeping within budget.
- Implementation research provides general insights into the different strategies available for influencing prescribing behaviour.

However, the factors determining effectiveness remain unclear.

- Given the diverse and complex nature of medicines management currently found within the NHS, it may prove difficult to interpret the findings of implementation research, even if carefully designed.
- Given our lack of knowledge about what works, and the need for local ownership of initiatives, government should resist the temptation to impose too rigid a framework for local medicines management, in particular by becoming more prescriptive as to the content of prescribing schemes.
- Rather, government should play a key role in ensuring that lessons are learned as to what interventions do and do not appear to be effective. This could be achieved partly by commissioning structured research, and partly by ensuring that experiences of good and bad practice are shared within the NHS and the wider research community.
- PCOs need to think through how to handle NICE appraisal guidance that restricts the use of medicines to a subset of patients for whom it is both effective and cost-effective.

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- *The aim of the project was to evaluate the likely success of medicines management in a primary care led UK National Health Service (NHS). The methods used to achieve this objective included a postal survey and a review of the implementation literature.*
- *Medicines management is a broad process concerned with optimising patient outcomes, while achieving value for money. The improvement of the quality of prescribing is a central feature of medicines management.*
- *Although medicines management is a relatively new concept in the NHS, policies to improve the use of medicines in the NHS are not.*
- *The current organisational structure for primary care in the NHS takes the form of Primary Care Groups (PCGs) and Primary Care Trusts (PCTs), collectively known as Primary Care Organisations (PCOs). These organisations have a unified budget that incorporates primary care prescribing into the overall NHS cash limit.*
- *About 80% of NHS expenditure on drugs is accounted for by prescriptions dispensed in the community. The focus of this report is therefore on prescribing by doctors in primary care, although influences by secondary care are also considered.*

1.1 Objectives

The aim of the project was to evaluate the likely success of medicines management in a primary care led NHS. To understand the current influences in the NHS on the quality and cost of medicines prescribing, the MANMED (MANagement of MEDicines) survey was sent to PCOs and NHS Hospital Trusts in England. To determine what types of strategies are most likely to be most effective, a review of the implementation literature¹ was undertaken. Findings from the literature were then used to assess these current strategies in medicines management, and by identifying the strengths and weaknesses of these influences, implications for medicines management have been explored.

The focus of the survey findings reported here is on influences on doctors at the primary care level. Findings from the MANMED

¹ Implementation research is 'the scientific study of methods to promote the uptake of research findings, and hence to reduce inappropriate care' (Foy et al., 2001).

(PCO) survey are reported fully, but those from the MANMED (NHS Trust) survey are reported only where they provide an insight or a perspective on PCO activity.

1.2 What is medicines management?

Medicines management has been defined as:

‘encompassing the entire way that medicines are selected, procured, delivered, prescribed, administered and reviewed to optimise the contribution that medicines make to producing informed and desired outcomes of patient care’ (adapted from the Audit Commission (Audit Commission, 2001))

The principal goals of medicines management include (National Prescribing Centre and NPCRDC, 2002):

- reshaping care around the patient (for example to achieve better concordance between health care professionals and to improve patient compliance);
- improving the quality of prescribing by setting national standards (via National Service Frameworks – NSFs) and by giving guidance (via the National Institute for Clinical Excellence – NICE), and by seeking to reduce the risk of error through clinical governance initiatives;
- making more efficient use of NHS medical, pharmacy and nursing skills.

Medicines management is also about getting value for money. Over the last three decades, expenditure on medicines has increased in real terms by almost five-fold and currently forms about 12% of all NHS expenditure (Yuen, 2001). For the last decade, the rate of increase has averaged almost 9% annually, well above the level of inflation. Reasons for this trend include both rising unit costs per prescription (due to the development and adoption of new and more expensive treatments) and also rising volumes per capita (reflecting the changing demographic composition of the population and the availability of therapies for conditions that were previously not identified or treated, or which required more expensive non-pharmaceutical

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16 medical interventions) (Audit Commission, 2001). Whilst there is much evidence that pharmaceutical treatment is cost-effective, and evidence of the underutilisation of cost-effective treatments, there is also evidence of waste and of poor quality prescribing.

About 80% of NHS expenditure on drugs is accounted for by prescriptions dispensed in the community (Audit Commission, 1994) and the focus of this report is on how community prescribing is managed in England. Only prescribing by doctors in general practice is considered, but influences from secondary care are also assessed where these shed light on community prescribing. Other aspects of medicines management in the community sector are discussed in the Department of Health document 'Pharmacy in the Future' (Department of Health, 2000b) and in the hospital sector in the Audit Commission Report 'A Spoonful of Sugar' (Audit Commission, 2001).

1.3 Background

Medicines management is a relatively new concept in the NHS, but policies to improve the use of medicines in the NHS are not. We briefly comment on some of the key publications and policy initiatives from the last two decades.

1.3.1 The Greenfield Report

The Greenfield Report in 1982 proposed that effective prescribing should include not only prescribing of appropriate medication but also consideration as to whether the use of medicines is necessary at all (Greenfield, 1982). Furthermore it recommended:

- provision of information on their own prescribing to general medical practitioners (GPs);
- Regional Medical Officers visiting GPs with very high prescribing costs;
- providing funding for doctors to receive the 'British National Formulary', 'Prescribers Journal' and the 'Drug and Therapeutics Bulletin';
- a common approach to prescribing by hospital and family doctors

by the more widespread establishment of local Drug and Therapeutics Committees (D&T Committees) with GP participation and the production of local formularies;

- promotion of ‘generic prescribing’ by GPs;
- strengthening undergraduate and postgraduate training of doctors in pharmacology and therapeutics;
- educating patients on appropriate expectation and use of medicines.

Many of these recommendations were acted upon – notably in the development of Prescription Analysis and Cost (PACT) data in 1988 to provide GPs with information on their prescribing costs and in the promotion of generic prescribing.

1.3.2 GP fundholding

The 1990 National Health Service and Community Care Act introduced an ‘internal market’ with GPs having the option of becoming fundholders. GP practices could manage their budget for practice staff, certain hospital referrals, drug cost, community nursing services and management costs (Department of Health, 1997). GP practices that did not become fundholders were given annual Indicative Prescribing Amounts by their Health Authorities and required to join an Indicative Prescribing Scheme. The rationale for the scheme was clear:

‘It is generally recognised that some prescribing is wasteful or unnecessarily expensive. The objective of the new arrangements is to place downward pressure on expenditure on drugs in order to eliminate this waste and to release resources for other parts of the Health Service’ (NHS Review, 1989).

The evidence suggests that fundholding practices did have lower prescribing costs through ‘the employment of one or more of a relatively narrow and well established techniques increased generic prescribing, limitations on prescription volume, the use of practice formularies and the receipt of improved prescribing information.’ (Baines et al., 1997). However, after an initial effect ‘the growth of prescribing expenditure ..reverted to trend thereafter.’ We discuss the literature on incentives in section 3.3.3.

1.3.3 The Audit Commission Report: 'A prescription for improvement'

An independent review on rational prescribing by GPs was produced by the Audit Commission in 1994 (Audit Commission, 1994). Many of the recommendations highlighted in the Greenfield Report were reiterated. In addition the following recommendations were made:

- use of incentive schemes to encourage rational prescribing;
- audit by GP practices of the reasons for prescribing decisions;
- promotion of practice formularies and clinical guidelines;
- local prescribing advisors to visit each GP practice to focus on prescribing issues;
- utilise the skills of community pharmacists on advising GPs on choices of medicines;
- target groups of medicines that are deemed to be inappropriate.

Furthermore Audit Commission suggested that up to 40% of prescribing by GPs might be strongly influenced by hospitals. The report recommended that financial incentives relating to the costs of medicines between hospitals and primary care should be aligned, with primary care exerting more influence on the element of hospital prescribing that impacted it.

1.3.4 Department of Health Consultation Document: 'A first class service'

There are numerous quality initiatives – both local and national – that also influence prescribing. The most important of these are the National Service Frameworks (NSFs) and the decisions of the National Institute for Clinical Excellence (NICE). NSFs and NICE were introduced as part of a quality framework along with clinical governance and the Commission for Health Improvement by the 1998 consultation document 'A First Class Service' (Department of Health, 1998a). The objective was to introduce national standards for the quality of clinical care and local mechanisms for monitoring whether or not this quality was being delivered. A strong motivation for the setting of national standards was to move away from 'post code prescribing' whereby access to some expensive treatments varied around the NHS as Health Authorities, NHS Trusts and GP practices in dif-

ferent parts of the NHS made their own local decisions about availability.

1.4 Primary Care organisations

Primary Care Organisations (PCOs) – which encompass both Primary Care Groups (PCGs) and Primary Care Trusts (PCTs) – were New Labour’s centrepiece of a restructured NHS. While GP fundholding was acknowledged to have achieved a limited degree of decentralisation, benefits were perceived to be associated with inequality of access. GP fundholding in its various forms was consequently abolished. The concept of, and rationale for, PCGs and PCTs, the government’s replacement for fundholding, were introduced in the 1997 White Paper ‘The New NHS’ (Department of Health, 1997). In April 1999, 481 PCGs were created in England and covered all GPs, practice and community nurses. Governed by a Board that included lay members, local GPs, nurses and representatives from social services and from the local health authority, PCGs were designed to fulfil the following functions:

- contribute to Health Authorities’ Health Improvement Programmes;
- promote the health of the local population;
- commission health services;
- monitor the performance of services provided by NHS Trusts;
- develop primary care and help integrate this with community care and social services.

PCGs would move away from the fundholding concept of the previous administration and be responsible for resource management across the local health communities. The government intended that these PCGs would develop over time to become freestanding bodies, responsible for commissioning care and for providing community health services. These freestanding bodies were to be known as Primary Care Trusts (PCTs).

Alongside this new structure for decision making in primary care, the funding arrangements for PCOs were also restructured. Unified PCO budgets were introduced, incorporating primary care prescribing

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into the overall NHS cash limit – previously, only the medicines expenditure of fundholding GPs had been within the cash limit. Instead, the new unified PCO budgets were intended to decentralise power, resources and responsibility to the ‘front line’ of the NHS (Department of Health, 2002a). NHS prescribing expenditure in primary care was to be controlled by merging it into a cash limited stream that included Hospital and Community Service budgets, prescribing costs of GPs and nurses and the General Medical Services cash-limited budget, which covers general practice infrastructure. Not only is prescribing the most flexible of these three elements, but at least 20% of PCT funds are spent on medicines and medicines services (National Prescribing Centre and NPCRDC, 2002). How well PCOs manage medicines may therefore determine their overall financial health and success.

2 METHODS

2.1 MANMED surveys

2.1.1 Design

To investigate the methods currently used in England to manage prescribing in the NHS, a set of three surveys was designed. The professional groups targeted included chief pharmacists of NHS (Hospital) Trusts; PCG or PCT prescribing advisers; and PCG or PCT prescribing leads. Questions from existing surveys were considered and included if requested by the authors, modified where appropriate. The name 'MANMED' (MANagement of MEDicines) was chosen as an easily intelligible acronym for the survey. Following revisions, surveys were piloted in April 2001. The survey was mailed at the end of May 2001, with reminders sent out over July, August and September. An incentive to respond was offered: respondents were promised an advance copy of the report and also offered the opportunity to participate in a prize draw. Further details of the survey sample and its relation to the population of PCOs and NHS Trusts can be found in Appendices 1 and 2.

2.1.2 Response rates

Response rates for the 329 PCOs and 275 NHS Hospital Trusts included in the MANMED survey are shown below.

Prescribing Advisers (PA):	153	(46%; N=332 ²)
Prescribing Leads (PL):	128	(39%; N=329)
Combined PA /PL responses:	220	(66%; N=332)
Hospital Pharmacists:	157	(57%; N=275)

Responses from prescribing advisers and prescribing leads were combined where appropriate. An additional 44 responses from Tracker organisations were included for a question on prescribing initiatives. For further details of response rates, see Appendix 2 (Table A2.1).

2 To avoid the risk of exacerbating 'survey fatigue', 71 PCOs participating in the National Tracker survey (NPCRDC and Kings Fund, 2000) were excluded from the MANMED survey. However, a MANMED survey was inadvertently sent to three of these, two of which had independently merged with other PCOs and become part of newly established organisations.

22 2.2 Prescribing incentive schemes

All PCO prescribing advisers were asked for a copy of the current prescribing incentive scheme, with the assurance these would be treated in strict confidence. It became apparent that many of the PCOs would not have a prescribing incentive scheme for 2001/02 in place when the MANMED survey was first mailed. Owing to problems with generic prices, the Prescription Pricing Authority (PPA) was approximately five months in arrears in issuing the 'outturn' (final spend) data for 2000/01, thus delaying information needed to draw up the schemes. In October, a repeat request for schemes was sent to those prescribing advisers who had previously indicated that their scheme had not yet been finalised. The background to the introduction of prescribing incentive schemes was researched and information from the schemes obtained from the MANMED (PCO) survey was extracted and tabulated.

2.3 Literature review

There is a large literature on the interventions used to influence physicians' prescribing behaviour (NHS Centre for Reviews and Dissemination, 1999). A systematic review of the literature was beyond the scope of this project and so we decided to limit the review. The review focussed on evidence from systematic reviews of implementation studies published over the last 20 years. In addition, UK based studies that focussed on changing prescribing behaviour were identified from reference lists of these reviews. Searches of the both the mainstream and 'grey' literature for more recently published reports were also conducted, including those relating to techniques currently or recently employed in the NHS such as benchmarking. Lastly, references on promotional techniques used by the pharmaceutical industry were retrieved.

The search strategies outlined in Appendix 3 produced 1,377 hits. A summary of the reviews included in the report is tabulated below.

Using these sources, studies that considered changes in prescribing behaviour and that were conducted in the UK were identified.

Table 1 **Overviews and systematic reviews included in the report**

Type of review	Focus of review	No. of reviews	References
Overviews of systematic reviews	Changing professional practice	3	(NHS Centre for Reviews and Dissemination, 1999; Grimshaw et al., 2001; Bero et al., 1998)
Systematic reviews from the Cochrane database	Changing professional practice	16	(Thomson O'Brien et al., 2001b; Thomson O'Brien et al., 2001a; Gosden et al., 2001; Walton et al., 2001; Thomson O'Brien et al., 2001; Thomson O'Brien et al., 2001c; Thomson O'Brien et al., 1999; Hunt et al., 1998; Beney et al., 2001; Zwarenstein et al., 2001; Hulscher et al., 2001; Thomson O'Brien et al., 2001d; Grilli et al., 2001; Bower and Sibbald, 2001; Freemantle et al., 2001; Giuffrida et al., 2001)
Other systematic reviews	Changing prescribing behaviour	4	(Soumerai et al., 1989; Gurwitz et al., 1990; Anderson and Lexchin, 1996; Gill et al., 1999)

Recently published trials were also identified from the searches outlined above. To be included in the report, studies had to be either randomised controlled trials (RCTs), or designed as a controlled before-and-after (CB&A) study or as an interrupted time-series (ITS) study. In total, 39 such studies were identified, covering educational interventions (15 studies), audit and performance management (7) and financial incentives or practical support (17). Most were set in England (82%) and 35 studies covered primary care in the community. Two studies covered both primary and secondary care, addressing the effect of hospital discharge plans (Smith et al., 1997; Nazareth et al., 2001). The remaining two studies were purely hospital-based (Al

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24 Eidan et al., 2000; Huang et al., 2000). Details of the UK studies are reported in Appendix 4. Other studies or reviews addressing techniques currently or recently employed in the NHS were retrieved. No reference on promotional techniques used by the pharmaceutical industry in the UK was found, and so the US literature was referenced instead.

3 RESULTS

3.1 MANMED survey

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- *The MANMED survey was designed to explore how medicines are currently managed in the NHS in England. Prescribing advisers and prescribing leads of 329 PCOs and chief pharmacists of 275 NHS Hospital Trusts were included in the survey.*
- *Quality of prescribing was reported as the top priority for most PCOs, followed by budget adherence at both practice and PCO levels. It would appear that while cost considerations are important, quality is perceived as the overriding principle on which PCO prescribing strategy is based.*
- *There appeared to be few differences between Primary Care Groups (PCGs) and Primary Care Trusts (PCTs). One might expect PCTs to be exerting more budgetary control over prescribing costs, but we found no evidence for this. The finding could reflect the relatively early stage in development of PCTs.*
- *Dissemination of information by both NHS Trusts and PCOs was very common, but most PCOs are following up with visits to both practices and to individual GPs, audits and feedback.*
- *PCOs appeared to be active in pursuing a wide range of prescribing initiatives, covering an average of seven different therapeutic areas. National targets were the main driver, but other key influences included inappropriate prescribing and clinical governance considerations.*
- *The most common therapeutic areas for prescribing initiatives were high volume areas – for example, proton pump inhibitors (82% of respondents) and antibacterials (76%) – or areas targeted by government guidance such as generics (76%) and statins (62%).*
- *With respect to decision making, the level of involvement with secondary care was very variable among PCOs. About a third of PCOs included a hospital pharmacist on their prescribing committees, and even fewer committees included a hospital consultant (7%). Nevertheless evidence from the MANMED (NHS Trust) survey suggested that most PCOs were represented on the Drug and Therapeutics committee of their local NHS Trust.*
- *Arrangements for issuing private prescriptions in primary care appeared to be uncommon, but where they existed they were typically informal and more likely to be organised within, rather than between,*

practices. Informal arrangements between individual GPs also existed. Respondents generally disagreed that government guidance on medicines would lead to a PCO policy on private prescribing.

In this section, we report on how medicines are managed in a primary care led NHS, using findings from the MANMED survey. We describe who is managing medicines; the prescribing priorities reported by respondents; and the prescribing initiatives that PCOs are currently pursuing. In the latter section, the therapeutic areas covered and the primary reasons for the pursuit of these initiatives are outlined. PCO responses to particular guidance from NICE and to particular National Service Frameworks are then considered. The balance between government guidance and clinical freedom is considered and the implications for private prescribing are explored. Finally, the tools used to manage medicines in primary care are described.

3.1.1 Who is managing medicines?

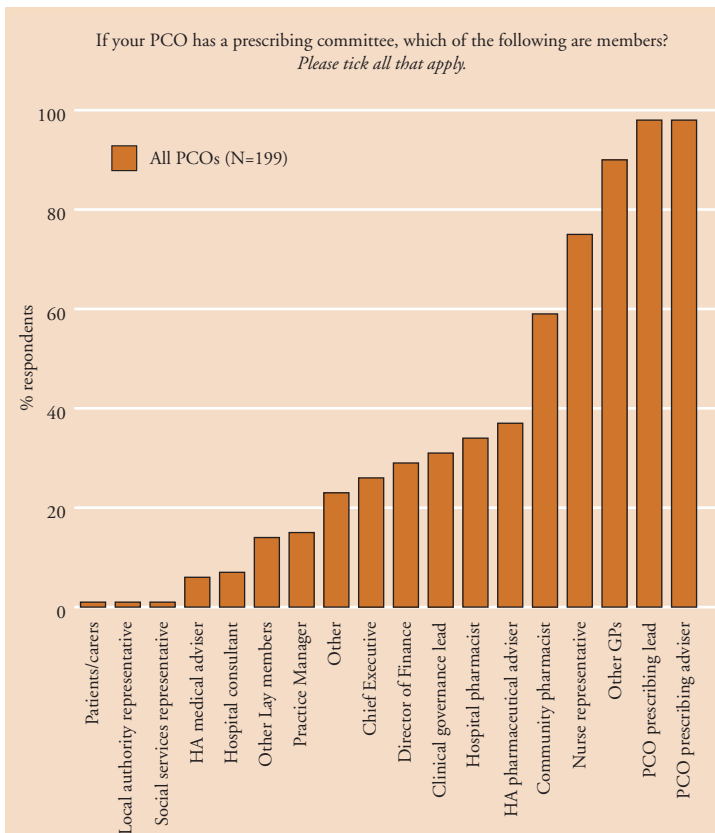
In this section we report on PCO prescribing committees. We give details of committee membership and consider links between primary and secondary care.

- Nine out of ten PCO respondents indicated that their organisation had a prescribing committee. A graphical presentation of the membership of these committees is given in Figure 1.
- None of the 20 PCOs without a prescribing committee differed from the sample in terms of regional distribution or in the proportion of PCG/Ts; however seven of the eight PCTs without a prescribing committee had undergone re-organisational change in 2001, a finding that was not mirrored by PCGs.
- Almost all PCOs with a prescribing committee included the prescribing adviser, a prescribing lead and 'other' GPs as members.
- Differences in the composition of the PCG and PCT committees were not statistically significant at the 5% level (Total χ^2 (2xk), $p = 0.074$).
- Three-quarters of all PCOs had a nurse representative on the committee; a higher proportion of PCTs (81%) than PCGs (71%) reported nurse membership.
- About one-quarter of prescribing committees included the Chief

Executive of the PCO board, and this was more common in PCGs than in PCTs (33% vs. 14%).

- PCTs were also less likely than PCGs to include a Health Authority pharmaceutical adviser (29% vs. 43%) or Health Authority medical adviser (5% vs. 6%) on the committee.
- PCTs were more likely than PCGs to have a community pharmacist (69% vs. 53%), a hospital pharmacist (40% vs. 30%) or a hospital consultant (10% vs. 5%). The clinical governance lead (42% vs. 25%) and lay members (19% vs. 12%) were also more com-

Figure 1 PCO prescribing committee membership



mainly reported as members of PCT prescribing committees.

Assuming that only one of each type of individual was on the committee, the average number of members was 6.4 (95%CI: 6.2-6.7). PCTs had more members on average than PCGs on their prescribing committees, but the difference was not significant at the 5% level (unpaired Student's t test, two sided, $p = 0.063$).

The finding that on average 34% of PCOs had a hospital pharmacist on the prescribing committee may be related to findings from the MANMED (NHS Trust) survey. With about 400 PCOs in England in 2001/02, and assuming that respondents are representative of all PCOs, then we would expect about 136 hospital pharmacists to be members of PCO prescribing committees. With about 280 NHS Hospital Trusts in England in 2001/02, we would expect about 48.6% ($= 0.34 \times 400/280$) of these organisations to have one of their pharmacists sitting on a PCO prescribing committee. The finding from the MANMED (NHS Trust) survey was actually 48.1%.

We did not ask PCO prescribing advisers and prescribing leads about their participation in NHS Trust Drug and Therapeutics (D&T) committees, but 68% of respondents from the MANMED (NHS Trust) survey reported that their D&T committee included an average of two PCO prescribing representatives (range: one to six). Assuming that the survey findings are representative of the country as a whole, this would imply that almost all (94%) PCOs are represented on a local NHS Trust D&T committee. Responding NHS Trusts with acute hospitals were most likely to include PCO representatives (83%, $N=103$) and those with community hospitals were least likely (5%, $N=37$). Half of Trusts with teaching hospitals and almost two-thirds of those with mental health hospitals included a PCO representative on their Trust D&T committee.

3.1.2 PCO prescribing objectives

- All respondents answered the question on prescribing objectives, but only 186 (85%) specified a priority ordering. These respondents represented equal proportions of PCGs (85%) and PCTs (84%). Responses are shown in Table 2.
- Two-thirds of the 186 respondents who specified a priority order

cited the improvement of prescribing quality as the number one priority, and all but two respondents included it in their top three prescribing objectives.

- Adherence to practice-level drug budgets was a priority for 85% of respondents, but was the top priority for just 15% of all respondents; staying within the PCO budget was a priority for most (80%) respondents, but making a saving on this budget was far less likely to be a priority (13%).
- Only 17 respondents (8%) reported that their top three prescribing objectives included the adherence by individual clinicians to drug budgets and just three respondents cited this as their top priority.
- PCGs and PCTs ranked the same three priorities identically and there was no statistically significant difference in the overall distribution of response between the two types of PCO (Chi-square test (2xk), $p = 0.241$).

Table 2 **PCO objectives for prescribing**

For the financial year 2001/02, what are the PCO objectives for prescribing? Please indicate the PCO's top 3 priorities, by numbering the boxes 1, 2, or 3				
Priority level	% Respondents indicating priorities			
	1	2	3	All priority levels*
N	186	186	186	220
Encourage individual clinicians to stay within budget	2%	2%	3%	8%
Encourage local practices to stay within budget	17%	32%	37%	85%
Make saving on PCO budget	3%	5%	4%	13%
Improve prescribing quality	64%	23%	12%	99%
Stay within PCO budget	17%	36%	29%	80%
Other	1%	1%	10%	15%

* i.e. those specified and unspecified.

3.1.3 PCO prescribing initiatives

3.1.3.1 *Therapeutic areas covered by PCO prescribing initiatives*

Prescribing advisers and prescribing leads were asked about any specially designed policies or initiatives for prescribing pursued. As this question was also asked of the Tracker organisations excluded from the main survey, data for this question were contributed from 257 PCOs, 64% of all PCOs in England³. Respondents were asked to indicate not just which of the 15 specific areas that were relevant, but also the primary reason for the choice, from a list of eight options and a further 'other' option. These were initiatives that may or may not have been included in the prescribing incentive scheme.

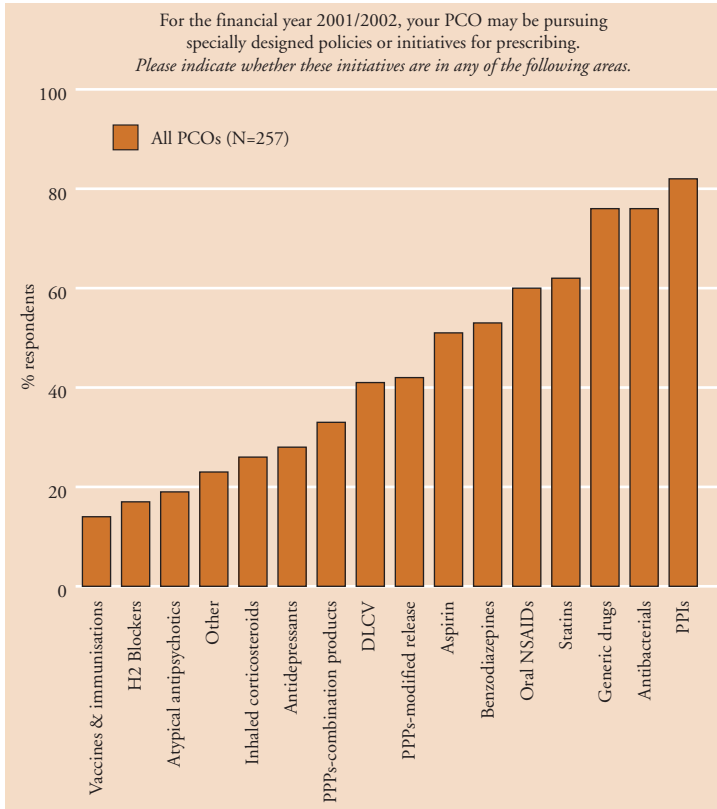
- On average, each PCO had a policy or initiative in seven different therapeutic areas (95%CI: 6.6-7.4). Responses are depicted in Figure 2.
- The most commonly cited area for prescribing initiatives or policies was proton pump inhibitors (PPIs), which was indicated by 82% of respondents. The most popular primary reasons for pursuing the initiative on PPIs were the existence of a 'national target' (31%), high prescribing cost (23%) and inappropriate prescribing (19%).
- Three-quarters of respondents reported a prescribing initiative or policy for generic drugs; policies or initiatives on antibacterials were equally popular.
- The least popular areas for prescribing policy or initiatives were vaccines and immunisations (14%) and H2 blockers (17%).
- For overall therapeutic categories there was no statistically significant difference in the distribution of response between PCTs and PCGs (Chi-square test (2xk), $p = 0.984$).

3.1.3.2 *Primary reasons for PCO prescribing initiatives*

- The primary reasons for pursuit of prescribing initiatives or specially designed prescribing policies are depicted in Figure 3.
- National targets were the most frequently indicated primary reason for pursuing any prescribing policy or initiative (34% of all reasons

3 Seven respondents from the main survey declined to answer this question.

Figure 2 Areas of PCO prescribed policies or initiatives



Notes:

DLCV = drugs of limited clinical value.

NSAID = non-steroidal anti-inflammatory drug.

PPI = proton pump inhibitor.

PPP = premium priced preparations.

Other = analgesics, branded prescribing, diuretics, ‘expensive drugs’, hormone replacement therapy, National Service Frameworks, osteoporosis, repeat prescribing, topical NSAIDs, vasodilators.

stated), with ‘inappropriate prescribing’ the second most frequently cited reason (21%).

- ‘Low volume prescribing’ accounted for just 2% of primary rea-

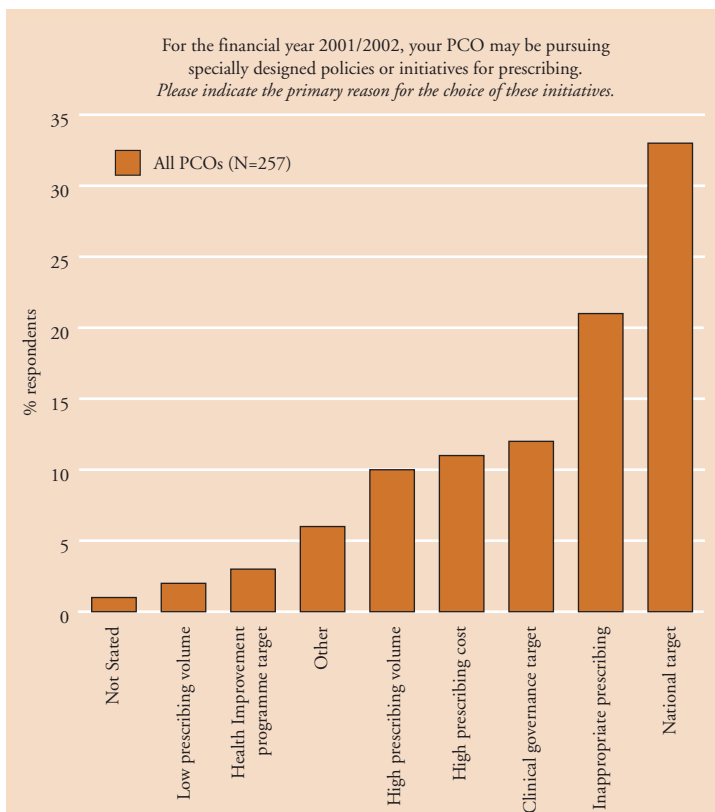
sons for prescribing initiatives and the local Health Authority's 'Health Improvement Programme' targets were similarly uncommon (3%). The most commonly indicated area for initiatives pursued for either of these reasons was statins.

- High prescribing volume (10% of all stated reasons), high prescribing cost (11%) and clinical governance targets (12%) were equally popular reasons for pursuing prescribing policies.
- Proton pump inhibitors (PPIs) and benzodiazepines were the areas most frequently cited as targets with high prescribing volumes; the corresponding areas for high prescribing costs were PPIs and modified release preparations. Cardiovascular drugs (statins and aspirins) were most commonly linked to clinical governance targets.
- The top five reasons for pursuing initiatives were ranked identically by PCGs and PCTs. However, because of the relative frequency that reasons were indicated, there was a statistically significant difference between the distribution of reasons given by PCGs compared with PCTs (Chi-square test (2xk), $p = 0.005$).
- PCGs were more likely than PCTs to cite Health Improvement Programme targets (3% of all reasons given vs. 2%), low prescribing volumes (3% vs. 2%), high prescribing volumes (12% vs. 7%), and high prescribing cost (12% vs. 10%) as the primary reason for an initiative.
- PCTs were more likely than PCGs to cite inappropriate prescribing (22% vs. 20%), national targets (35% vs. 32%) and 'other reasons' (7% vs. 6%).

3.1.4 National service frameworks and NICE guidance

We asked prescribing advisers and prescribing leads about their PCO's specific responses to government guidance. We chose the first two National Service Frameworks (NSFs) to be published, namely those addressing coronary heart disease (CHD) and mental health. We also chose two topics for NICE guidance: as a topic of general relevance, we asked about the guidance on proton pump inhibitors (PPIs), and as a more specialist topic, we asked about the guidance on rosiglitazone. All types of guidance had been published at least nine months before the survey was mailed. Eight categories of action were listed,

Figure 3 Reasons for PCO prescribing policies or initiatives

*Notes:*

High prescribing volume = high relative to national levels for this therapy area.

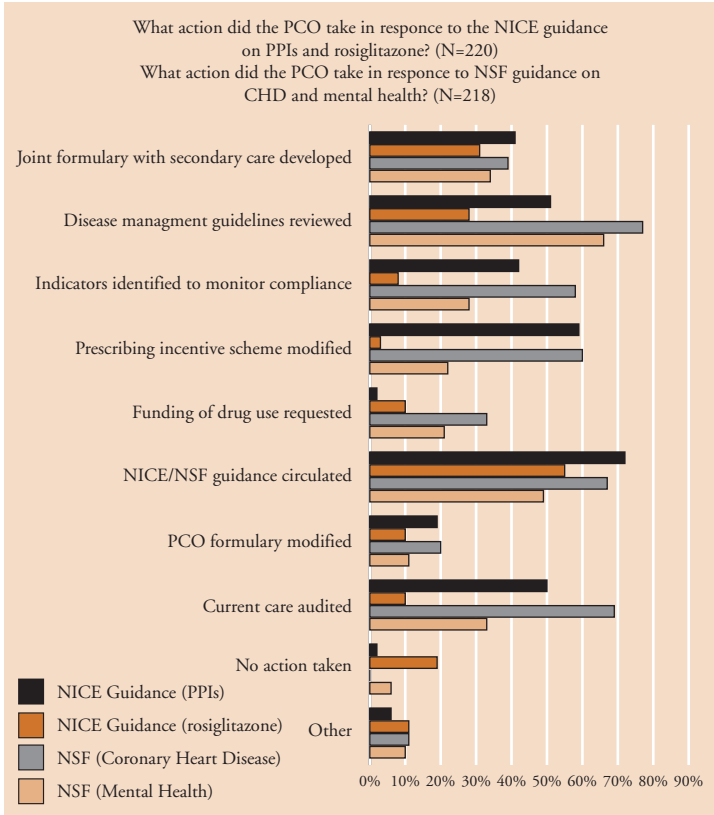
Low prescribing volume = low relative to national levels for this therapy area.

High prescribing cost = high net ingredient cost per item.

Other = audits/ reviews, compliance with formulary, improve quality systems.

with 'no action' and 'other' action as further options. Respondents were asked to indicate if action was ongoing, but the questions did not address action taken before the guidance was published or any action that was taken subsequent to, but that was not a direct result of, the guidance. Thus, for instance, the finding that over 40% of respon-

34 Figure 4 PCO responses to NICE and NSF guidance



dents had developed a joint formulary in response to NICE guidance on PPIs should not be interpreted as implying that only 40% of responding PCOs had a joint formulary with secondary care on PPIs.

3.1.4.1 PCO response to NSFs and NICE guidance

All PCOs had taken some type of action in response to NICE or NSF guidance. Findings are depicted in Figure 4 and are presented for all types of action undertaken, both completed and ongoing.

- Respondents were most likely to have reacted to the NSF on coro-

nary heart disease (CHD) (99.5%) and least likely to have reacted to NICE guidance on rosiglitazone (81.4%).

- Considering only respondents who indicated a positive response to guidance, on average 4.4 (95%CI: 2.6-4.6) types of action were taken following the NSF on CHD, but the corresponding figure for NICE guidance on rosiglitazone was just under half of this figure (2.0; 95%CI: 0.9-2.2).
- About one in five actions was reported to be ongoing and this ranged from 14% (PPIs) to 25% (rosiglitazone). Ongoing action was most common for audits of rosiglitazone (48% of all audits in this area) and for the development of joint formularies for CHD (40%) and mental health (48%).
- Although there was no statistically significant difference between the overall distribution of response by PCGs and PCTs in any of the four types of guidance, some differences were observed.
- Circulation of the guidance was the most popular response when all types of guidance were considered together. Interestingly, a lower proportion of PCTs (54%) than PCGs (64%) had circulated guidance and this was true of all types of guidance (mean difference: 10%, range: 1-19%).
- The review of disease management guidelines was the second most popular response overall (55%), and this was in fact the most popular response for both NSFs. Responses from PCGs and PCTs were broadly similar.
- Joint formularies had been developed with secondary care by 36% of respondents and there was a small difference between PCG (35%) and PCT (38%) responses. A joint formulary was most often reported for PPIs (41%) and least often for rosiglitazone (31%).
- PCGs were also less likely to request funding and this was true of all types of guidance (mean difference: 6%, range: 1-13%). The divergence was greatest in response to the Mental Health NSF.
- Almost 80% of respondents reported that the PCO had modified the prescribing incentive scheme in response to at least one of the NSFs or types of NICE guidance listed; this was a more common response for NSFs (78%) than for NICE guidance (61%).

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Table 3 **PCO and NHS Trust responses to NICE guidance and to NSFs**

Respondent	NICE guidance				National Service frameworks			
	PPIs		Rosiglitazone		CHD		Mental health	
	NHS Trust	PCO	NHS Trust	PCO	NHS Trust	PCO	NHS Trust	PCO
N	140 [1]	220 [2]	140 [3]	220 [4]	150 [5]	218 [6]	150 [7]	218 [8]
Audit of current practice	43%	50%	12%	10%	42%	68%	25%	33%
Review DM guidelines	29%	51%	21%	28%	45%	76%	23%	65%
Identify indicators of compliance	10%	42%	5%	8%	18%	58%	8%	28%
Request for funding of drug use	2%	2%	11%	10%	35%	33%	15%	20%
Guidance circulated	66%	72%	65%	55%	56%	67%	33%	48%
Formulary modified	31%	19%	44%	10%	20%	20%	7%	11%
No action taken	26%	2%	21%	19%	19%	0%	30%	5%

Chi-square test (2xk): [1] vs. [2], $p < 0.0001$; [3] vs. [4], $p < 0.0001$; [5] vs. [6], $p < 0.0001$; [7] vs. [8], $p < 0.0001$

3.1.4.2 NHS Trust response: comparison with PCO response

In the MANMED (NHS Trust) survey, we asked how NHS Trusts had responded to NICE guidance and to the NSFs. Ten options were given, including a 'no action' option. Seven of the ten options were the same as those in the PCO surveys and we compared the findings with PCO responses. The results are presented in Table 3.

- Unsurprisingly, NHS Trust responses were distributed quite differently from PCO responses and the difference was statistically significant for each type of guidance.

- Both NHS Trusts and PCOs gave a high priority to the circulation of guidance. Of the seven possible responses, this was the one most frequently reported by NHS Trusts, both for NICE guidance and for NSFs. While this was also the most popular response by PCOs following NICE guidance, PCOs more frequently responded to the NSFs with a review of disease management guidelines.
- For each type of guidance, NHS Trusts were more likely than PCOs to have taken no action at all: this was indicated by between 19% (CHD NSF) and 30% (Mental Health NSF) of NHS Trust respondents. This finding was, of course, a reflection of the specialist nature of some of these respondents.
- However, very similar proportions of PCOs and NHS Trusts requested funding of drug use and, when asked if an audit of current practice had been undertaken in response to the guidance, only the NSF on CHD elicited a large difference between NHS Trust (42%) and PCO response (68%).
- NICE guidance was more likely to lead to a change in the Trust formulary, than in the PCO formulary, but this difference in response was not replicated in the reactions to the NSFs. One in five of both groups of respondents modified their formularies following the NSF on CHD and a greater proportion of PCO formularies than Trust formularies were altered to reflect the NSF on mental health, although the difference was small (11% vs. 7%).
- PCOs were much more likely than NHS Trusts to respond by identifying indicators to monitor compliance; this was true of all four types of guidance.

3.1.5 PCO support and GPs' clinical freedom

The relationship between clinical freedom and PCO support was explored. We asked prescribing advisers and prescribing leads about disagreement with NICE guidance; about whether this might lead to a PCO policy on private prescribing; and we asked prescribing leads about the existence of formal and informal arrangements for managing patients requesting a private prescription.

Table 4 PCO support and the GP's clinical freedom

Scored on a linear scale from 'Strongly agree' = 0 to 'Strongly disagree' = 50							
	N	Mode	Mean	Standard deviation	Lower quartile	Median	Upper quartile
All PCOs	215	40	27.33	12.15	20	30	40

3.1.5.1 Disagreement with NICE guidance

Prescribing advisers and leads were asked to indicate their agreement or otherwise with the following statement:

'If a GP disagrees with NICE guidance over the use a particular drug, then PCOs should always support the GP's clinical freedom to prescribe.'

- Overall, both the mean and median responses indicate that respondents slightly disagreed with the statement. However, the most popular (mode) response was 'disagree', corresponding to 40 points on the scale; 59 (27%) respondents gave this as their answer.
- Responses from PCGs and PCTs organisations were broadly similar. Although slightly higher levels of disagreement were expressed in PCTs, this difference was not statistically significant (Mann-Whitney U test: 95% confidence level, two sided $p = 0.308$).
- Further details of findings are presented in Table 4.

3.1.5.2 Implications of NICE guidance for private prescribing policies

Using the same type of question, we asked respondents about the implication of government guidance for the development by PCOs of a policy on private prescribing:

'The implementation of NICE or NSF guidance may limit the NHS use of a drug to a subgroup of patients for whom it is cost-effective, whilst it is clinically effective for a wider patient group. PCOs may then develop policies to determine whether their GPs should offer private prescriptions to patients who can benefit clinically, but who lie outside NHS guidance on cost effectiveness.'

Table 5 Government guidance and private prescribing policies

Scored on a linear scale from 'Strongly agree' = 0 to 'Strongly disagree' = 50							
	N	Mode	Mean	Standard deviation	Lower quartile	Median	Upper quartile
All PCOs	213	40	33.75	12.38	20	40	40

- Summarising the responses using the mean statistic, would suggest that the average response to the statement was 'slightly disagree'. However, both the middle point of the range of response (median) and the most frequently given response (mode) were 'disagree', corresponding to 40 points on the scale. Sixty-nine (32%) respondents gave this as their answer.
- Slightly higher levels of disagreement were expressed in PCTs and this difference approached statistical significance (Mann-Whitney U test: 95% confidence level, two sided, $p=0.052$).
- Further details of findings are presented in Table 5.

3.1.5.3 PCO arrangements for private prescribing

We asked prescribing leads about the existence of formal and informal arrangements for managing patients requesting a private prescription.

Data for this question were contributed by respondents to the prescribing lead survey only; three of the 127 respondents did not answer this question (N=124, 31% of all PCOs in England). The question was addressed only to prescribing leads, as we believed that, as GPs, these individuals would be better informed than would prescribing advisers about the existence of such arrangements. However, a good proportion of respondents were known in reality to be prescribing advisers; consequently 'don't know' responses may be higher than would have been expected had only prescribing leads responded.

- For each type of arrangement, between 39% and 57% of respondents reported that they were unaware whether or not any arrangements existed.
- Where arrangements existed, they were more likely to be informal,

Table 6 PCO arrangements for private prescriptions

Type of arrangement (N=124)	Response		
	Yes	No	Don't know
Formal arrangements BETWEEN GP practices	2%	57%	39%
Formal arrangements WITHIN GP practices	5%	40%	53%
Informal arrangements BETWEEN GP practices	7%	45%	48%
Informal arrangements WITHIN GP practices	17%	29%	53%
Arrangements between individual GPs	10%	31%	57%

rather than formal, and were more likely to occur within, rather than between, GP practices. Arrangements between individual GPs were more frequently reported than arrangements between practices.

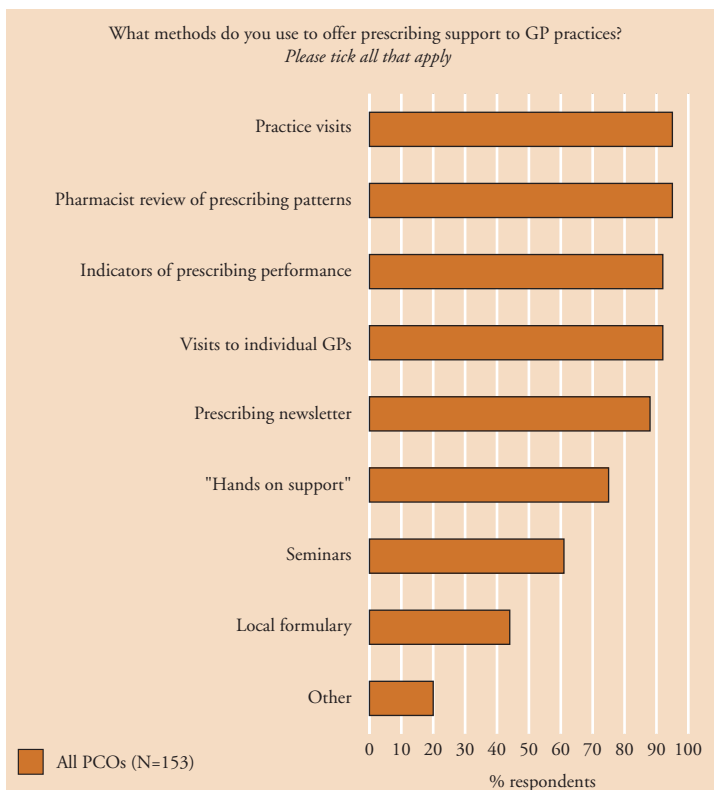
- There was no statistically significant difference between the distribution of responses when PCG and PCT responses were compared (Chi-square test (2xk), $p = 0.767$).
- Further details of findings are presented in Table 6.

3.1.6 Tools for medicines management

In this section, we consider two ways in which PCOs can manage medicines, namely through the use of clinical governance and prescribing incentive schemes.

3.1.6.1 Clinical governance

Introduced in the 1997 White Paper 'The New NHS', clinical governance is an initiative to assure and improve clinical standards at local level throughout the NHS (Department of Health, 1997). Prescribing support is one expression of clinical governance. We asked prescribing advisers about the different methods used to provide GPs with prescribing support. The different methods of support used in PCOs were reported by respondents to the prescribing adviser survey only; (N=153, 38% of all PCOs in England). Responses are depicted in Figure 5.

Figure 5 **Methods of PCO prescribing support**

- Prescribing advisers offer an average of 6.6 forms of support (range: 3-9), indicating that multifaceted support is the norm for these respondents.
- The most popular methods include the review of prescribing patterns (95%), practice visits (95%) and visits to individual GPs (92%), indicators of prescribing performance (92%), and prescribing newsletters (88%).
- Three-quarters of respondents provided 'hands on support' to practices and over 60% gave seminars; 44% used a local formulary.
- One-fifth of respondents indicated that they offered methods of support other than those listed, including different types of meet-

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ings within the PCO such as ‘educational updates’, ‘locality meetings’ and ‘cluster group meetings for 4-5 practices for peer review of therapeutic areas’.

- Other forms of support included pharmacist-led clinics; collaborative endeavours with those outside the PCO (‘working with community pharmacists’, ‘secondary care interface’), and the use of computers ‘to shape behaviour’.
- Although there were small differences between PCG and PCT responses, the overall distribution of response was very similar (Chi-square test (2xk), $p = 0.100$).

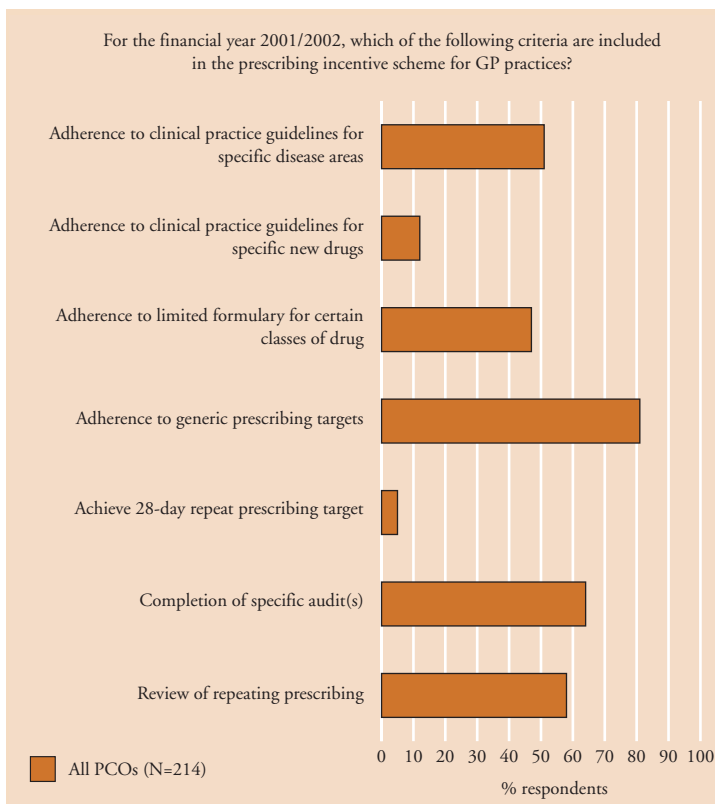
3.1.6.2 Prescribing incentive schemes

We asked PCO prescribing advisers about the criteria included in the 2001/02 prescribing incentive scheme for GP practices. Seven options were given and respondents were not asked to indicate any additional areas. Responses are depicted in Figure 6.

- Over 80% of respondents reported that generic prescribing targets were included in the current scheme, and this was indicated by a higher proportion of PCGs (84%) than PCTs (77%).
- Almost two-thirds of respondents had specified the completion of a particular audit as part of the scheme and approximately 6 out of 10 respondents reported that a review of repeat prescribing was on the scheme’s list of conditions. There was no significant difference in PCG and PCT responses to these questions (Fisher’s exact test: $p = 0.801$).
- About half of respondents had included clinical practice guidelines for specific disease areas in their scheme and 47% had used a limited formulary.
- Clinical practice guidelines for specific new drugs were less popular, with just 12% of PCOs reported their inclusion. The least popular area to be included in schemes was the achievement of a 28-day repeat prescribing target: only 5% of respondents said they were using this target and PCGs (7%) were more likely than PCTs (2%) to do so.

With the MANMED survey, we included a request for a copy of the PCO’s current (2001/02) incentive scheme. In all, 91 schemes

Figure 6 Criteria included in PCO incentive schemes



were sent, covering 96 PCOs. Data were extracted from these and the results are presented in the following section.

3.2 Prescribing incentive schemes

- *It is a legal requirement for all PCGs and PCTs to have and to operate a prescribing incentive scheme in which all practices must participate. PCOs must reward practices that achieve their budgetary target and there is discretion for PCOs to specify additional conditions, which may or may not trigger a reward.*

- *A request for the 2001/02 PCO prescribing incentive scheme was included in the covering survey letter to PCO prescribing advisers. Ninety-one schemes (representing 96 PCOs) were received.*
- *Despite government directives, there was still considerable diversity in the design of prescribing incentive schemes. Qualifying criteria, budgetary and quality targets varied and schemes covered a wide range of therapeutic areas.*
- *13% of schemes had no overall budgetary target. Over 70% of the remaining schemes offered multiple practice-level budgetary targets, in line with the statutory framework. Only 4% of schemes appeared to require practices to achieve a budgetary underspend in order to qualify for any sort of reward.*
- *All schemes included conditions additional to any budgetary targets specified.*
- *Most schemes included a target for antibacterials (76%), generics (78%), proton pump inhibitors (62%) and non-steroidal anti-inflammatory drugs (60%). Three-quarters of schemes targeted cardiovascular system medications, but fewer than half included an initiative for central nervous system drugs.*
- *20% of all the indicators used were cost-based, measuring either expenditure, net ingredient cost or 'spend'. Volume-based indicators, measuring the number of items, were similarly popular (25%).*
- *There was great variation in prescribing incentive schemes issued by PCOs in terms of the content of targets and consequent requirements for data placed upon general practitioners.*

3.2.1 Background

In 1995, prescribing incentive schemes were introduced to the NHS at a national level (Department of Health, 1995), following local pilots. Family Health Service Authorities (FHSAs) were given a new statutory duty 'to establish, operate and make payments to practices under a prescribing incentive scheme in accordance with directions (given by the Secretary of State under section 17 of the National Health Service Act 1977)' (Department of Health, 1995). The focus of the schemes was on cost containment:

Regulation 1(2): ‘prescribing incentive scheme’ means a scheme under which an FHSA is required to make a payment to a practice which, in any financial year, has contained its prescribing costs as specified in the directions.

Under Section 18(1) of the National Health Service and Community Care Act 1990, FHSAs were to specify an ‘indicative amount’ to non-fundholding practices. This ‘indicative amount’ was to represent ‘the basic price of the drugs, medicines and listed appliances which, in the opinion of the Authority, it is reasonable to expect will be supplied in that year pursuant to orders given by or on behalf of the members of that practice.’ The notion of an indicative amount is still in use. FHSAs, established 18 years previously under the National Health Service Act of 1977, were abolished under the Health Authorities Act 1995, which became operational in April 1996. FHSAs were amalgamated with District Health Authorities to form 100 new Health Authorities accountable to eight Regional Offices. The statutory duty for prescribing incentive schemes was passed to these Health Authorities in 1998 (Department of Health, 1998). On 25th March 1999, Directions were issued by the Secretary of State for Health, listing the operation of the national Prescribing Incentive Scheme arrangements as one of six functions that could be delegated by Health Authorities to PCGs. In April 2000, amendment regulations came into force, enabling PCGs to exercise this statutory duty (Department of Health, 2000c).

A Department of Health circular HSC 1998/228 (Department of Health, 1998b) stated that ‘incentives for Primary Care Groups are at the heart of the system’ and outlined the scope that schemes should cover (paragraphs 78-89). Paragraph 83 states:

A national scheme will apply whereby all Primary Care Groups must have a prescribing incentive scheme and each practice will participate (Department of Health, 1998b).

HSC 1998/228 emphasised the need for incentive schemes to encourage PCGs to improve health, to develop primary care provision and to commission clinically and cost-effective hospital and community services. The link with clinical governance was also emphasised. However, HSC 1998/228 was guidance rather than statute. In the

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Secretary of State's Directions of 31/03/00 (Department of Health, 2000d), the principles outlined by the HSC were made law.

In addition to the 'indicative amount' defined under section 18(1) of the 1990 NHS Act, PCGs had to calculate a 'lesser amount of money' that would represent the minimum expected expenditure (on prescribing) for that financial year. The target budget is defined as the range between these two amounts. The essence of the Directions is that PCGs must reward practices that meet two criteria:

- 1 The first criterion relates to budgetary performance. PCOs must reward practices that either contain their costs within the target budget, or that exceed the target budget with 'good cause' or that exceed the target budget by a reduced amount compared with the previous year {para. 4(1)(a)(i)}.
- 2 Secondly, the PCG may (not 'shall') specify 'additional conditions' that PCGs must, or may, meet to qualify for an incentive payment {para. 4(1)(a)(ii)} and this second criterion is also tempered by the 'good cause for failure' caveat.

This means that a practice that meets the budgetary target, but that does not meet additional conditions specified as qualifying criteria by the PCG, will receive no reward unless there is good cause for failure. However, the PCG has the discretion to determine whether and to what extent, payments may be linked to these 'additional conditions' {para. (6)(2)}. The directions also outline how PCGs should modify payments. PCGs must take account of the size of a practice and may relate the size of payments made for budgetary targets to the nature of the 'good cause' or the proximity of the practice to its target budget {para. (4)(2)}. Confusingly, the directions go on to state in paragraph (4)(3) that PCGs must reward practices who fail to meet targets with 'good cause' as if the practice were unaffected by the 'good cause', which appears to remove the discretion given in paragraph 4(2)! Lastly, if a practice has met the budgetary target only because of good fortune (e.g. diminished list size), then the PCG must reduce any payment accordingly.

The directions repeat HSC1998/228, both in the guidance on how incentive payments relate to savings (which indicate a suggested maximum annual payment of £45,000 per practice) and also in the purpos-

es to which payments may and may not be put. No money can go directly as income to practices. It is worth observing that the maximum recommended reward would be available only to practices achieving an underspend on their prescribing budget of at least £80,000.

In conclusion, the Directions from the Secretary of State in March 2000 tell PCGs that they must reward practices meeting specific budgetary targets and that these rewards may be subject to further conditions. However, the Directions do not explicitly forbid PCGs to reward practices that do not meet the two criteria outlined in paragraph 4(1)(a)(i & ii). To do that, the Directions would have to specify that PCGs must only reward practices meeting these criteria. It would appear, then, that PCOs have a fairly free hand when drawing up their schemes: they must ensure that practices meeting the criteria are rewarded in accordance with the directions, but PCOs can also reward practices that do not. Since the scheme has to apply to all practices, however, this may be a difficult logistical task to achieve!

There has been very little research on prescribing incentive schemes to date (Ashworth et al, 2002). The MANMED survey included a number of questions relating to prescribing incentive schemes and the results are presented in the next section.

3.2.2 Findings from the schemes

In total, 91 prescribing incentive schemes were received, covering about one-quarter (96/400) of the PCOs in England. The regional distribution of the schemes was very similar to that of the PCOs nationally and although the South East was over represented and London was under represented, there was no statistically significant difference in the regional distribution overall (Chi-square test (2xk), $p = 0.404$). A higher proportion of PCGs was represented in the schemes (69%) compared with the national rate (59%) and this difference bordered on statistical significance at the 5% level (Fisher's Exact test, $p = 0.075$).

Despite the legal framework governing the content and operation of prescribing incentive schemes, the schemes' diversity was their most striking feature. Some were extremely complex, containing successively more demanding combinations of budgetary and prescribing targets, with each level of payment depending on success at the previous hur-

dle. Others were very simple, with just one or two targets and all-or-nothing reward systems. Some of the key areas are presented below.

3.2.2.1 *Qualifying criteria*

Qualifying criteria are conditions specified in the incentive schemes that must be met for any reward to be triggered. PCOs used a range of different criteria needed to qualify for incentive payments.

- 60% of schemes set a budgetary target and required it to be met as a condition for receiving a reward. 24% of schemes, although they had a budgetary target, did not make it a pre-condition for receiving rewards. 2% of schemes had a budgetary target but it was unclear whether or not it was a pre-condition for reward. 13% of schemes specified no budgetary target.
- Other schemes listed audits, pharmacist visits or the development of prescribing plans or protocols as qualifying criteria. Some schemes included specific prescribing targets as qualifying criteria.
- Only two schemes explicitly required practices to maintain prescribing target levels achieved under the previous year's scheme, in order to qualify for payment this year.

3.2.2.2 *Budgetary targets*

As outlined in the background section above, prescribing incentive schemes must reward practices that either meet a specified budgetary target or that fail to meet the target for 'good cause' or that reduce their overspend compared with the previous year.

- Despite the legislation, 12 schemes (13%) contained no budgetary target. Whilst some of these schemes alluded to budgetary targets specified elsewhere, others did not.
- Where at least one budgetary target was included, there was considerable variation in their structure and content.
- 94% of the scheme where at least one budgetary target was included, also specified an 'underspend' in relation to the practice's 'target budget' (or to remain within prescribing allocation).
- However, there were some interesting exceptions. A 'ceiling spend', defined as the prescribing allocation plus 8% to allow for inflation, served as a qualifying criterion in one scheme. Another

PCO offered its members two schemes, one with and one without a budgetary target; practices were reported to have elected the latter. Another PCO offered practices an ‘adapted’ scheme (with no budgetary target) ‘in light of the uplift on prescribing agreed by the Regional Office’⁴. Finally, a PCO that had formally opted out of the government’s national scheme used the notion of a ‘fair share’ budget, although this was not defined in the document.

- Six schemes included an indicator on generics as part of the budgetary target and one scheme defined a budgetary target as ‘an improvement in the named BNF sections’.
- Most schemes (72%) with a budgetary target offered practices multiple targets, reflecting the Department of Health directive that practices reducing their overspend should also qualify for a reward (Department of Health, 2000d). However, only four schemes appeared to require practices to achieve an underspend in order to qualify for any sort of reward.

3.2.2.3 *Maximum payments*

The maximum payment allowable as stated in the Department of Health directive is £45,000 per practice. PCOs have discretion to modify this ceiling according to the number of whole time equivalent (WTE) GPs in the practice. To receive this reward, a practice would have to achieve a saving of £80,000 on its prescribing budget (Department of Health, 2000d).

- About one-quarter of schemes cited the maximum payment allowable as £45,000 per practice, in line with ceiling given by the Department of Health directive.
- Small numbers of these schemes scaled the level of savings that could be kept according to the number of WTE GPs in the practice (four) or by the number of patients on the practice list (one). Alternative per-practice maximums for savings ranged from £6,000 to £15,000.
- One quarter of schemes used the notion of WTE GPs (or principals or partners), as the basis for maximum payments. The average reward using this system was around £3,000 /WTE GP (range: £1,000 to £14,000).

4 87% of the schemes received from this region contained a budgetary target.

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- 8% of schemes used simply GPs (or principals or partners), without specifying whole time equivalence (mean reward: £2,500 /GP; range: £1,000 to £4,500).
- About 13% of schemes worked on a per-patient basis, either estimating the actual number of patients (seven schemes) or using ASTRO-PUs⁵ (five). This worked out at an average of about £2.40/patient or about £200 /1,000 ASTRO-PUs, although one PCO offered £500/100 patients and another offered £350/1,000 ASTRO-PUs.
- About 3 in 10 schemes did not specify, or give enough information to estimate, the maximum reward payable.

3.2.2.4 *Reward systems*

PCOs used a range of different systems to calculate rewards associated with prescribing targets.

- Twenty-two of the schemes (24%) used a points system and five schemes awarded points for achieving budgetary targets too. Three schemes included negative points for movements away from target.
- 21 schemes (23%) used a very similar system, allocating a proportion of the reward to each target met.
- In both the points system and the proportion system, budgetary awards were sometimes modified according to the number of points or targets obtained.
- The most popular reward system, used by 27 schemes (30%) was the assignment of a fixed amount per target, per GP, per WTE GP, per practice or per patient.
- In ten schemes the reward system was not specified and in the remaining 11, prescribing targets acted purely as qualifying criteria, hurdles that had to be jumped in order to receive the payments associated with budgetary targets.

3.2.2.5 *Target therapeutic areas*

Current legislation gives PCOs the discretion to specify conditions

⁵ A measure of GP patient load which weights different types of patient according to their expected impact on prescribing expenditure. ASTRO-PU = Age, Sex, Temporary Residents Originated Prescribing Unit.

additional to budgetary targets. These additional conditions may or may not trigger a reward. All schemes included in our sample specified, or made reference to, additional conditions. These took the form of prescribing targets, which covered a wide range of therapeutic areas. The principal areas are described below.

- Most schemes included a target for antibacterials (76%), generics (78%), PPIs (62%) or NSAIDs (60%).
- Three-quarters of schemes targeted cardiovascular system medications, including antihypertensives in general (4%), antiplatelets in general (4%), aspirin (24%), ACE inhibitors (12%), beta-blockers (12%), diuretics (22%), nitrates (13%), statins (25%) and warfarin (4%).
- Fewer than half of the schemes (45%) included central nervous system drugs as targets. The most common were hypnotics and anxiolytics (40%), followed by antidepressants (11%) and antipsychotics (3%).
- About one-third of schemes included Premium Priced Preparations, both as a general category (2%) and in the form of combination products (13%) or modified release products (32%).
- Drugs of Limited Clinical Value (DLCV) in general (17%) and topical NSAIDs in particular were included (14%); modified release NSAIDs (11%) and Cox 2 inhibitors (8%) were also targeted.
- Repeat prescribing was addressed by 36% of schemes.

3.2.2.6 *Target indicators employed*

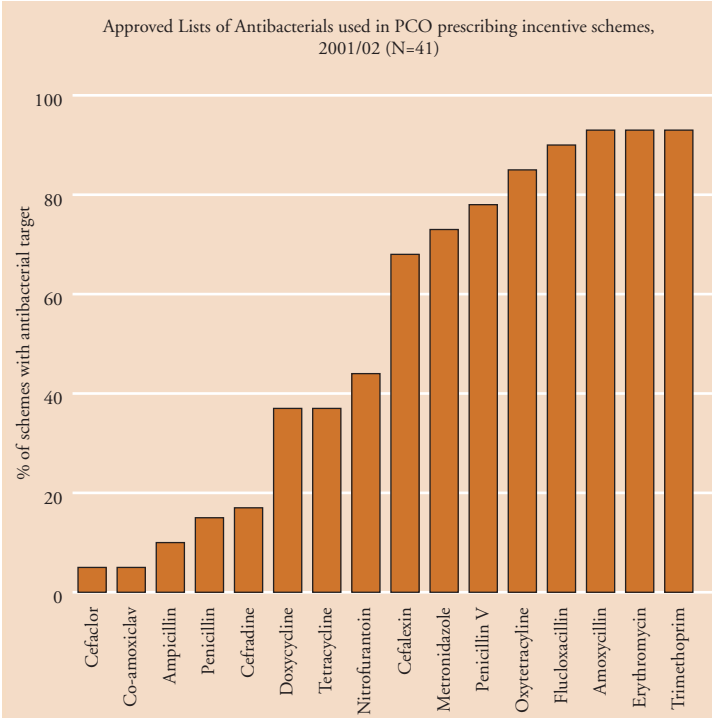
A wide range of indicators was used to measure the prescribing targets.

- Audits were included in three-quarters of schemes, each including an average of three audits.
- Schemes contained a variety of patient denominators, including PUs⁶ (61), ASTRO-PUs (49 indicators), STAR-PUs⁷ (154) and, simply, number of patients (18).
- Cost terms included 'expenditure', 'spend', 'outturn', 'total actual cost' and 'Net Ingredient Cost' (NIC). Cost-related indicators together formed just under 20% of all the indicators used.

6 Prescribing Unit, which weights over-65s as three units and all other patients as one unit.

7 Specific Therapeutic group Age-sex Related Prescribing Unit.

52 Figure 7 PCO prescribing incentive schemes: Approved lists of antibacterials



- Some indicators used volume measures, such as a specified level of items (19% of all indicators) for a particular patient denominator or the proportion of patients within a particular group prescribed a certain drug (5%).
- Ratios of items of two drugs, or class of drugs, were also used, especially for PPIs. Treatment-dose ratio was used in 75% (56/75) of PPI indicators found in the schemes and there were three instances of PPI/H2 antagonist ratios.
- Approved lists formed 11% of indicators, most commonly applied to antibacterials (51% of schemes) and to NSAIDs (33%), and less frequently used for beta-blockers (5%), diuretics (5%) and generics (4%).

- Antibacterials to be prescribed from the list ranged from 70% to 90% of overall antibacterial prescribing, with one scheme using the PCO average and another specifying practice-specific targets. There was an average of 8.6 approved drugs on each list. The chart summarising the approved lists for antibacterials can be found in Figure 7⁸.

3.3 Literature review

- *A review of the literature on medicines management examined findings from systematic reviews, studies based in the UK and promotional literature.*
- *Despite a vast literature on methods of changing professional practice, the evidence for most prescribing initiatives was limited and leaves important questions unanswered.*
- *Dissemination of information alone is usually ineffective in modifying prescribing behaviour, although it may be a necessary part of the management process. Multifaceted interventions generally appear to be more effective than single interventions.*
- *Evidence from studies conducted in the UK indicates that audits of various types and outreach visits (academic detailing) are the most promising approaches. The fundholding literature suggested that greater financial autonomy for general practitioners had some impact on prescribing costs.*
- *Although performance management and financial incentives are techniques commonly employed in the NHS, their effectiveness does not appear to have been systematically evaluated.*

Strategies for changing prescribing behaviour are outlined below. We grouped these into three broad categories, namely education and the provision of information; audit and performance management; and financial incentives and practical support.

3.3.1 Education and information

Strategies include mass media interventions, the dissemination of printed educational materials, continuing educational programmes,

8 Only 41 of the 46 PCOs using an approved list for antibacterials specified the names of the drugs in the documentation supplied to us.

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use of local opinion leaders and educational outreach visits. There is great diversity within these broad headings and no category could be described as homogeneous.

- Dissemination of information alone is generally ineffective in modifying prescribing behaviour, although it may be a necessary part of the management process.
- Although the impact of continuing education upon prescribing is unclear, there is some evidence that interactive workshops are more effective than didactic teaching.
- One RCT conducted in the US found that local opinion leaders could have a clinically important effect upon (secondary care) prescribing behaviour, but evidence from the UK is limited.
- Findings from the US literature indicated that educational outreach can effect positive behavioural changes, but studies conducted in the UK gave mixed messages. There was some evidence that educational outreach can have small, but important, effects on prescribing, although untargeted outreach is probably not worthwhile.

3.3.1.1 Mass media interventions

The effect of mass media interventions on health services utilisation was the subject of a systematic review that included 17 studies (Grilli et al., 2001). The authors found that mass media can have an impact on utilisation, although whether this effect was a result of influences on health care professionals or on consumers or on both could not be determined. Only one study was found that related to prescribing: a US mass media reporting of the relationship between the use of aspirin in children and Reye's syndrome. However, reanalysis by the reviewers indicated that the observed changes originally reported were not, after all, statistically significant. No UK based study of a mass media intervention relating to prescribing was reported in the review and none was found by our search strategy.

3.3.1.2 Printed educational materials

Printed educational materials are perhaps the simplest educational strategy and are based on the presupposition that sub-optimal behaviour is due, at least partially, to inadequate information. Although the

approach usually adopted by researchers, professional bodies and health care organisations, the dissemination of printed educational materials alone is recognised to be generally ineffective in changing physician behaviour (Grimshaw et al., 2001; Bero et al., 1998; Soumerai et al., 1989).

While the passive dissemination of information may not lead to changes in practice, this approach may be an essential basis on which to effect change through supplementary interventions (Grimshaw et al., 2001), although there is no hard evidence to support or refute this theory (Freemantle et al., 2001). A systematic review of the literature found that the effects of printed educational materials compared with no active intervention were small and 'of uncertain clinical significance' (Freemantle et al., 2001). However, the addition of educational outreach visits and opinion leaders produced larger effects that were likely to be of practical importance. Included in the review were four studies that examined the impact of mailed educational advice on prescribing; none found any statistically significant effect.

Two UK studies were retrieved that examined the effect of printed educational materials. Details are reported in Table A4.1 (Appendix 4). A quasi-experimental interrupted time series analysis found that printed educational materials could effect a modest change in prescribing (Mason et al., 1998). Prescribing trends for selective serotonin reuptake inhibitor (SSRI) antidepressants in England were examined over a six-year period (1991-1997). At the time of distribution of an Effective Health Care Bulletin, in which the use of SSRIs as first line therapy was discouraged, the trend showed a significant slowing in the rate of uptake of SSRI prescribing by 8.2%. The impact of possible confounding factors, such as the price of tricyclics (the competing treatment) or SSRIs, and seasonal influences were explored but did not alter the study findings. With an estimated saving of £40 million in SSRI costs, the cost of the Bulletin (£25,000) appeared good value for money.

A second UK study examined the effect of printed educational materials on the prescribing of respiratory drugs for over 3,000 children with asthma (Bryce et al., 1995). A printed guideline was placed in the randomly chosen patient records of the intervention group.

The central message of the guideline was to prescribe cromoglycate first line, then inhaled steroids. Prescription rates for inhaled cromoglycate were significantly higher in the intervention group, relative to the control, but there was no significant difference between the groups regarding prescriptions of inhaled steroids. As the same physicians treated children in both groups, the findings may have been subject to bias.

Since pharmaceutical companies continue to market their products in medical journals, this suggests that companies perceive the dissemination of printed materials to have some effect on prescribing behaviour. In the US, the pharmaceutical industry spends between \$450–\$500 million annually on journal advertising (Rosenthal et al., 2002). However, this comprises less than 5% of total promotional expenditure on health professionals, indicating the perceived relative importance of this particular form of promotion in effecting changes in professional behaviour.

3.3.1.3 Continuing medical education

‘Continuing Medical Education’ (CME) incorporates conferences, seminars and tutorials. Health professionals spend an average of 50 hours a year on CME (Davis et al., 1999). However, although CME may affect physician attitudes and knowledge, the impact on prescribing behaviour is unclear (Soumerai et al., 1989). Interactive workshops have been shown to effect ‘moderately large’ changes in professional practice, whereas didactic teaching appears less effective (Thomson O’Brien et al., 2001e).

Interprofessional education, in which a variety of professionals learn together, is another form of CME. A review found a large body of literature, but none was of sufficient methodological rigour to evaluate the impact of interprofessional education (Zwarenstein et al., 2001). Two English studies of educational meetings were found (see Appendix 4, Table A4.1) although only in the more recent study were prescribing data clearly reported (White et al., 1989; McNulty et al., 2000). Focussing on antibacterial prescribing, McNulty and colleagues compared the effect of educational workshops with a more formal tutorial format. Both groups also received mailed guidelines. Statistically significant differences between the groups’ compliance with the guidelines were found in five of eight prescribing measures.

The pharmaceutical industry provides funding for about half of the \$1.1 billion of total expenditure on CME in the US (Holmer, 2001), roughly the same amount as the industry spends on journal advertising. It has been argued that the industry ‘could not invest such large sums without seeking more commercial benefit than mere goodwill and name recognition’ (Relman, 2001). In other words, the industry appears to believe that such support will promote sales and this can happen only through changes in prescribing behaviour.

3.3.1.4 Local opinion leaders

Local opinion leaders are health professionals who have been nominated by colleagues as being ‘educationally influential’. RCTs of the use of local opinion leaders were the subject of a Cochrane review (Thomson O’Brien et al., 2001d). Eight studies were included, involving about 300 health professionals. Two of the studies showed a clinically important effect, but the results were subject to some biases and only one study addressed prescribing (Soumerai et al., 1998). This was a study of inpatient care for post-myocardial infarction, comparing the effect of a local opinion leader with audit and feedback.

All but one of the eight studies were set in North America; it is unclear if such an intervention is practicable in the UK, since difficulty has been observed regarding the identification of such ‘leaders’ (Thomson O’Brien et al., 2001d). We found two UK studies that included local opinion leaders as part of an intervention. In one study, two different educational methods were compared, both of which involved local opinion leaders (McNulty et al., 2000). In the other, a local opinion leader held interactive workshops to educate doctors about dyspepsia drugs (Valori et al., 2001). Both studies reported significant improvements in prescribing. One qualitative study of 18 London-based GPs found self-reported evidence that prescribing patterns can be responsive to views from particular ‘respected’ or ‘trusted’ consultants and are also, interestingly, influenced by new partners, or locums, when these are perceived as being educationally more up-to-date (Armstrong et al., 1996).

3.3.1.5 Educational outreach visits

'Educational outreach visits' are face-to-face visits by a trained person to a health care provider, in his/her own setting. They are also known as 'academic detailing', 'public interest detailing' and 'university-based educational detailing'. In 1989, Soumerai and colleagues published a review of the experimental literature on prescribing. Based on findings from six studies, all of which were set in the US, the authors concluded:

'Brief educational visits by an appropriately trained counselor is associated with practically and clinically significant improvements in prescribing. Despite moderately high personnel costs, some of these programs have been shown to save more dollars than they cost, and to improve quality of care' (Soumerai et al., 1989).

A subsequent review in the same vein found that 'successful educational strategies involve face-to-face contact between an expert and the physician', noting that these could be not only cost-effective but also possibly even cost saving (Anderson and Lexchin, 1996). This conclusion was based on findings from four studies, one of which found no lasting effect.

Thomson O'Brien and colleagues conducted a systematic review of educational outreach (Thomson O'Brien et al., 2001c). Of the 18 studies included in the review of randomised trials, 13 studies related to prescribing, of which two were set in the UK (Feder et al., 1995; Newton Syms et al., 1992). Educational outreach visits were considered by the reviewers to be a 'promising approach to modifying professional behaviour, especially prescribing', but further research was required to identify the key components for success.

Gill and colleagues' review included four outreach interventions, of which two demonstrated a statistically significant change in the majority of outcomes measured (Gill et al., 1999). None of the studies was set in the UK.

Our searches yielded six UK studies that examined the effect of educational outreach visits on prescribing (Feder et al., 1995; Fender et al., 1999; Freemantle et al., 2002; Hall et al., 2001; Newton Syms et al., 1992; Watson et al., 2001). Of these, only one found no significant difference between the two groups (Hall et al., 2001), although one of the remaining five studies found only a very small

effect in a single outcome measure (Watson et al., 2001). Further details of the studies are reported in Table A4.1 (Appendix 4).

The most recently published study was a randomised controlled trial of Evidence-Based Outreach (EBOR) (Freemantle et al., 2002). Specially trained pharmacists gave evidence-based messages to 162 GPs in 69 practices. The message topics included ACE inhibitors (considered to be a cost-effective treatment) and antidepressants (considered to be cost saving) (Mason et al., 2001). The trial found that there was a small (5.2%) but significant effect on adherence to guideline recommendations in the intervention group, relative to the control. Smaller practices appeared more responsive to outreach than larger practices, with an improvement from a baseline adherence rate of 40% to 53.5%. The evidence from this trial suggests outreach visits are most effective when targeted at small practices. However, practices in this study received group visits: it is possible that it was the more personal nature of the visits to smaller practices that accounts for the difference in observed impact, rather than the size of the practice *per se*. The content, context, length and number of outreach visits, and the characteristics of the doctors and practices visited are additional factors whose effect remains unclear. Taking account of the estimated implementation cost to an average Health Authority (approximately £26,000 per guideline), the cost-effectiveness message (ACE inhibitors) was found to be worth implementing, but the cost-saving message (antidepressant selection) was not (Mason et al., 2001).

'Office visits' by pharmaceutical companies could be seen as the prototype for educational outreach (Soumerai et al., 1989). In the year 2000, pharmaceutical companies spent over \$4 billion in the US on office-based promotion alone, representing about 30% of all promotional expenditure to health professionals and eight times the amount spent on journal advertising (Rosenthal et al., 2002). Spending on free samples for professionals accounted for a further \$8 billion of expenditure, but it is unclear how much of this was directly associated with office visits.

3.3.2 Audit and performance management

- Audit and feedback appears to have modest but valuable effects on prescribing behaviour.

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- Feedback can consist of many different types of information and may be delivered and presented in a variety of different ways.
- The effectiveness of this strategy may be heightened by the use of comparisons with peer behaviour, the inclusion of ‘accepted’ clinical standards or of specific recommendations for change.
- There is some evidence that active feedback is more effective than passive delivery.
- There appears to be very little evidence to determine the impact of benchmarking on prescribing behaviour.

3.3.2.1 *Audit and feedback*

In their review of randomised trials of audit and feedback, Thomson O’Brien and colleagues identified ‘small to moderate but potentially worthwhile’ effects on professional practice (Thomson O’Brien et al., 2001a,b). However, the evidence did not support widespread use of audit and feedback and the reviewers found little evidence of a measurable effect of adding a complementary intervention to audit and feedback. Of the 37 studies included, six related to prescribing, all of which were based in the US.

In four studies where audit and feedback were compared with no intervention, three found statistically significant reductions in prescribing (one in a training environment and two in community settings). The fourth found an increase in generic prescribing, but it was unclear whether or not this was statistically significant. Schectman and colleagues conducted an RCT in which cimetidine was promoted over other H₂-blockers (Schectman et al., 1995). The effect of audit and feedback with educational materials and educational meetings was compared with educational materials alone. Whereas physicians in a group model Health Maintenance Organisation improved their prescribing, those in the network model did not. Steele and colleagues considered the reduction of prescribing costs in an outpatient setting (Steele et al., 1989). Audit and feedback, with specific patient recommendations, was compared with no intervention. In one intervention group, there was active feedback in the form of a pharmacist visit to a group of physicians and in the other passive feedback was given in the form of ‘peer-comparison’ prescribing data. The authors report a sta-

tistically significant difference between the face-to-face intervention and the control group. However, the Cochrane reviewers indicated that there was a possible unit of analysis error in the calculations and were unable to replicate the authors' findings (Thomson O'Brien et al., 2001a,b).

A review of studies designed to improve primary care physician prescribing concluded that ongoing feedback of drug use profiles was unlikely to affect prescribing behaviour (Soumerai et al., 1989). However, if comparisons with peer behaviour or accepted clinical standards are included, then feedback could be effective for certain types of prescribing. Gill and colleagues, in their review of interventions to change doctor prescribing behaviour, found that about half of the 33 interventions using audit and feedback reported significant positive findings (Gill et al., 1999). A review that included only data from RCTs found that if specific recommendations for change were included in the feedback, this was more successful than simply describing current practice (Anderson and Lexchin, 1996). Data from five RCTs contributed to this finding, three of which addressed polypharmacy.

We identified seven UK studies that addressed audit and feedback. All were RCTs, based in the community, except for one controlled before-and-after study (CB&A) which examined the effect of 'active enforcement' by middle grade medical staff of adherence by junior staff to a hospital protocol (Huang et al., 2000). The remaining studies employed pharmacists to conduct the audit and feedback process (Braybrook and Walker, 1996; Braybrook and Walker, 2000; Bond et al., 2000; Furniss et al., 2000; Krska et al., 2001; Zermansky et al., 2001). Two studies reported the effects of different delivery methods for feedback and found that active delivery – a face-to-face visit by the pharmacist to the GP to convey information – was more effective than passive dissemination (Braybrook and Walker, 1996, 2000), echoing the findings of the outreach studies. Further details are reported in Table A4.2 of Appendix 4.

3.3.2.2 *Performance management*

Benchmarking is a type of performance management that is popular in the UK. Originating in the private sector, benchmarking is a measure of comparative performance that is used in the public sector as a

means of improving organisations thought to have weak incentives for efficiency (Grout et al., 2000). In 1983, performance indicators were introduced to the NHS and were used to compare performance at the level of health service districts. Health service indicators were introduced as part of the 1991 reforms and were chiefly hospital-related. With the advent of High Level Performance Indicators in 1999, benchmarking widened its focus from costs and throughputs to embrace six key areas, including health outcomes, health improvements, efficiency and effective delivery of appropriate health care. Effective delivery incorporates ‘cost effective prescribing’, a composite measure consisting of the prescription rate for combination and modified release products, drugs of limited clinical value and inhaled corticosteroids (Department of Health, 2002b). Indicators of prescribing for benzodiazepines, antibacterials and ulcer healing drugs also form part of the effective delivery area, with generic prescribing used as an indicator of efficiency.

Currently, benchmarks are not directly linked to financial rewards, although heightened career opportunities for successful service providers and increased demand for services from successful Trusts are possible ‘rewards’ (Grout et al., 2000). While there is some evidence to suggest that indicators do act as proxies for more general prescribing patterns (Avery et al., 1998), we found no study addressing the impact of benchmarks on prescribing behaviour.

3.3.3 Financial incentives and practical support

‘Financial incentives and practical support’ incorporates computerised advice, financial incentives, support by pharmacists and support by other professionals.

- There is evidence of effectiveness of computerised advice, although studies are chiefly confined to secondary care settings. The evaluation of UK studies in primary care is not yet in the public domain.
- The literature on both fundholding and on prescribing incentive schemes points to the existence of a downward impact on prescribing costs. Rates of growth then returned to trend, albeit at lower overall levels of expenditure. There was little evidence on cost-effectiveness.
- Evidence on the impact of professional support on prescribing varied. There was some evidence that ‘replacement’ model mental

health workers achieved significant short-term reductions in GP psychotropic prescribing, but the effects were not reliable. Findings from two UK studies of pharmacist support were mixed.

- No controlled UK study was found addressing the effect of either computerised advice or financial incentives.

3.3.3.1 *Computerised advice*

Computerised advice was the topic of a review by Walton and colleagues (Walton et al., 2001) that found there was evidence to support the use of computer assistance in determining drug dosage. However, all 15 of the studies included in the review related to hospital settings and further research is needed to determine if these findings are applicable to primary care.

PRODIGY (Prescribing Rationally with Decision Support in General Practice Study) is a research project of a national prescribing decision-support system (Rogers et al., 1999) and the Department of Health plans to extend the scheme to all GPs in the UK. We found studies analysing the factors affecting GP use of PRODIGY (Bojke and Williams, 1998; Bojke and Nestor, 2000), but no evidence evaluating the impact of PRODIGY on prescribing behaviour.

3.3.3.2 *Financial incentives*

Gosden and colleagues (Gosden et al., 2001) conducted a review of the effect of different methods of payment on the clinical behaviour of GPs. The payment methods reviewed included capitation (GPs receive an amount per patient registered with them or under their care); salary (an annual amount for a fixed number of hours per week per year); fee-for-service (FFS; retrospective reimbursement for each item of service provided); and mixed systems of payment. The search yielded almost 5,500 references, but only four studies were identified that met the inclusion criteria of the review, none of which was based in the UK.

Compared with capitation, FFS resulted in more primary care visits or contacts, more visits to specialists and diagnostic and curative services. However, FFS also resulted in fewer hospital referrals and fewer repeat prescriptions, relative to capitation payment methods. The finding on prescribing was taken from a before-and-after study of

Danish GPs, in which a FFS/capitation system operating on one site (the control) was compared with a separate site, where the payment system changed from capitation to FFS/capitation (Krasnik et al., 1990). One hundred GPs were randomly selected for the intervention group and monitored for a week six months before the change in payment system, and 6 and 12 months after the change. The control group was made up of 326 GPs in the same county. Relative to the control group, the rate of renewal prescriptions was lower in the intervention group in both 'after' periods, but the difference was only statistically significantly lower at the 12-month assessment. The authors suggested that the level of remuneration for consultations, compared with that for prescription renewal, might explain this finding.

With the advent of fundholding in April 1991, some prescribing expenditure became part of the NHS cash limit and under the direct budgetary responsibility of GPs for the first time (Sussex, 1998). The scheme was voluntary and offered direct financial incentives to GPs to keep within the practice budget. Underspensing practices could keep savings and use them to improve health care for their local population; any overspend was covered by the Health Authority. In 1996, a survey of fundholding reported considerable variation in the extent to which practices controlled prescribing expenditure between one year and the next (Waite et al., 1996). While the growth of prescribing costs was initially curbed (Bradlow and Coulter, 1993), the rate of increase reverted to trend one to two years after entry (Stewart Brown et al., 1995); mean prescribing costs for fundholders were, however, still below those of non-fundholders (Baines et al., 1997). Savings were reportedly achieved by the use of generics targets, practice formularies, better information and limits on prescribing volumes.

However, practices in the earlier 'waves' (i.e. those becoming fundholders in the early 1990s) appeared more diligent than later wave fundholders in their review of prescribing, including assessments of practice prescribing rates, audit of prescribing against a formulary, and agreements on hospital prescribing with acute providers (Waite et al., 1996). Further evidence of qualitative differences between early and later wave fundholders has been reported elsewhere and is unsurprising given the evolution of fundholding entry criteria that occurred as

the scheme was rolled out (Wilson et al., 1995; Baines et al., 1997). It is unclear to what extent changes in prescribing costs may be attributed to the financial incentives embodied in fundholding when there are important differences in practice characteristics, although there is some evidence that fundholding was a major influence (Wilson et al., 1996).

Target payments to (all types of) physicians were the topic of another Cochrane systematic review (Giuffrida et al., 2001). Target payments differ from fees-for-service insofar as the latter are directly proportional to the supply of services, whereas the former remunerate the achievement of a minimum level of service (or 'target'). The effect of target payments on vaccination levels was considered; the reviewers found insufficient evidence to draw conclusions regarding effectiveness. The effect of target payments on prescribing behaviour was not addressed.

In the UK, target payments are employed by prescribing incentive schemes; these were originally used for non-fundholding general practices and are currently employed by PCOs (Department of Health, 2000d). Introduced in statute at a national level in 1995, pilot incentive schemes were operated in 11 of the 14 former regions in 1993/94. An observational study evaluated the impact of a scheme on 459 non-fundholding practices in the former Northern region of England (Bateman et al., 1996). Practices were set target savings, based on the ratio of the practice's indicative prescribing amount (IPA) relative to the local average, with payments scaled according to this ratio to a maximum of £2,500 per principal. Fewer than one quarter (23%) of practices achieved their target savings; these achievers had significantly lower per patient prescribing costs than did non-achievers, without reducing the quality of prescribing. Savings on IPAs exceeded incentive payments awarded by a factor of three. Weaknesses in the study design may have impaired the validity of the evidence (Robinson and Harvey, 1996), although support for the findings was provided by studies of similar schemes in Grampian (Rutledge, 1997) and Coventry (Paris et al., 1994).

3.3.3.3 *Pharmacist support*

Pharmacist support of physician prescribing includes the identification, resolution and prevention of potential and actual drug-related problems. The effect of outpatient pharmacists on physician prescrib-

ing was reviewed by Beney et al. (2001). The review identified ten studies, seven of which were set in the US; none in the UK. All involved pharmacist visits and/or audit and feedback; the role of the pharmacist as a source of multifaceted support was not examined.

We found two UK RCTs that looked at the role of the pharmacist in a patient-support role, co-ordinating discharge planning between primary and secondary care settings. The first study was of patients aged 65 and over, who were deemed likely to experience medication difficulties on discharge from the study hospital (Smith et al., 1997). These 66 patients were counselled by the pharmacist, given a copy of a pharmaceutical care plan (which they were instructed to show to their GP and community pharmacist) and access to a telephone helpline. No patient used the telephone helpline for advice. The domiciliary visit following discharge was found to be necessary for 75% of the intervention group and for 96% of the control group, with reported problems including inability to manage child resistant closures, altered medication (affecting 31/66 patients) – patients were issued with medications from ‘old’ repeat prescriptions, rather than the new discharge medications – and faulty compliance. A significantly better compliance rate was recorded for intervention patients, relative to the control group.

The subjects of the second UK study of pharmacist support were 362 patients aged 75 and over, receiving at least four medications (Nazareth et al., 2001). The pharmacists’ role was very similar to that reported by Smith and colleagues, but a telephone helpline was not offered. No significant difference in either patient knowledge of, or adherence to, prescribed medication was detected.

3.3.3.4 Support by other professionals

A review by Bower and Sibbald (2001) of on-site mental health workers in primary care looked at the impact of the availability of non-medical alternatives to drug therapy on prescribing behaviour. RCTs, controlled before-and-after studies and interrupted time series analyses were considered for inclusion. Workers’ involvement was classified as either a ‘replacement’ role where workers took over the role of the primary care doctor, or as a ‘consultation-liaison’ role providing sup-

port and/or collaborative care. Mental health workers included psychiatrists, psychologists, nurses (psychiatric and non-psychiatric), counsellors and social workers and offered various non-medical treatments. Patient outcomes were not addressed by the review, but the 'direct' and 'indirect' effects of the intervention on physician prescribing behaviour were considered. 'Direct' effects were those pertaining to the patient allocated to an on-site worker, whereas 'indirect' effects were those observed in the wider patient population.

There was some evidence that 'replacement' model mental health workers achieved significant short-term reductions in GP (primary care provider) psychotropic prescribing, but the effects were not reliable. There were no indirect effects in prescribing behaviour on the wider population. There was some evidence that mental health workers operating in a 'consultation-liaison' role may influence GPs' prescribing behaviour, when used as part of a multifaceted intervention, but the effects may not be generalisable to the wider population under the care of the GP or endure once the intervention is removed (Bower and Sibbald, 2001).

Including studies referenced in Bower and Sibbald's review, we found 15 studies set in the UK that focussed on the effect of mental health workers on prescribing. In one study, a clinically trained nurse assessed patients and could advise patients to consult their GP, but did not offer counselling (Mann et al., 1998). In all the remaining studies, counsellors were employed. Seven studies used nurse counsellors, two employed psychiatrists, one used a psychologist and the remaining four studies used trained counsellors, including a psychotherapist. Counselling techniques included problem-solving (Catalan et al., 1991; Mynors Wallis et al., 1997, 2000), non-directive counselling (Boot et al., 1994), behavioural treatments (Earll and Kincey, 1982; Ginsberg et al., 1984; Robson et al., 1984) and support and relaxation therapy (Jones, 1990). Ten studies found no significant effect on prescribing levels; four reported some significant impact; and one study did not report the significance of the findings. Further details are reported in Table A4.3 (Appendix 4).

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- *Recent NHS reorganisation has imposed multiple quality initiatives upon PCOs and hospitals through National Service Frameworks, guidance from NICE and local priority setting.*
- *Although there is consistency in the general approach to the management of prescribing in primary care, PCOs are responding variably to these initiatives in terms of the specific policies they pursue. For example, the level of response for any type of national guidance cited in the MANMED survey ranged from no action to nine types of action.*
- *In the light of such variations in response by PCOs to central guidance, health policy makers may need to give consideration to the capacity of these organisations to accommodate further change.*
- *While prescribing incentive schemes appear to be broadly similar, differences in detail may mean that schemes vary in their ability to incentivise prescribing behaviour.*
- *Improved quality of prescribing is more important to most respondents than staying within budget. This is reflected in the prescribing incentive schemes, most of which allow rewards to be earned without achieving budgetary targets.*
- *Implementation research provides general insights into the different strategies available for influencing prescribing behaviour. However, the factors determining effectiveness remain unclear.*
- *Given the diverse and complex nature of medicines management currently found within the NHS, it may prove difficult to interpret the findings of implementation research, even if carefully designed.*
- *Given our lack of knowledge about what works, and the need for local ownership of initiatives, government should resist the temptation to impose too rigid a framework for local medicines management, in particular by becoming more prescriptive as to the content of prescribing schemes.*
- *Rather, government should play a key role in ensuring that lessons are learned as to which interventions do or do not appear to be effective. This could be achieved partly by commissioning structured research, and partly by ensuring that experiences of good and bad practice are shared within the NHS and the wider research community.*
- *PCOs need to think through how to handle NICE appraisal guidance that restricts the use of medicines to a subset of patients for whom it is both effective and cost-effective.*

4.1 How are PCOs managing medicines?

Recent NHS reorganisation has imposed multiple quality initiatives upon PCOs and hospitals through National Service Frameworks (NSFs), guidance from NICE and local priority setting. There are also new important budget constraints, with PCO medicines expenditure now included in their overall cash limited budget. The MANMED survey provides an important insight into how PCOs are beginning to manage medicines expenditure in the new environment. It achieved response rates of 66% for the PCOs and 57% for the NHS Trusts. Although self-reported data are susceptible to a range of biases, these response rates, during a period of reorganisation and merger, nevertheless enable us to gain an informative snapshot of medicines management in the NHS.

Improved quality of PCO prescribing is more important to most respondents than staying within budget. This is reflected in the prescribing incentive schemes, most of which allow rewards to be earned without achieving budget targets. Findings from the survey point to a common overarching approach in tackling these initiatives. Almost all PCO prescribing advisers visit both practices and individual GPs (outreach), provide printed materials (prescribing newsletters and dissemination of NSFs and NICE guidance), and use audit and performance management (review prescribing patterns and indicators of prescribing performance). In addition, most advisers also hold educational meetings (seminars) and most PCOs operate financial incentives in the form of a prescribing incentive scheme. On average, advisers offered six or seven types of prescribing support and no respondent offered fewer than three. Multifaceted support appears to be the norm.

Despite this consistency in the general management approach, enormous diversity was found in the detail of execution, as demonstrated by the scope of prescribing incentive schemes and other prescribing initiatives and by reported response to NICE guidance and NSFs. For example, while some PCOs took no action in response to guidance, others reported taking up to nine types of action; this was true for each of the four types of guidance cited in the survey. In addition, the mean level

Table 7 **Dates of publication for NICE/NSF guidance**

NICE/NSF	Title	Year	Month
NSF	Mental Health	1999	September
NSF	Coronary Health Disease	2000	March
NICE	Guidance on the use of taxanes for breast cancer ⁹	2000	June
NICE	Guidance on the use of PPIs in the treatment of dyspepsia	2000	July
NICE	Guidance on rosiglitazone for type 2 diabetes mellitus	2000	August

of response to the different types of guidance ranged from 2.0 types of action (NICE guidance on rosiglitazone) to 4.4 (CHD NSF). One possible explanation for this finding was the timing of the survey in relation to guidance publication dates (see Table 7).

As the survey was mailed in May 2001, a minimum of nine months had elapsed since the publication of the most recent guidance. This was probably sufficient to allow responses to be made, particularly since the survey allowed for ongoing action to be reported. However, since the NICE publications followed in quick succession, it is possible, that lower reported levels of activity for rosiglitazone were in part a reflection of the survey date.

Although recommendations in the CHD NSF involved an increase in the prescribing volume of medicines effective for reducing cardiovascular risk, no specific funding was allocated for this purpose. Instead, the NSF cited the government's Comprehensive Spending Reviews – which outline increases in general NHS funding levels – as the source of additional resources for cardiovascular system medications (Department of Health, 2000a). Similar proportions of PCO respondents (33%) and NHS Trust respondents (35%) had specifically requested funding of drug use in response to the NSF.

9 The question on taxanes was included in the MANMED (NHS Trust) survey only.

PCOs and NHS Trusts are not keeping up with all of the central quality initiatives issued to them, but nonetheless more are planned. Health policy makers may need to give consideration to the capacity of these organisations to accommodate further change. The introduction from the beginning of 2002 of a requirement for PCOs to provide funding for all positive NICE decisions within three months of NICE issuing guidance from a technology appraisal may reduce the diversity of response at least in the case of NICE guidance. However, it may reduce the ability of PCOs to fund other initiatives.

The prescribing incentive schemes analysed in this report represent about one quarter of all PCOs in England. Although the sample of schemes was representative in terms of regional location, it is unclear whether the findings – for instance, that 25% of schemes used the Department of Health specified maximum payment – are true of prescribing incentive schemes more generally. In addition, it was clear that some schemes received were an edited version of the full scheme, and the findings should be interpreted in this light.

All schemes contained therapeutic prescribing targets and most schemes (87%) included at least one budgetary target; most (63%) offered multiple budgetary targets. We should note that the first priority stated by survey responders for PCO prescribing was improved quality. Staying within budget was an important but secondary objective. Making savings against budget was in the top three priorities of only 13% of respondents. These priorities appear to have been reflected in the incentive schemes we analysed. Nearly all linked financial rewards to the achievement of a mix of quality and financial targets. In many cases rewards could be earned from achieving quality indicators even if budgetary targets were not met. Even in those schemes where rewards were only triggered by achieving financial targets, quality targets acted as qualifying criteria that had to be achieved before the practice was eligible to receive rewards for hitting the financial targets. Taking into account the different levels of reward on offer, the different systems used to qualify for these rewards and, in particular, the different data requirements placed upon GPs, one might expect the schemes to vary in their capacity to incentivise prescribing behaviour.

NICE decisions are increasingly restricting the use of medicines

within the NHS to a subset of those who would benefit under the licensed indications. The MANMED survey suggests that few PCOs have thought through the consequences – i.e. that a view must be taken as to whether patients for whom a medication would be effective but not cost-effective should be offered a private prescription.

4.2 Evidence on what works

Given the diversity of activity currently found in medicines management and the climate of continuous change in PCO and NHS Trust configuration, it will be difficult to evaluate the various initiatives.

Implementation research, which studies the methods used to promote the uptake of research findings, provides some general messages as to what is likely to work (NHS Centre for Reviews and Dissemination, 1999). Even here, however, there is scepticism as to what we can conclude. Foy and colleagues believe that the current evidence base is limited: inadequacies in the theoretical framework underpinning studies, coupled with poor reporting of key process variables (relating to the context and content of interventions) has made a systematic aggregation of findings impossible (Foy et al., 2001). They argue that future research will have to address these issues, if answers to these key questions are to be found.

Our review of existing literature concluded that no intervention, or combination of interventions, is effective under all circumstances. Multifaceted interventions appear to be generally more effective than single strategies. In terms of the process of implementation, routine mechanisms to monitor, feedback and reinforce changes should be in place, those delivering the intervention should have appropriate knowledge and skills, and interventions should be adequately funded. Printed materials or didactic educational sessions are generally less effective in changing provider behaviour, whereas there is evidence that educational outreach, audit and feedback and interactive workshops can be effective under certain conditions. The evidence on the impact of financial incentives is limited. There are no controlled trials and the fundholding literature suggests that whilst there was evidence of a short term impact it is much less clear whether the differ-

ences in expenditure levels and growth rates were sustained over time, after taking into account practice characteristics and where they started from.

Important questions remain unanswered by the implementation literature: we still do not understand which factors influence effectiveness, nor do we understand their interplay. For instance, educational outreach is a strategy for changing prescribing behaviour that has been relatively thoroughly researched. Findings from the studies conducted in North America suggest not only that the intervention is effective, but also that it may even be cost saving (Anderson and Lexchin, 1996). Evidence from the UK, however, reports mixed findings: the only clear conclusion is that that untargeted outreach is probably not worthwhile (Freemantle et al., 2002; Hall et al., 2001). However, the implications of this conclusion are unclear: exactly how should an outreach intervention be targeted?

It must also be the case that the effectiveness of interventions to change prescribing behaviour will depend in part on the acceptability, to the intended audience, of the type of target chosen. The diversity of response we found in PCO response to NICE and NSF guidance must in part reflect whether the guidance relates to an issue of local concern. Similarly, willingness to achieve a budget target must in part depend on the degree of effort required, what any financial reward would be spent on, and the perceived consequences of failing to hit the target.

4.3 Implications for PCO medicines management

The PCOs appear to be moving in the right direction. However, greater understanding is needed of what types of intervention work. The diversity of PCO response provides an opportunity to undertake research through natural experiments, whereas controlled trials will take time to organise. In the meantime PCOs need to be given more explicit guidance as to what the literature suggests is more or less likely to work.

The diversity of PCO response to national advice and to the requirement to establish prescribing incentive schemes suggests an ele-

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ment of local discretion as to which national targets are priorities, and differences of view between PCOs as to how best incentivise prescribing. This is likely to assist the achievement of these targets as local 'buy in' is important.

Given our lack of knowledge about what works and the need for local ownership, government should resist the temptation to impose too rigid a framework for local medicines management, in particular by becoming more prescriptive as to the content of prescribing schemes. Setting multiple targets and constraining local initiatives will be counterproductive. Rather it should play a key role in ensuring that lessons are learned as to what interventions do and do not appear to be effective. Partly this could be achieved by commissioning structured research, and partly by ensuring that experiences of good and bad practice are shared within the NHS and the wider research community.

Finally, PCOs need to think through how to handle NICE appraisal guidance that restricts the use of medicines to a subset of patients for whom it is both effective and cost-effective.

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APPENDIX 1: THE MANMED SURVEY

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The MANMED Survey Sample

The survey was conducted during a period of reorganisation within the NHS, as April 1st 2001 saw a substantial level of change to NHS organisations in England. About one quarter of existing NHS Trusts and 45% of existing PCOs were involved in at least one type of change, whether dissolution, change of name, transfer of property or merger and an additional 30 NHS Trusts, 36 PCTs¹⁰ and 22 PCGs were established. This created problems for determining the sample size (and hence the response rate) for two reasons:

- 1 Some newly established organisations were unable to complete the survey. This was partly because some of the survey questions were historical in nature and partly because the infrastructure of the new organisations was insufficiently established to allow a response.
- 2 Some 'dissolved' organisations were still able to complete the survey. In some cases, more than one response was received from some new organisations (i.e. from the constituent – 'dissolved' – organisations involved in the creation of the new one).

Three NHS Trusts contacted us directly to highlight the impossibility of completing the survey. To take the number of organisations resulting from the reorganisations as the sample size would be therefore inappropriate. We decided instead to include in our sample only those who could have responded at the time of the survey. Two NHS Trusts that were newly established from a merger of multiple bodies were excluded for the first reason listed above and we excluded from the sample ten NHS Trusts that had been completely dissolved and whose services had been taken over by newly established organisations; and we excluded two newly established NHS Trusts that had reported that they were unable to respond. In addition to the analysis of all respondents, we decided to perform a subgroup analysis to look separately at responses from 'changed' and 'unchanged' organisations.

NHS Trusts

Ambulance Trusts and Special Hospital Authorities (such as Rampton) were excluded, as were Trusts that had no inpatient facilities or facilities only for patients with learning disabilities. The contact details of all

¹⁰ This does not include the 89 PCGs that 'upgraded' to PCTs in 2001, but refers only to newly established organisations that resulted from the merger of two or more PCOs.

remaining NHS Trusts in England were identified from Binley's Directory of NHS Management, Spring 2001 edition (Binley's, 2000) and, where possible, a chief pharmacist, or similar rank of individual, was identified. Details were supplemented by the Chemist & Druggist Directory 2001 (Chemist & Druggist, 2000). Following exclusions, a total of 275 NHS Trusts were included in the survey, 227 (83%) of which had not undergone reorganisation in 2001.

Primary Care Groups and Trusts

Contact details for PCO prescribing leads and prescribing advisers were taken from two directories (Binley's, 2000; Chemist & Druggist, 2000). These were supplemented with more up to date information from the Department of Health website (Department of Health, 2001a,b). To avoid the risk of exacerbating 'survey fatigue', 71 PCCs participating in the National Tracker survey (NPCRDC and King's Fund, 2000) were excluded from the MANMED survey. Instead, a single page 'Prescribing Enquiry Form' was sent to the prescribing adviser. Respondents were assured that all information supplied through the survey would be treated in confidence and that no individual PCO would be identified in the analysis, without written consent.

Although we sent separate and slightly different surveys to two individuals (i.e. the prescribing adviser and the prescribing lead) at each PCO, in practice we found that the prescribing adviser frequently responded to the survey addressed to the prescribing lead. It would therefore be inappropriate to treat data from the two surveys as independent sources of information, as originally planned; findings from the two surveys were consequently pooled for all relevant questions. Only one question in each survey was unique and responses for these were analysed separately. Responses from the 'Tracker' organisations were also combined with findings from the MANMED survey, where appropriate.

Following reorganisations, there were 401 PCOs (237 PCGs and 164 PCTs) in England in April 2001. Of these, 71 were participants in the Tracker survey and were excluded from the main survey. In June 2001, three PCGs were dissolved and reformed to make two PCGs, bringing the total number of PCOs included in the survey to 329. Of these, 215 (65%) had not undergone reorganisation in 2001.

Relation of survey sample to population

'Changed' organisations are those that experienced a change in the year of

the survey (2001), such as an upgrade (to PCT), a merger, establishment or dissolution. Although these 'changed' organisations were over represented in our survey samples, both of PCOs and of NHS Trusts, the differences were not statistically significant.

NHS Trusts

Of the 275 NHS Hospital Trusts included in our survey, 227 (83%) had undergone no change. Responses were received from 123 (54%) of these organisations. Forty-eight (17%) NHS Trusts surveyed had been subject to either dissolution or to merger or were newly established. Responses were received from 34 (71%) of these organisations. Our sample of NHS Trusts differed from the national situation therefore, in that a higher proportion of 'changed' organisations was included in the response. However, the difference between the population and sample in the proportion of changed and unchanged Trusts was not statistically significant (Appendix 2, Table A2.2).

Overall, our survey sample was also broadly representative of the population of NHS Trusts in England in terms of regional distribution. Although the South West and West Midlands regions were slightly under represented and the North West region over-represented in our survey, the differences were not statistically significant (see Appendix 2, Table A2.3).

Primary Care Groups and Trusts

Of the 332 PCOs in England included in the MANMED survey, 216 (65%) had undergone no change in 2001 and 142 (66%) of these responded to the survey. Of the 116 PCOs that had changed, responses were received from 78, giving a response rate of 67%. No difference was found between the sample and the population in terms of the proportion of changed and unchanged organisations (see Appendix 2, Table A2.4).

In 2001, the NHS in England was divided into eight regions. We compared the regional distribution of our survey samples with that of all PCOs in England and found that the two were very similar. Data are presented in Appendix 2, Table A2.5. Data were also analysed by proportion of PCTs of all PCOs. The results are presented in Appendix 2, Table A2.6 and show that the sample of respondents was very similar to that of the population in terms of PCT status.

APPENDIX 2: RESULTS TABLES

Table A2.1 MANMED response rates: NHS Trusts and PCOs

		Population	Respon- dents	Response rate (%)
NHS Trust responses	All	275	157	57%
	Unchanged	227	123	54%
	Changed	48	34	71%
Combined PCO responses (PA and PL)	All	332	220	66%
	Unchanged	215	140	65%
	Changed	117	80	68%

Table A2.2 ‘Changed’ and ‘unchanged’ NHS Trusts in England, 2001: a comparison with the MANMED respondents

	Sample (N=157)		Population (N=275)	
	No. [1]	%	No. [2]	%
Unchanged	123	78%	227	83%
Changed	34	22%	48	17%

Fisher’s exact test: two sided (by summation) [1] vs. [2], $p = 0.31$

Table A2.3 **Regional distribution of NHS Trusts in England, 2001: a comparison with the MANMED respondents**

	Sample (N=157)		Population (N=275)	
	No. [1]	%	No. [2]	%
Eastern	15	10%	26	9%
London	25	16%	46	17%
North West	30	19%	43	16%
Northern & Yorkshire	18	11%	30	11%
South East	27	17%	44	16%
South West	10	6%	26	9%
Trent	16	10%	24	9%
West Midlands	16	10%	36	13%

Chi-square test (2 by k): [1] vs. [2], $p = 0.89$

Table A2.4 **'Changed' and 'unchanged' PCGs and PCTs in England, 2001: a comparison with the MANMED respondents**

	Whole sample ¹¹ (N=264)		Whole population ¹² (N=400)		Non Tracker sample ¹³ (N=220)		Non Tracker population ¹⁴ (N=332)	
	No. [1]	%	No. [2]	%	No. [3]	%	No. [4]	%
Unchanged	166	63%	249	62%	142	65%	216	65%
Changed	98	37%	151	38%	78	35%	116	35%

Fisher's exact test: two sided (by summation): [1] vs. [2], $p = 0.93$; [3] vs. [4], $p = 0.93$

11 Whole sample: all PCGs and PCTs contributing data to the survey (N=264). This sample contributed data for question 14 of the prescribing adviser survey.

12 Population: all PCGs and PCTs in England in 2001, following reorganisation (N=400).

13 Non-Tracker sample: PCGs and PCTs contributing data to the remaining survey questions (N=220).

14 Non-Tracker population: all PCGs and PCTs in England, excluding those included in the Tracker survey (but including three Tracker PCOs inadvertently surveyed).

Table A2.5 Regional distribution of PCGs and PCTs in England, 2001: a comparison with the MANMED respondents

	Whole sample (N=264)		Whole population (N=400)		Non Tracker sample (N=220)		Non Tracker population (N=332)	
	No. [1]	%	No. [2]	%	No. [3]	%	No. [4]	%
Eastern	31	11.7%	46	11.5%	26	11.8%	38	11.4%
London	33	12.5%	51	12.8%	24	10.9%	42	12.7%
North West	40	15.2%	58	14.5%	36	16.4%	49	14.8%
Northern & Yorkshire	31	11.7%	48	12.0%	26	11.8%	39	11.7%
South East	54	20.5%	68	17.0%	46	20.9%	57	17.2%
South West	25	9.5%	38	9.5%	21	9.5%	32	9.6%
Trent	23	8.7%	44	11.0%	18	8.2%	35	10.5%
West Midlands	27	10.2%	47	11.8%	23	10.5%	40	12.0%

Chi-square test (2 by k): [1] vs. [2], $p = 0.94$; [3] vs. [4], $p = 0.92$

Table A2.6 PCGs and PCTs in England, 2001: a comparison with the MANMED respondents

	Whole sample (N=264)		Whole population (N=400)		Non Tracker sample (N=220)		Non Tracker population (N=332)	
	No. [1]	%	No. [2]	%	No. [3]	%	No. [4]	%
PCG	158	60%	236	59%	135	61%	201	61%
PCT	106	40%	164	41%	85	39%	131	39%

Fisher's exact test: two sided (by summation): [1] vs. [2], $p = 0.87$; [3] vs. [4], $p = 0.86$

APPENDIX 3: SEARCH STRATEGIES

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Silverplatter databases

The following search strategy was used to search Medline, EMBASE, Kings Fund Database, HELMIS, DHDData, EconLit, Cinahl, AMED and PAIS.

SilverPlatterASCII 3.0WINNSelected Databases

1. medicines management in ti ab
2. academic detailer* in ti ab
3. therapeutics adviser* in ti ab
4. prescribe in ti ab
5. prescribing in ti ab
6. prescription* in ti ab
7. prescribed in ti ab
8. pharmaceutical* in ti ab
9. pharmacy in ti ab
10. pharmacist* in ti ab
11. PACT in ti ab
12. PPA in ti ab
13. hmo in ti ab
14. advice in ti ab
15. adviser* in ti ab
16. advising in ti ab
17. control* in ti ab
18. influenc* in ti ab
19. budget* in ti ab
20. incentive* in ti ab
21. expenditure* in ti ab
22. spending in ti ab
23. overspending in ti ab
24. spent in ti ab
25. overspent in ti ab
26. cost* in ti ab
27. indicator* in ti ab
28. guidance in ti ab
29. behaviour in ti ab
30. behavior in ti ab
31. audit* in ti ab
32. policy in ti ab

33. policies in ti ab
34. computer system* in ti ab
35. manag* in ti ab
36. clinical governance in ti ab
37. evidence based in ti ab
38. quality in ti ab
39. general practi* in ti ab
40. family practi* in ti ab
41. (family near (doctor or physician*)) in ti ab
42. gp in ti ab
43. gps in ti ab
44. pcg in ti ab
45. pcgs in ti ab
46. (primary near2 care) in ti ab
47. pct in ti ab
48. pcts in ti ab
49. #1 or #2 or #3
50. #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13
51. #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23
or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or
#33 or #34 or #35 or #36 or #37 or #38
52. #39 or #40 or #41 or #42 or #43 or #44 or #45 or #46 or #47 or #48
53. #50 near2 #51
54. #53 and #52
55. #54 or #49
56. #55 and (PY >= '1980')
57. #56 and (LA = 'ENGLISH')

Internal database

To search the internal catalogue for the CRD/CHE Information Service the following strategy was used;

- S medicines management or academic detailer\$ or therapeutics adviser\$
- S prescri\$ or pharmac\$ or PACT or PPA or hmo
- S general(W)practi\$ or family(W)practi\$ or family(W)doctor or fami-
ly(W)physician\$ or gp or gps or pcg or pcgs or primary(W)care or pct
or pcts
- S S2 and s3
- S s1 or s4

Cochrane database

The following strategy was used to search the Cochrane database

- 1 (MEDICINES and MANAGEMENT)
- 2 (ACADEMIC and DETAILER)
- 3 (THERAPEUTIC or THERAPEUTICS)
- 4 (ADVISER or ADVISOR)
- 5 (#3 and #4)
- 6 ((#1 or #2) or #5)
- 7 PRESCRIBE
- 8 PRESCRIBING
- 9 (PRESCRIPTION or PRESCRIPTIONS)
- 10 PRESCRIBED
- 11 PHARMACEUTICAL
- 12 PHARMACEUTICALS
- 13 PHARMACY
- 14 (PHARMACIST or PHARMACISTS)
- 15 PACT
- 16 PPA
- 17 HMO
- 18 (((((((((#7 or #8) or #9) or #10) or #11) or #12) or #13) or #14) or #15) or #16) or #17)
- 19 ADVICE
- 20 ADVISING
- 21 ((CONTROL or CONTROLS) or CONTROLLING)
- 22 ((INFLUENCE or INFLUENCES) or INFLUENCING)
- 23 (BUDGET or BUDGETS)
- 24 (INCENTIVE or INCENTIVES)
- 25 (EXPENDITURE or EXPENDITURES)
- 26 (SPENDING or OVERSPENDING)
- 27 (SPENT or SPEND)
- 28 (OVERSPENT or OVERSPEND)
- 29 ((COST or COSTS) or COSTING)
- 30 (INDICATOR or INDICATORS)
- 31 (GUIDANCE or GUIDELINE)
- 32 GUIDELINES
- 33 (BEHAVIOUR or BEHAVIOR)
- 34 ((AUDIT or AUDITS) or AUDITING)
- 35 (POLICY or POLICIES)
- 36 (COMPUTER and (SYSTEM or SYSTEMS))

- 37 (((MANAGE or MANAGEMENT) or MANAGING) or MAN-
AGES)
- 38 ((CLINICAL and GOVERNANCE) or QUALITY)
- 39 (EVIDENCE and (BASE or BASED))
- 40 (((((((((((((((((((((#20 or #21) or #22) or #23) or #24) or #25) or #26)
or #27) or #28) or #29) or #30) or #31) or #32) or #33) or #34) or
#35) or #36) or #37) or #38) or #39) or #40)
- 41 (GENERAL and (PRACTITIONER or PRACTITIONERS))
- 42 (GENERAL and (PRACTITIONER or PRACTITIONERS))
- 43 (FAMILY and (PRACTITIONER or PRACTITIONERS))
- 44 (FAMILY and (PHYSICIAN or DOCTOR))
- 45 GPS
- 46 (PCG or PCGS)
- 47 (PCT or PCTS)
- 48 (PRIMARY and CARE)
- 49 ((((((#43 or #44) or #45) or #46) or #47) or #48) or #49)
- 50 ((#19 and #41) and #50)
- 51 (#51 or #6)

APPENDIX 4: TABULAR SUMMARY OF LITERATURE REVIEW

Table A4.1 The effect of education and information on prescribing (UK studies)

Study	Country (County)	Design	Randomisation Unit of analysis	Setting Prescribers	N enrolled N final Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Al Eidan et al., 2000	Northern Ireland (Antrim)	CR&A	NA patient	Institution; hospital medical staff	227 patients 100% 0%	Ongoing 28 days Follow up	Adults admitted with a primary diagnosis of lower respiratory tract infection (LRTI)	Antibacterials	Protocol development and implementation no intervention	Number patients receiving IV therapy; duration of IV therapy; cost of antibacterials	Intervention group statistically significantly better than control in all three measures
Avery et al., 1997	England (Lincolnshire)	Case study with matched controls	NA practice	Community; primary care practices GPs	20 practices 0% 100%	Ongoing 3 months Follow up	All practices in study invited	NSAIDs	Participation in practice formulary development with physician assistance no intervention	(1) % NSAID DDDs from formulary; (2) Number different NSAIDs used; (3) % NSAID DDDs from 3 most used drugs; (4) %NSAID DDDs prescribed generically; (5) Number of NSAIDs; DDD/1000PU; (6) NSAID costs/1000PU	(1)-(3) showed statistically significant difference between groups; (4)-(6) did not.

Table A4.1 The effect of education and information on prescribing (UK studies) (continued)

Study	Country (County)	Design	Randomisation Unit of analysis	Setting Prescribers	N enrolled N final Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Bryce et al., 1995	Scotland (Tayside)	RCT	Patient patient	Community; primary care practices GPs	3373 patients 93% 7%	12 months	Children aged 1-15 inclusive, with symptoms suggestive of asthma	Respiratory drugs	Printed educational materials in patient record no intervention	Relative risk of receiving prescription	The central message of the guideline was to prescribe cromoglycate first, then inhaled steroids. Prescription rates for inhaled cromoglycate were significantly higher in the intervention group, relative to the control, but there was no significant difference between the groups regarding prescriptions of inhaled steroids. NOTE: the same physicians treated both groups.
Cates, 1999	England (Hertfordshire)	CB&A	NA practice	Community; primary care practices GPs	NS NS NS	1 year 1 year	Investigator's practice, and one other local practice	Amoxicillin suspension for otitis media	Patient-directed advice + leaflet + prescription to be kept for 1-2 days usual care	Total number of prescriptions issued, monthly; median number of prescriptions	Significant fall in number of prescriptions issued by both groups, relative to before period; fall greater in intervention group

Table A4.1 The effect of education and information on prescribing (UK studies) (continued)

Study	Country (County)	Design	Randomisation Unit of analysis	Setting Prescribers	N enrolled N final (%) Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Feder et al., 1995	England (London)	RCT	Practice practice	Community; primary care practices GPs	24 practices 100% 0%	3 x lunchtime sessions 12 months	Inner city non-training practices	Asthma medications	Outreach visit (group visit by trialists)+ distribution of asthma guideline	Index of median cost of prescribing of prophylaxis to bronchodilators, before and after intervention	Significant increase in index for intervention group, relative to control.
Fender et al., 1999	England (Norfolk)	RCT	Practice patient	Community; primary care practices GPs	100 practices 74% 26%	1 x hour visit + follow up visit @ 6 months 12 months	Practices in study area	Drugs for menorrhagia: tranexamic acid, mefenamic acid; norethisterone	Outreach visit (group visit by trialists) distribution of diabetes guideline	Proportions prescribed study drugs	Significantly higher proportion of women in intervention group were prescribed tranexamic acid. No significant differences between groups for other study drugs.

Table A4.1 The effect of education and information on prescribing (UK studies) (continued)

Study	Country (Country)	Design	Randomisation Unit of analysis	Setting Prescribers	N enrolled N final Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Freeman et al., 2002	England (North of England; London)	RCT	Practice Practice	Community; primary care practices GPs	69 practices (11328 patient records) 91% 9%	2 visits, duration NS 3-11 months	Practices within 12 Health Authorities	Aspirin; ACEI; NSAIDs; anti-depressants	Outreach visit (group visit by pharmacist)+ distribution of educational materials + promotional materials (2 of 4 targeted guidelines) Non-targeted areas served as control	Practice adherence to guideline recommendations (Proportion of patients treated in line with guideline recommendations)	Overall improvement in performance: 5.2% (significant). Small practices (2 or fewer partners): 13.5% (sig.); large practices: 1.4% (not sig.)
Hall et al., 2001	England (North-umbria)	RCT	Practice practice	Community; primary care practices GPs	76 practices 100% 0%	1 visit; duration NS 12 months	Practices in study area	H. pylori eradication drugs (omeprazole, metro-nidazole)	Mailed guidelines + offer of outreach visit (group; pharmacist) + offer of audit Mailed guidelines	Mean dose units of study drugs	No significant difference between the groups

Table A4.1 The effect of education and information on prescribing (UK studies) (continued)

Study	Country (Country)	Design	Randomisation Unit of analysis	Setting Prescribers	N enrolled N final (%) Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Jones et al., 1993	England (Hampshire)	RCT	Practice physician	Community; primary care practices GPs	45 practices; 185 GPs 97% 3%	2 x 2-hourly meetings 6 months	All practices in study area invited	Gastrointestinal drugs	Participation in guideline development + mailed guidelines Mailed guidelines	Number of items prescribed; cost of items prescribed	No significant difference between groups in number of items prescribed; significant increase in prescribing costs in both groups, relative to baseline – significance of differences not reported.
Mason et al., 1998	England	ITS	NA patient	Community; primary care practices GPs	NA	NA 4 years	All patients receiving primary care antidepressant over study period	Anti-depressants	Printed educational materials None	Volume of use of SSRIs in person-years	Prescribing of SSRIs was estimated to be 8.2% lower than that predicted by the rates of prescribing prior to distribution
McNulty et al., 2000	England (Gloucestershire)	Case study with matched controls	NA practice	Community; primary care practices GPs	84 practices 77% 23%	12x1.5-2 hour workshops over 7 weeks; series of tutorials 4 months post intervention	All practices in study area invited	Antibacterials	Educational meetings + guidelines Microbiology tutorials + guidelines	Items prescribed and cost for (1) all antibacterials; (2) narrow spectrum; (3) broad spectrum; (4) new macrolides	(1)-(3) between group differences significant for items; (4) increase in both groups, contrary to guideline; between-group difference non significant

Table A4.1 The effect of education and information on prescribing (UK studies) (continued)

Study	Country (County)	Design	Randomisation Unit of analysis	Setting Prescribers	N enrolled N final (%) Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Newton Syms et al., 1992	England (West Yorkshire)	RCT	Physician physician	Community; primary care practices GPs	373 physicians 85% 15%	NS 5 months	Physicians in study setting	NSAIDs	Outreach visit (pharmacist) + distribution of educational materials no intervention	Mean monthly prescribing cost/physician; prescribing index (PI) (target drug); cost of prescribing target drug/ (cost of median PI for prescribing all drugs in class)	Significant decrease in mean monthly prescribing cost of ibuprofen in the intervention group, relative to baseline. Non-significant increase in reference group prescribing of ibuprofen. PI for ibuprofen increased significantly relative to control and to baseline.
Valori et al., 2001	England (Gloucestershire)	CB&A	NA population	Community; primary care practices GPs	48 practices (180 GPs) 96% (68%) 4% (32%)	10x1.5 hour workshops 3 years	Practices in study area	Drugs for dyspepsia	Interactive workshops (led by local opinion leader) + local guidelines + personalised reminders + guideline leaflet guideline leaflet only	Dyspepsia drug costs (BNF section 1.3)	Cost per head of population fell significantly in intervention group relative to control; finding maintained for 3 years.

Table A4.1 The effect of education and information on prescribing (UK studies) (continued)

Study	Country (Country)	Design	Randomisation Unit of analysis	Setting Prescribers	N enrolled N final (%) Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Watson and et al., 2001	England (Avon)	RCT	Practice practice	Community; primary care practices GPs	20 practices 100% 0%	2 x 10 minute visits 12 months post intervention	Practices in study area with EMIS computer system	NSAIDs	Outreach visits (1-2-1 x2) + guidelines Mailed guidelines No intervention	Primary outcome: volume of prescribing of 3 recommended NSAIDs as percentage of total NSAID prescribing. Secondary outcomes: various, but includes volume of prescribing of 5 recommended NSAIDs as percentage of total NSAID prescribing	Primary outcome: no significant difference; secondary outcome: significant difference only in volume of prescribing of 5 recommended NSAIDs as percentage of total NSAID prescribing.
White et al., 1989	England (Surrey)	RCT	Physician patient	Community; primary care practices GPs	27 physicians; 454 patients 74% 26%	7 meetings; length NS 2.5 years	Physicians in study setting, with no partner also participating trial	Asthma medications	Educational meetings, meetings, fortnightly Educational meetings, weekly No intervention	Patients reported use of asthma medications	Findings not reported by group, but for all patients.

Table A4.2 The effect of audit and performance management on prescribing (UK studies)

Study	Country (County)	Design	Randomisation	Setting Prescribers	N enrolled N at final assessment (%) Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Bond et al., 2000	Scotland (Grampian)	RCT	Practice patient	Community pharmacy PCPs	19 practices; 307/4 patients 75% 25%	12 months 12 months	All practices in study area invited	Drugs on repeat prescription	Audit and feedback (pharmacist) usual care	Number of items prescribed; number of compliance problems identified	Significantly more items prescribed in control group; Significantly more compliance problems identified in intervention group
Ray-brook and Walker, 1996	Wales (Gwent)	RCT	Practice patient	Community primary care practices PCPs	91 practices NS in abstract NS in abstract	6 months 24 months	All practices in study area invited	Antibacterials	Audit and feedback (active – pharmacist visit) Audit and feedback (passive – workbooks) No intervention	Items and cost per 1000 patients	Active feedback more effective in effecting required change than passive feedback; both more effective than no intervention. NB Reference group consisted of practices in study area declining to participate (25/91).

Table A4.2 The effect of audit and performance management on prescribing (UK studies) (continued)

Study	Country (County)	Design	Randomisation Unit of analysis	Setting Prescribers	N enrolled N at final assessment (%) Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Braybrook and Walker, 2000	Wales (Gwent)	RCT	Practice patient	Community; primary care practices PCP's	91 practices unclear unclear	1 x 1 hour visit 12 months	All practices in study area invited	NSAIDs	Audit and feedback (active – pharmacist visit) Audit and feedback (passive – workbooks) No intervention	Items and cost per 1000 patients	Active feedback more effective in effecting required change than passive feedback both more effective than no intervention. NB Reference group consisted of practices in study area declining to participate (25/91). Crossover occurred between groups after randomisation.
Huang et al., 2000	England (Buckinghamshire)	CB&A	NA patient	Institution; hospital junior medical staff	200 patients 100% 0%	Ongoing unclear	Patients undergoing major general surgery	Heparin	Active enforcement of protocol for prophylaxis of DVT by middle grade medical staff No active enforcement	% patients prescribed study drug in accordance with protocol	Significant improvement in adherence to protocol in intervention group, relative to control and to baseline.

Table A4.2 The effect of audit and performance management on prescribing (UK studies) (continued)

Study	Country (County)	Design	Randomisation	Setting Prescribers	N enrolled N at final assessment (%) Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Furniss et al., 2000	England (Cheshire)	RCT	Nursing home nursing home	Community; nursing home PCPs	14 nursing homes 100% 0%	4 months 8 months	Nursing homes in study area; residents included by consent	All drugs; neuroleptics	Audit and feedback (pharmacist) No intervention	Items and cost of prescriptions	Reduction in mean number and cost of prescribed drugs (not significant)
Krska et al., 2001	Scotland (Grampian)	RCT	Patient patient	Community; primary care practices PCPs	381 patients 87% 13%	NS 3 months	Patients aged 65 and over, receiving at least four medications on repeat an with at least two chronic diseases	All drugs	Audit and feedback (pharmacist) Audit only (pharmacist)	% pharmaceutical care issues (PCIs) resolved	Significantly more PCIs of almost all types were resolved in the intervention group, relative to the control.

Table A4.2 The effect of audit and performance management on prescribing (UK studies) (continued)

Study	Country (Country)	Design	Randomisation Unit of analysis	Setting Prescribers	N enrolled N at final assessment (%) Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Zerman-sky et al., 2001	England (Leeds)	RCT	Patient patient	Community; primary care practices GPs	1188 patients 95% 5%	20 minutes 12 months	Patients aged 65 and over, receiving at least one medication on repeat	Drugs on repeat prescription	Audit and feedback (pharmacist) usual care	Primary outcome: number of changes to repeat prescriptions over study period. Secondary outcome: changes in number and cost of medicines	Significantly higher number of changes to repeat prescriptions in intervention group, relative to control. Significantly smaller increase in number and cost of medicines in intervention group, relative to control. Intervention found to be cost saving.

Table A4.3 The effect of financial and practical support on prescribing (UK studies)

Study	Country (County)	Design	Randomisation	Setting Prescribers	N enrolled N at final assessment (%) Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Boot et al., 1994	England (Northamptonshire)	RCT	Patient patient	Community; primary care practices PCPs	192 patients 87% 13%	1x 1 hour session over 6 weeks 6 weeks from start of intervention	Patients with mixed emotional problems	Psychotropic medications	Replacement model; practice counsellor, using non-directive counselling usual care	Proportion of patients receiving prescription for psychotropic drugs over study period	Intervention group significantly less likely to receive prescriptions of psychotropics (p=0.029). Finding applied to anidepressants, but not to anxiolytics.
Catalan et al., 1991	England (Oxfordshire)	RCT	Patient patient	Community; primary care practices PCPs	113 patients NS NS	4 sessions over 6 weeks 28 weeks	Patients with recent onset emotional disorders of poor prognosis	Psychotropic medications	Replacement model; psychiatrist, using problem solving usual care	Number of patients issued new prescriptions	More patients in the control group were issued new prescriptions, relative to the intervention group, during and after the trial.

Table A4.3 The effect of financial and practical support on prescribing (UK studies) (continued)

Study	Country (Country)	Design	Randomisation	Setting Prescribers	N enrolled N at final assessment (%)	Duration of intervention	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Earl and Kinsey, 1982	England (Cheshire)	RCT	Patient patient	Community; primary care practices PCPs	50 patients 84% 16%	8 sessions over 16 weeks 7 months from referral by GP	Patients with mixed psychological problems, referred consecutively from one GP practice	Psychotropic medications; other medication	Replacement model: psychiatrist, using behavioural treatment usual care	Number of patients receiving at least one psychotropic prescription; number of patients maintained at 7 months follow up least one non- psychotropic prescription	Statistically significantly fewer patients in the treatment group received psychotropic medication; significance not maintained at 7 months follow up
Friedli et al., 1997	England (London)	RCT	Patient patient	Community; primary care practices PCPs	136 patients 86% 14%	6-12 sessions, 50 minutes/ week 9 months	Adults with emotional difficulty, considered by GP to require brief psychotherapy	Anti- depressants	Replacement model: psychotherapist using Rogerian model of psychotherapy usual care	Number of patients prescribed study drug during first 3 months	14% of intervention group and 18% of control group were prescribed antidepressants (difference non significant)

Table A4.3 The effect of financial and practical support on prescribing (UK studies) (continued)

Study	Country (Country)	Design	Randomisation	Setting Prescribers	N enrolled N at final assessment (%) Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Ginsberg et al., 1984	England (London)	RCT	Patient patient	Community; Health centres PCPs	92 patients 76% 24%	Variable number of 1 hour sessions 2 years	Patients with neurotic problems	Unclear	Replacement model: nurse therapist, using behavioural psychotherapy usual care	Average cost of drugs and dispensing; baseline and 1 year	No statistically significant difference between the two groups (based on sample)
Gourmay and Brookings, 1994	England (London)	RCT	Patient patient	Community; primary care practices PCPs	231 patients 54% 46%	Unclear 24 weeks	Patients with non-psychotic problems	Psychotropic medication: hypnotics, tranquillisers, phenothiazine, anti-depressants	Replacement model: CPN, using counselling Replacement model: CPN, using counselling (intervention delayed by 12 weeks) usual care	Number of patients receiving prescription for psychotropic drug(s)	No significant difference between the groups

Table A4.3 The effect of financial and practical support on prescribing (UK studies) (continued)

Study	Country (Country)	Design	Randomisation Unit of analysis	Setting Prescribers	N enrolled N at final assessment (%) Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Hemmings, 1997	England (East Sussex)	RCT	Patient patient	Community; primary care practices, with no experience of working with counsellors PCPs	188 patients 78% 22%	Unclear 8 months	Patients with mixed emotional problems	Psychotropic medications	Replacement model: practice counsellor, using eclectic counselling usual care	% patients using psychotropic drugs	No significant difference between the groups
Jones, 1990	Wales (South)	RCT	Patient patient	Community; primary care practices PCPs	253 patients 90% 10%	Variable 9 months	Patients aged 65 and over, receiving psychotropic medicine for at least 3 months	Psychotropic medications	Consultant liaison model: practice nurse offering counselling, support and relaxation therapy usual care	Proportion stopping psychotropic medication; Proportion reducing psychotropic medications	Significant differences for both prescription measures. Only 46% of intervention group agreed to attempt reduction in psychotropic medication

Table A4.3 The effect of financial and practical support on prescribing (UK studies) (continued)

Study	Country (Country)	Design	Randomisation	Setting Prescribers	N enrolled N at final assessment (%) Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Mann et al., 1998 (study 1)	England (various)	RCT	Patient patient	Community; primary care practices PCPs	158 patients 88% 12%	NA 4 months	Patients with depression	Anti-depressants	Consultant liaison model; nurse assessment and feedback + usual GP care nurse assessment + no feedback + usual GP care	% patients receiving antidepressant medication	A higher % of patients in the intervention group received medication, relative to the control group ($p < 0.08$)

Table A4.3 The effect of financial and practical support on prescribing (UK studies) (continued)

Study	Country (Country)	Design	Randomisation Unit of analysis	Setting Prescribers	N enrolled N at final assessment (%) Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Mann et al., 1998 (study 2)	England (various)	RCT	Patient patient	Community; primary care practices PCPs	419 patients 92% 8%	8 hours of contact time over study period 4 months	Patients with depression	Anti- depressants	Consultant liaison model; nurse assessment and feedback + nurse assisted care Consultant liaison model; nurse assessment and feedback + usual GP care	% patients receiving antidepressant medication	No statistically significant difference between the groups
Mynors Walis et al., 1997	England (Oxford- shire)	RCT	Patient patient	Community; Health centres PCPs	70 patients 69% 31%	4 sessions (1/2-1 hourly) over 8 weeks 26 weeks	Patients with mixed emotional problems of at least on month's duration	All drugs	Replacement model: community nurses, using problem solving usual care	Mean cost of medications	No significant difference between groups during treatment, but a significant difference between the groups was found during the 4 months following the trial and at 26 weeks.

Table A4.3 The effect of financial and practical support on prescribing (UK studies) (continued)

Study	Country (County)	Design	Randomisation	Setting Prescribers	N enrolled N at final assessment (%) Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Mynors Wallis et al., 2000	England (Oxfordshire)	RCT	Patient patient	Community; Health centres PCPs	151 patients 75% 25%	6 sessions over 12 weeks 52 weeks	Patients with major depression	Anti-depressants	Replacement model; research GP or research nurse, using problem solving + antidepressant Replacement model; research nurse, using problem solving Replacement model; research GP, using problem solving	Relationship between prescription for antidepressant and clinical outcome	No significant difference on any clinical outcome measures.

Table A4.3 The effect of financial and practical support on prescribing (UK studies) (continued)

Study	Country (Country)	Design	Randomisation Unit of analysis	Setting Prescribers	N enrolled N at final assessment (%) Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Nazareth et al., 2001	England (London)	RCT	Patient patient	Mixed; hospital; community GPs; hospital physicians	362 patients 82% 19%	5.5 hours to prepare and administer discharge plan; 1-3 domiciliary visits @30-4 minutes/visit 6 months	Non-demented hospitalised patients aged 75 and over and receiving 4 or more medications	All drugs	Patient counselling (pharmacist) + copy of pharmacy medication discharge plan + domiciliary visit(s) usual care	Patient knowledge of / adherence to prescribed medication over previous week	No significant differences between groups at either 3 month or 6 month assessments.
Pharoah, 1996	England (Cambridgeshire)	CB&A	NA NA	Community; primary care practices PCPs	32 practices 100% 0%	NS 6 months	Physicians at study practices	Psychotropic medications; hypnotics, anxiolytics	Replacement model: practice counsellors usual care	Mean monthly prescription items / 1000 PU	Prescribing fell in both groups difference not statistically significant

Table A4.3 The effect of financial and practical support on prescribing (UK studies) (continued)

Study	Country (Country)	Design	Randomisation	Setting Prescribers	N enrolled N at final assessment (%) Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Robson et al., 1984	England (Surrey)	RCT	Patient patient	Community; health centre PCPs	429 patients NS NS	4 sessions over 10 weeks (max) 52 weeks	Patients with mixed psychological problems, with potential to benefit from psychologist support (perceived by PCP)	CNS drugs; gastro-intestinal, nutritional and skin drugs; all other drugs	Replacement model: psychologists, using behavioural treatment usual care	Mean cost per patient of prescribed drugs	Significantly lower mean per-patient cost of prescribed CNS drugs for intervention group relative to control at 3 months, 6 months and 12 months
Smith et al., 1997	England (Lancashire)	RCT	Patient patient	Mixed hospital; primary care practices PCPs; hospital physicians	66 patients 80% 20%	NS 7-10 days	Hospitalised patients aged 65 and over, discharged from study hospital and deemed likely to experience medication difficulties	All drugs	Patient counselling (pharmacist) + copy of pharmaceutical care plan + access to telephone helpline usual care	Altered medication; compliance; incorrect use	Intervention group scored better than control on all measures, but authors report significant difference only for compliance.

Table A4.3 The effect of financial and practical support on prescribing (UK studies) (continued)

Study	Country (Country)	Design	Randomisation Unit of analysis	Setting Prescribers	N enrolled N at final assessment (%) Loss to follow up	Duration of intervention Follow up	Inclusion criteria	Study drug(s)	Intervention Comparators	Prescription measure(s)	Reported results
Wilkinson et al., 1993	England (London; Cheshire)	RCT	Patient patient	Community; primary care practices PCPs	61 patients 85% 15%	5 x 20 minute sessions 8 weeks	Patients with depressive disorders, prescribed antidepressant medication	CNS medications; dothiepin	Consultant liaison model; practice nurses + dothiepin usual care + dothiepin	Treatment adherence to antidepressant medication; mean dose of dothiepin; adverse events	No statistically significant difference between the study groups in treatment adherence or in mean dose of dothiepin or incidence or severity of adverse events.

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